

## **On the significance of REITs in international portfolios – A Canadian versus U.S. perspective**

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### **ABSTRACT**

Taking the perspectives of Canadian and U.S. investors, this paper applies a multi-level asset allocation strategy for assessing the contribution of real estate investment trust funds [REITs] to international optimal portfolios. Using an ex-post mean-variance analysis, it evaluates the benefits from including REITs in the domestic and international portfolios diversified into established countries, into emerging countries, and into the combination of both established and emerging countries. The results from the within-industry allocation suggest that both Canadian and U.S. investors would benefit from expanding their domestic REITs portfolios into international markets. The outcome of the bi-level allocation indicates that investors of both countries could benefit from including REITs in their international portfolios diversified across industries. In addition, the all-inclusive allocation reveals that Canadian REITs contribute to international efficient portfolios to a greater extent than U.S. REITs from both Canadian and U.S. perspectives. While the bi-level allocation provides a broader opportunity set, the all-inclusive methodology allows for superior risk reduction benefits.

Keywords: portfolio, investments, allocation, strategy, optimization.

## INTRODUCTION

In view of the recent U.S. financial crisis triggered mainly by irresponsible and abusive mortgage lending practices, the securitization of risky mortgage loans, and the subsequent real estate market bubble, investors may think twice before investing in real estate investment trust funds [REITs]. However, the absence of a universally efficient international portfolio suggests potential benefits from international diversification. International REITs could contribute to an international portfolio, but this could depend on perspective of an investor's country. It is also possible that the low correlations among domestic sectoral assets could outweigh the benefits from international diversification. This paper evaluates and compares the benefits from including REITs in an international portfolio from the perspectives of Canadian and U.S. investors.

Evidence provided in the current literature suggests that the benefits from international diversification depend largely on the choice of asset allocation strategies. Using a country allocation, Simons (1999) could not rule out any combination of U.S. stocks, bonds, and cash as being internationally efficient, from a U.S. investor's perspective. Cavaglia, Melas and Tsouderos (2000) on their part found that portfolios that aim to diversify across countries and across industries provide markedly better reward-to-risk ratios than the traditional asset allocation strategies that aim to select country positions. In addition, Baca and Weiss (2000) argued that the industrial factor is becoming increasingly important in explaining the national equity returns of major developed countries. However, Kuo and Satchell (2001) found, in common with Heston and Rouwenhorst (1994), that the country factor dominates the other factors in explaining stock return variations. More recently, Grandmont-Gariboldi (2005) found that the benefits from including emerging markets in an international portfolio depend on the country, on the industry, and on the risk level preference.

Taking the perspectives of Canadian and U.S. investors, this paper applies a multi-level asset allocation strategy for assessing the benefits from including REITs in an international stock portfolio. Using the methodology of Grandmont-Gariboldi (2010), and based on an ex-post mean-variance analysis, this study evaluates the contribution of REITs to the efficient domestic and international portfolios diversified into established countries, into emerging countries, and into the combination of both established and emerging countries.

Assuming that low correlations among financial assets imply good diversification opportunities, the inclusion of REITs in domestic and international portfolios could contribute to a superior performance in a mean-variance framework. Grandmont-Gariboldi (2005) found that the correlations between industries are lower than those among countries; they also display more inter-temporal stability compared to those between countries. Moreover, Goetzmann and al. (2002) argued that investing in international markets expands the opportunity set, but diversification relies increasingly on investment in emerging markets. Indeed, Grandmont-Gariboldi (2005) found significant benefits from including emerging markets in an international portfolio in terms of both risk reduction and return improvement. Expanding the U.S. portfolio into established countries provided only risk reduction benefits, whereas expanding the domestic portfolio into emerging markets resulted in return improvement only. So this paper considers both types of international markets.

With regard to REITs, Eichholdz (1996) concluded that international diversification reduces the risk of a real estate portfolio. Hoelsi and al. (2004) also confirmed that international diversification can improve the performance of a real estate portfolio. Cleary and MacKinnon

(2007) on their part found that income trusts exhibited risk-adjusted performance that far outperformed equities and bonds.

Including REITs in an international portfolio could provide risk-return benefits over the long-term. According to Canada Mortgage and Housing Corporation (2002), one of the most positive aspects of REITs is that, although they have a tendency to perform well in equity market downturns, they also tend to fare well in equity market upturns. Although Canada is an important U.S trading partner, the risk-return stock market behaviors of these two countries tend to display different patterns. For instance, it well known that the Canadian banking system is one of the most stable in the world. More particularly, Canadian banks have been much less exposed to the U.S. mortgage crisis than their U.S. counterparts. In addition, the geography and demographics of Canada make it less likely that Canadian REITs will specialize in a market niche and diversify geographically to the same degree as U.S. REITs have been achieving. Hence, this paper explores the contribution of Canadian versus U.S. REITs to the efficient international portfolios of Canadian and U.S. investors. Current research, practitioners, and investors as well should benefit from the additional insight provided by this study.

## **DATA**

This paper considers monthly sectoral stock data covering the period of January 2000 - March 2009 for the following industries: consumers staple, financials, materials, REITs, and telecommunications. Because of the lack of total return data for many countries, it uses the Standard & Poors' sectoral price indices of eight leading established markets (Canada, France, Germany, Italy, Japan, Switzerland, UK, US), ten emerging markets (Brazil, Chile, China, India, Malaysia, Mexico, Pakistan, Philippines, Thailand, Taiwan), and regional REITS indices. The choice of the industries is in function of their market capitalization in emerging markets and the choice of the emerging countries is in function of data availability and their market capitalization in the selected industries. Exchange rates are from Morningstar data.

## **DESCRIPTIVE STATISTICS**

Consistent with the findings of Grandmont-Gariboldi (2005) and (2010), the correlations between industries are lower (.44) than those among countries (.59) in the case of established markets (see Table 1). They also display more stability over time. In addition, supporting the observations of Solnik (1993), correlation movements seem related to volatility trends. In the case of emerging markets, the sectoral correlations (.53) are higher than the country correlations (.36) and they tend to react more to risk increase than the country correlations do. These findings contrast with those of Grandmont-Gariboldi (2005), but support the view of Kuo and Satchell (2001) and Heston and Rouwenhorst (1994), that the country factor may dominate the other factors in explaining stock return variations in the case of emerging markets. Different countries, industries, and time periods used in previous research could explain the divergent results.

## **METHODOLOGY AND FINDINGS**

This study takes the perspectives of both Canadian and U.S. investors. Because investors from different countries measure returns in function of their home currency, the exchange-rate adjusted returns of the sectoral indices are first computed. The monthly exchange-rate adjusted

return of an investment in the asset of country  $i$  from the perspective of the  $j$ th country is calculated as follows:

$$R_j = (1+R_i) (1+E_{ij}) - 1$$

where  $R_i$  = monthly return in country  $i$ , and  $E_{ij}$  = monthly percentage change in the currency of country  $i$  with respect to the currency of country  $j$

It has often been argued that a diversification strategy is better achieved with an optimization technique. Among others, Kleeberg (1995) provided some evidence in support of this argument. So in a second step, the international portfolios are constructed with the use of an asset allocation optimizer derived from the Markowitz' (1959) mean-variance optimization theory. Based on returns, standard deviations, and pair-wise correlations for all asset classes under consideration, a mean-variance analysis is performed. The general model of constrained (no short selling) profit maximization assumes no taxes, no transaction and information costs. The optimization process results in comparative efficient frontiers, which represent sets of portfolios that offer the highest return for a given level of risk or that present the lowest risk for a given level of return.

Given that the normality of the distributions cannot reasonably be assumed, even when using log-returns, the Graham-Harvey (1994) Measure is used. It is a nonparametric equal-variance method that is designed to compare a portfolio's performance with that of a reference portfolio with the same unconditional variance. To apply that measure, a bi-level asset allocation methodology is developed:

(1) At the first level, within each sector, the efficient frontiers of the international portfolios Ees, Eem, and Eesem are constructed and compared with the domestic portfolio (D). The international portfolios are derived from expanding the domestic (D) stock portfolio, (a) into established stock markets (Ees), (b) into emerging stock markets (Eem), and (c) into the combination of established and emerging stock markets (Eesem). The expanded portfolios Ees, Eem, Eesem are levered up or down in order to set their unconditional volatilities equal to that of the reference portfolio (D). The difference between the return of an expanded portfolio and that of the domestic portfolio provides a measure of abnormal return resulting from the inclusion of foreign securities.

Figures 1 and 2 display the comparative REITs frontiers from the perspectives of a Canadian and a U.S. investor. It can be observed that the international frontiers dominate the domestic portfolios. They also provide a larger opportunity set, thus offering investors a wider range of risk-return preferences. This suggests that both Canadian and U.S. investors would benefit from including international assets in their REIT portfolios. For the sake of brevity, the comparative frontiers of the four other sectors are excluded in this paper. But they present a similar pattern.

The results extend on the previous findings of Eichholdz (1996) and Hoelsi and al. (2004) that international diversification can improve the performance of a real estate portfolio. They also support the conclusion of Goetzmann and al. (2002) that international diversification relies increasingly on the inclusion of emerging markets. As shown in Table 1, the country correlations in the REITs sector are much lower than those in the four other sectors examined. The lowest average country correlation (-.0303) in that sector is found in the case emerging markets.

Tables 2 and 3 show the composition of the equal-standard deviation international portfolios within each industry at the risk level of the domestic asset, from the view of a Canadian and a U.S. investor respectively. From a Canadian investor's perspective, except for the REITs sector, adding emerging markets to a portfolio provides return improvement benefits.

As shown in Table 1, the Canadian market exhibits the lowest sectoral correlations among established and emerging markets, with the exception of Thailand. This can explain the high percentage allocation of Canadian assets in the international efficient portfolios set at the risk level of the domestic assets (please see Table 2). From a U.S. investor's perspective (Table 3), except for the telecommunications sector, Canadian assets also represent a significant portion of the international efficient portfolios. Among all the countries considered in the REITs sector, Canadian REITs present the lowest risk, with a standard deviation of .04, and the U.S. REITs display the highest risk with a standard deviation of .08. In addition to the lower risk posed by Canadian REITs, the low correlation between this asset category and its U.S. counterpart (.19) could explain the significant contribution of Canadian REITs to an international optimal portfolio of a U.S. investor. For the sake of brevity, the detailed sectoral/country descriptive statistics and correlations are not presented here. In summary, the results suggest that Canadian REITs can contribute to an efficient international portfolio for both Canadian and U.S. investors. Incremental returns over the domestic portfolios could be achieved by increasing the risk level along the dominant frontier.

(2) At the second level, within each of the diversification strategies D, Ees, Eem, and Eesem, optimizing on the five sectoral efficient portfolios results in the following set of efficient frontiers:  $D_{C,F,M,R,T}$ ,  $Ees_{C,F,M,R,T}$ ,  $Eem_{C,F,M,R,T}$ , and  $Eesem_{C,F,M,R,T}$ , with  $C, F, M, R, T$  representing respectively each of the five sectors. The incremental returns from expanding the domestic portfolios into international markets are evaluated at the lowest and highest risk levels at which they can be observed. Figures 3 and 4 depict the domestic and international frontiers from a Canadian and a U.S. perspective respectively. As can be observed, the dominant  $Eesem_{C,F,M,R,T}$  frontiers [the ones in red] suggest potential benefits from including established and emerging markets in an international portfolio. In addition, Figures 7, 9, and 11 show that REITs represent more than fifty percent of the extended portfolios into established markets (Ees) and into both established and emerging markets (Eesem), from a Canadian perspective. Based on these observations, a Canadian efficient investor should consider including REITs in an international portfolio. Furthermore, based on Figures 8 and 10, U.S. investors could also benefit from including REITs in their portfolios.

Finally, based on an all-inclusive sectoral allocation across countries, the following efficient frontiers are constructed:  $D_{AI}$ ,  $Ees_{AI}$ ,  $Eem_{AI}$ , and  $Eesem_{AI}$ . For instance, optimizing on all the Canadian and emerging-market sectoral indices results in the  $Eem_{AI}$  frontier. Then, possible return improvement and risk reduction from international diversification are evaluated. The dominant frontiers, shown in Figures 5 and 6, suggest that both Canadian and U.S. investors would benefit from including established and emerging markets in their portfolios. However, compared to the bi-level allocation, the all-inclusive methodology allows for superior risk reduction benefits; therefore it would be appropriate for risk-averse investors. The dominant Eesem frontiers in the bi-level allocation [Figures 3 and 4] provide a broader opportunity set for investors willing to assume higher risks.

As it appears in Figures 12 and 13, Canadian REITs constitute a more important part of the lower-risk efficient portfolios compared to U.S. REITs. At least in the period covered in this paper, Canadian financial institutions did not engage in risky real estate positions to the same extent as their U.S. counterparts. However, as observed in Figures 14 and 15, the weight of Canadian REITs in the higher-risk portfolios is also higher than their U.S. counterparts. As it appears in Table 1, the country correlations in the REITs sector are the lowest (0.1778) among all the industries examined. As the pair-wise correlations among assets are more important than the

standard deviations of individual assets for the purpose of computing the risk of a portfolio, the low country correlations in the REITs sector could explain the diversification benefits provided by the inclusion of Canadian REITs even in the higher-risk portfolios.

Also of interest for Canadian investors is that the industry correlations in the Canadian market are much lower compared to those of the other eleven countries observed, with very few exceptions. These observations support the view that Canadian investors should not be labeled as home-biased if they chose to allocate a substantial portion of domestic assets in their international portfolios. The home bias phenomenon refers to allocating a larger proportion of domestic assets in an international portfolio than the Markowitz theory would suggest.

In the overall, based on the all-inclusive allocation, Canadian REITs contribute to international efficient portfolios to a greater extent than U.S. REITs from both Canadian and U.S. perspectives. The results show that Canadian REITs prevail over all the national assets of that category, indicating that they play a significant role in maximizing the risk-return benefits of international portfolios for both Canadian and U.S. investors.

In addition, the findings in this paper suggest that using only one diversification strategy may not be the appropriate way to construct a well diversified portfolio. The different asset allocation methodologies discussed here provide distinctive opportunities depending on risk-return preferences and on the countries' perspectives. Looking at what happened in the past through different lenses may be helpful. However, careful thought should be given to the limitations of this type of analysis. First, optimization techniques present an estimation risk. By construct, they tend to overweigh assets with high returns, low risk, and low correlations. Therefore, they do not provide precise information. Also, it is possible to find statistically equivalent portfolios situated on different frontiers. Whenever possible, parametric tests are preferable for evaluating the practical implications of the findings. Moreover, it is important to avoid the trap of data mining, that is making investment decisions based solely on past performance. Also, the model used in this paper ignores transaction and information costs, and it assumes no taxes. The higher costs of investing in emerging markets could outweigh the benefits from including at least some of them in an international portfolio. International taxation issues also need to be considered in making investment decisions. In addition, using a different period, different industries and countries in this type of analysis may result in divergent conclusions. In fact Grandmont-Gariboldi (2005) found statistically significant gains from diversifying by industry across countries. Future research and investors as well would benefit from further insight. For instance, incorporating investment costs and fiscal planning in investment strategies could enhance the practical applications of the methodologies. The inclusion of other asset classes like government bonds and corporate bonds could also expand the efficient opportunity sets. Finally, it would be interesting to observe the results from the perspective of investors from other countries.

## **CONCLUSION**

Taking the perspectives of Canadian and U.S. investors, this paper applies a bi-level asset allocation strategy and an all-inclusive optimization technique for assessing and comparing the benefits from including REITs in an international stock portfolio diversified into established and emerging markets. At the first level, the results from the within-industry allocation suggest that, unlike their U.S. counterparts, Canadian REITs can contribute significantly to the efficient international portfolios for both Canadian and U.S. investors. At the second level, the outcome of

the between-industry allocation indicates that REITs contribute to the efficient international portfolios for both Canadian and U.S. investors. Finally, based on the all-inclusive sectoral allocation across countries, Canadian REITs contribute to the international efficient portfolios to a greater extent than U.S. REITs, from both Canadian and U.S. perspectives. The all-inclusive strategy allows for superior risk reduction benefits compared to the bi-level allocation; hence it would be appropriate for risk-averse investors. Alternatively, the bi-level allocation provides a broader opportunity set for investors willing to assume higher risks. The different asset allocation methodologies discussed here provide distinctive opportunities depending on risk-return preferences and on the countries' perspectives.

The results from the diversification strategies support the findings of Eichholdz (1996) that international diversification reduces the risk of a real estate portfolio. They also expand on the argument of Hoelsi and al. (2004) that international diversification can improve the performance of a real estate portfolio. Adding to previous research, the results in this paper suggest that the benefits from including REITs in an international portfolio depend on the country, the industries included in the portfolio, on the investor's country's perspective, on the risk-return preferences, and on the asset allocation strategies. Current research, practitioners, and investors could benefit from further insight from taking the perspective of investors from other countries.

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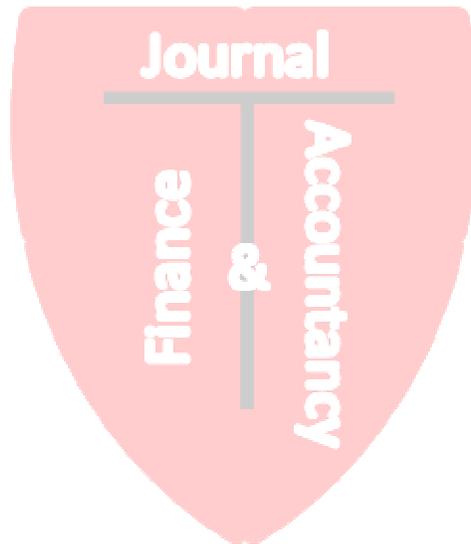


Table 1

### Comparative Average Country and Industry Correlations and Descriptive Statistics

CORRELATIONS	Between Countries			Between Industries			
	ES*	EM*	ES & EM	ES	EM		
CONSUMER	0.6068	0.5995	0.5602	CANADA	0.27446	CHINA	0.3348
FINANCIALS	0.6245	0.2498	0.3718	FRANCE	0.40918	BRAZIL	0.4574
MATERIALS	0.7828	0.5350	0.6106	GERMANY	0.52137	THAILAND	0.2039
REITS	0.3582	-0.0303	0.1778	JAPAN	0.34513	CHILE	0.8413
TELECOMMUNICATIONS	0.5798	0.4264	0.3785	SWITZ.	0.41885	INDIA	0.7902
				UK	0.76201		
				USA	0.34353		
<b>Average</b>							
Feb. 2000-May 2009	0.5904	0.3561	0.4198		0.4392		0.5255
Feb. 2000-Aug 2004	0.4353	0.2388	0.2159		0.2586		0.3774
Sept. 2004-May 2009	0.5504	0.2775	0.3535		0.2658		0.4534
Increase %	26%	16%	64%		3%		20%
<b>DESCRIPTIVE STATISTICS</b>							
	<u>Mean</u>	<u>SD</u>			<u>Mean</u>	<u>SD</u>	
<b>Established Markets</b>				<b>Emerging Markets</b>			
Feb. 2000-May 2009	-0.0049	0.0890		Feb. 2000-May 2009	0.0037	0.1178	
Feb. 2000-Aug 2004	-0.0007	0.0621		Feb. 2000-Aug 2004	0.0098	0.0899	
Sept. 2004-May 2009	0.0105	0.0655		Sept. 2004-May 2009	0.0082	0.0925	
Increase %		5%		Increase %		3%	

\*ES = Established Markets EM = Emerging Markets

Table 2

### Composition of the Equal-Standard Deviation Portfolios in the Within-Industry Allocation – from a Canadian Perspective

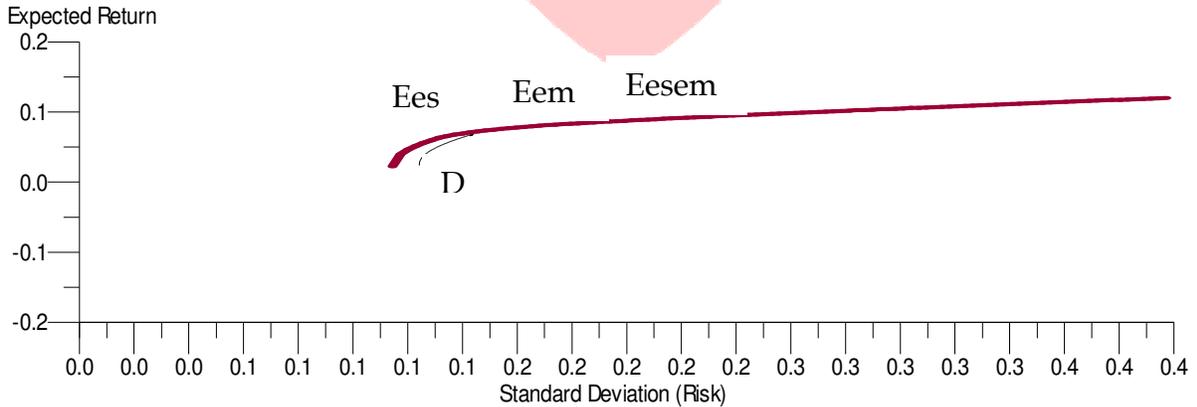
	CONSUMER				FINANCIALS				MATERIALS				REITS				TELECOMMUNICATIONS			
	Eesem	Eem	Ees	D	Eesem	Eem	Ees	D	Eesem	Eem	Ees	D	Eesem	Eem	Ees	D	Eesem	Eem	Ees	D
CANADA	61.26	76.28	87.40	100.00	54.76	53.05	89.05	100.00	29.10	29.33	100.00	100.00	83.75	84.58	93.67	100.00	17.21	21.30	100.00	100.00
FRANCE																				
GERMANY																				
JAPAN							1.63							6.34						
SWITZ.	15.62		6.89						2.21										8.07	
UK			5.72				9.32													
USA																				
CHINA	8.15	8.95			27.08	28.89			12.82	13.17							50.42	51.55		
BRAZIL	14.97	3.10			15.34	16.62			15.51	16.54										
CHILE		0.00							40.37	40.96							8.02	9.50		
INDIA																	14.14	14.16		
MALAYSIA													6.36	4.23						
MEXICO		11.67																		
PHILIPPINES																				
S.KOREA																				
TAIWAN					2.82	1.44														
THAILAND													9.89	11.20			2.14	3.50		
Totals	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Return	0.10	0.08	0.08	0.08	0.14	0.15	0.07	0.08	0.17	0.17	0.12	0.12	0.07	0.07	0.06	0.07	0.09	0.10	0.00	0.00
S.D.	0.12	0.12	0.12	0.12	0.18	0.18	0.18	0.18	0.21	0.21	0.21	0.21	0.14	0.14	0.14	0.14	0.20	0.20	0.20	0.20

**Table 3**  
**Composition of the Equal-Standard Deviation Portfolios**  
**in the Within-Industry Allocation – from a U.S. Perspective**

	CONSUMER				FINANCIALS				MATERIALS				REITS				TELECOMMUNICATIONS			
	Eesem	Eem	Ees	D	Eesem	Eem	Ees	D	Eesem	Eem	Ees	D	Eesem	Eem	Ees	D	Eesem	Eem	Ees	D
	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
CANADA	19.58		29.4		21.76				21.05				45.26		15.5					
FRANCE																				
GERMANY																				
JAPAN																				
SWITZ.	28.85																			
UK		6.37																		
USA	28.14	56.7	36.5	100		15.17		100				100								100
CHINA	12.18	9.87			48.62	50.16			10.6	15.4							56.39	56.6		
BRAZIL	6.35	15.3			29.62	28.86			24.18	33.6										
CHILE	4.9	12.5							44.18	51										
INDIA																				
MALAYSIA														43.2						
MEXICO		5.59																		
PHILIPPINES																				
SWITZ.			27.8										6.50		84.5					
S.KOREA																				
TAIWAN						5.81							48.23		56.8					
THAILAND																				
<b>Total</b>	100	100	100	100	100	100	0	100	100	100	0	100	100	100	100	100	100	100	0	100
<b>Return</b>	0.11	0.08	0.09	0.03	0.22	0.19	N/A	-0.03	0.22	0.22	N/A	0.04	0.13	0.10	0.11	-0.08	0.16	0.16	N/A	0.09
<b>s.d.</b>	0.13	0.13	0.13	0.13	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.27	0.27	0.27	0.27	0.26	0.26	0.26	0.26

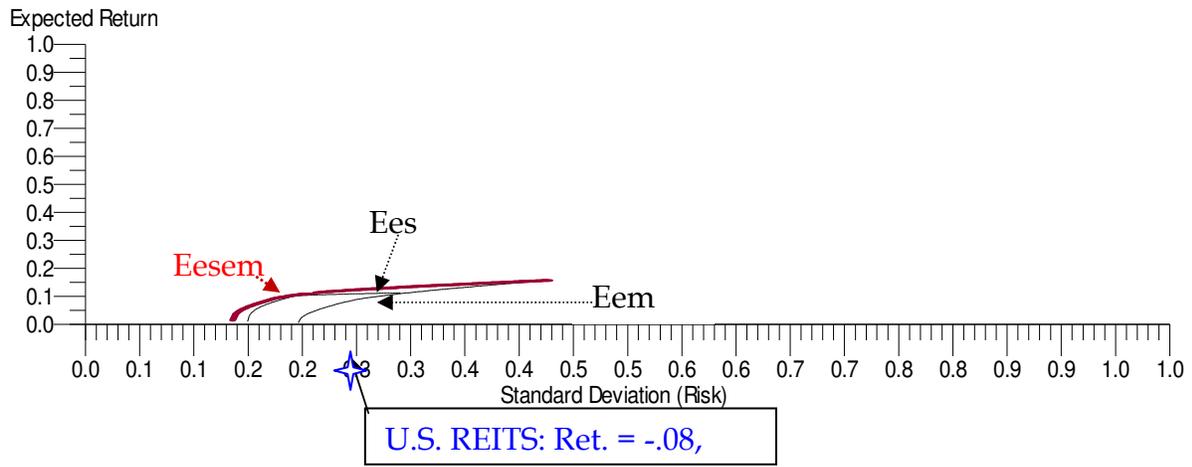


**COMPARATIVE FRONTIERS - REITS**

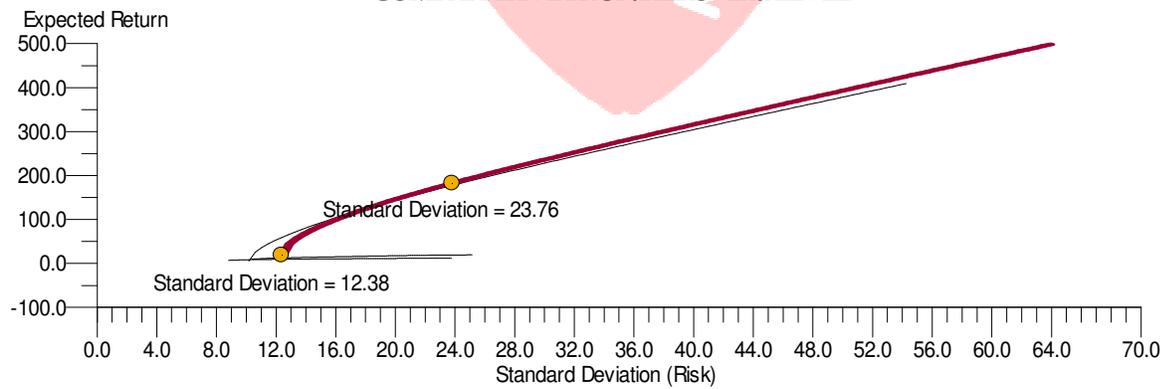


**FIGURE 2**  
**U.S. Perspective**

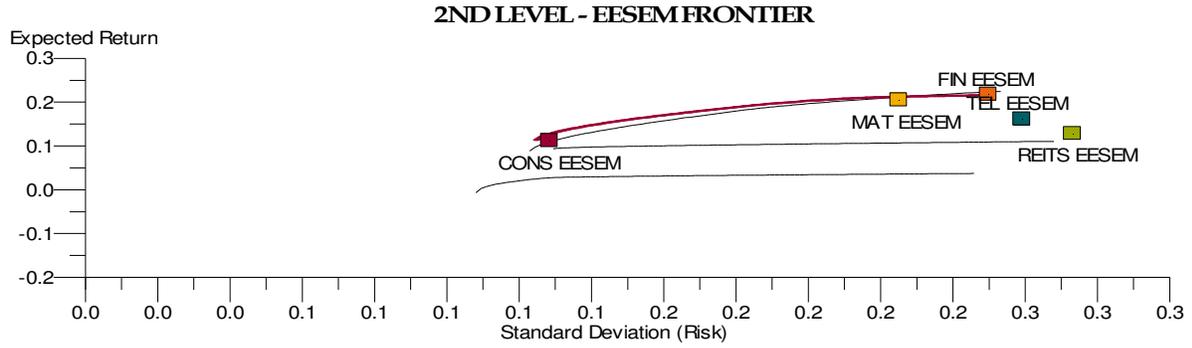
**COMPARATIVE FRONTIERS REITS - EESEM**



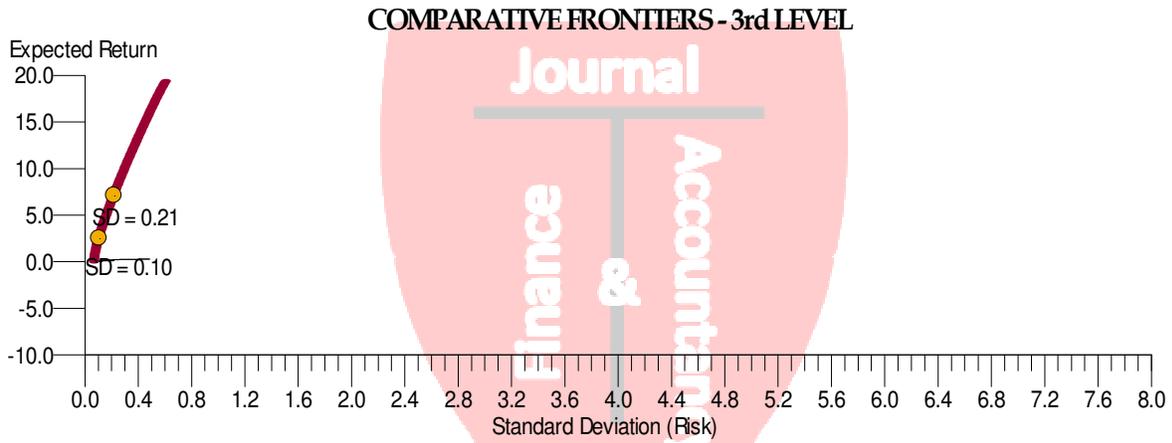
**COMPARATIVE FRONTIERS - 2nd LEVEL**



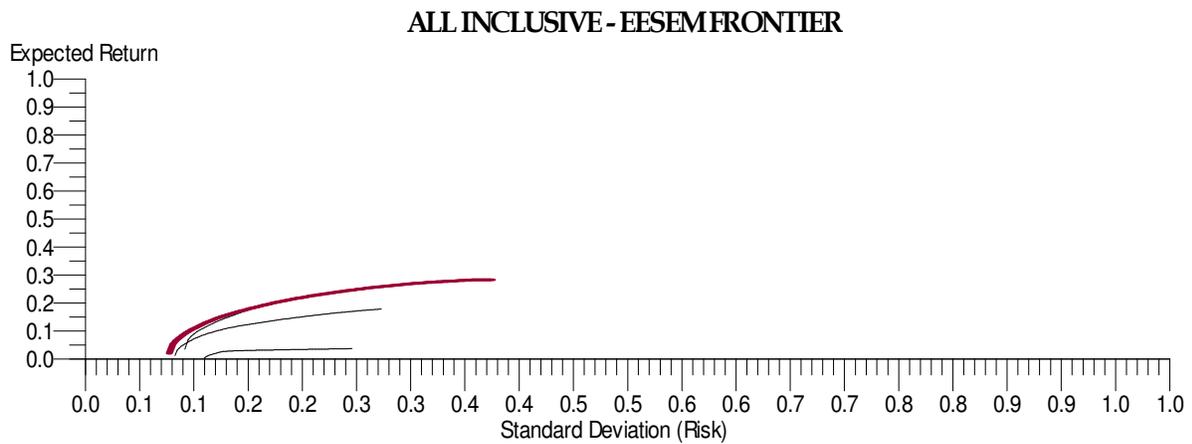
**FIGURE 4**  
**U.S. Perspective**



**FIGURE 5**  
**Canadian Perspective**

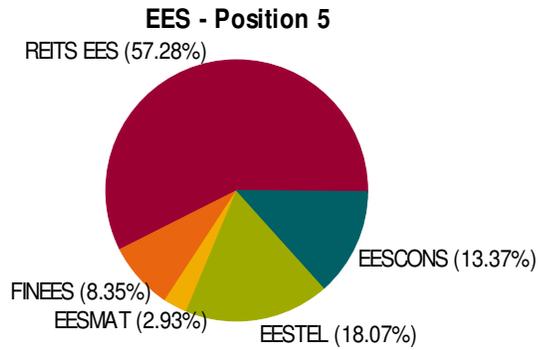


**FIGURE 6**  
**U.S. Perspective**

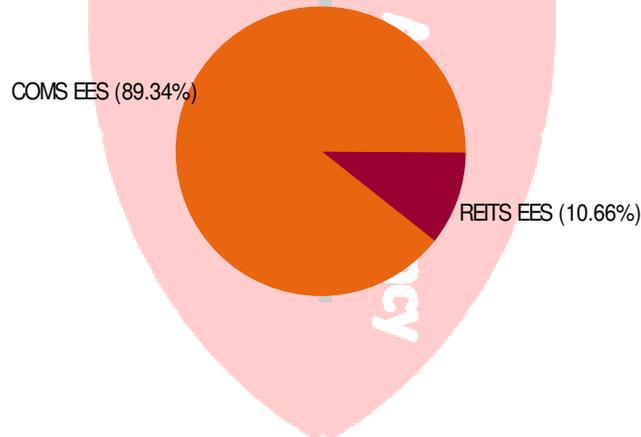


**SECOND- LEVEL PORTFOLIOS**

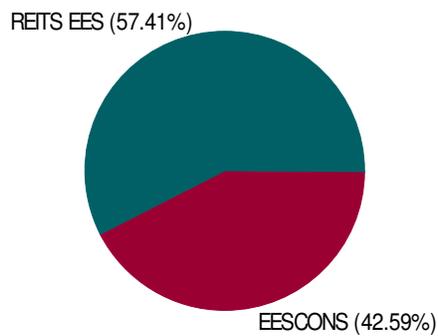
**FIGURE 7**  
**Canadian Perspective**  
**EES LOW SD PORTF**



**FIGURE 8**  
**U.S. Perspective**  
**EES - LOWER RISK PORTFOLIO**



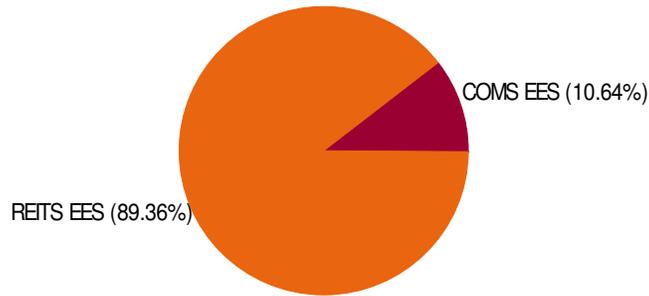
**FIGURE 9**  
**Canadian Perspective**  
**EES HI SD PORTF**



**FIGURE 10**

**U.S. Perspective**

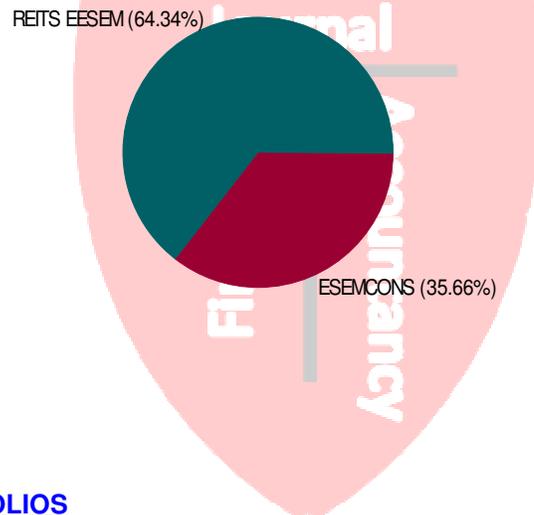
**EES- HIGHER RISK PORTFOLIO**



**FIGURE 11**

**Canadian Perspective**

**EESEM HIGH SD PORTFOLIO**

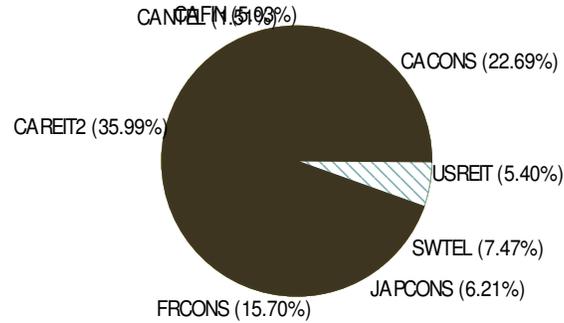


**ALL-INCLUSIVE PORTFOLIOS**

**FIGURE 12**

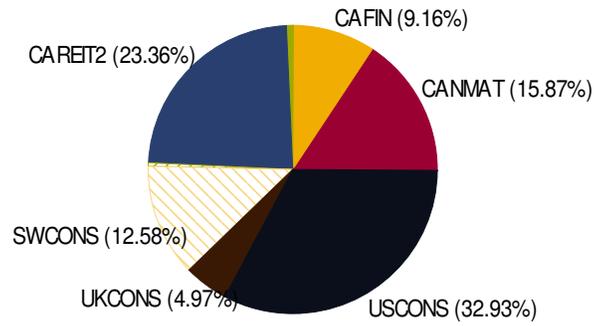
**Canadian Perspective**

**EES ALL-INCLUSIVE LOW SD PORTFOLIO**



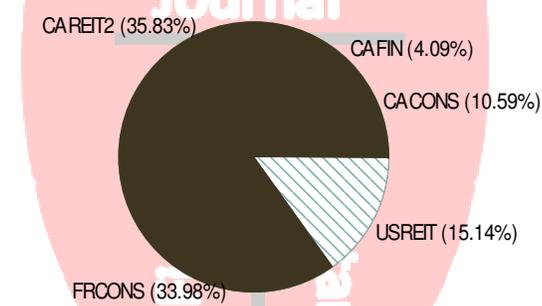
**FIGURE 13**  
**U.S. Perspective**

**EES LOWER RISK ALL-INCLUSIVE PORTFOLIO**



**FIGURE 14**  
**Canadian Perspective**

**EES ALL-INCLUSIVE HIGH SD PORTFOLIO**



**FIGURE 15**  
**Canadian Perspective**

**EESEM ALL-INCLUSIVE HIGH SD PORTFOLIO**

