On the significance of REITs in international portfolios – A U.S. perspective

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ABSTRACT

Taking a U.S. investor's perspective, this paper applies a bi-level asset allocation strategy and an all-inclusive optimization technique for assessing the benefits from including real estate investment trust funds (REITs) in international 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. Based on the outcome of the bi-level allocation, international REITs represent an important part of the efficient international portfolios. The results from all-inclusive allocation show that Canadian REITs prevail over all the national assets of that category in the lower-risk portfolios diversified into established markets and into the combination of established and emerging markets, indicating that they can play a significant role in reducing the risk of an international portfolio. Overall, the findings suggest that U.S. investors would benefit from including REITs in their international portfolios for the purpose of risk reduction and/or return improvement. The complementary diversification methodologies used in this paper could be helpful in developing an international diversification strategy.

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

INTRODUCTION

Evidence provided in the current literature suggests that the potential 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.

Based on monthly sectoral stock data for the period of January 2000 - March 2009 and taking a U.S. investor's perspective, this paper applies a bi-level asset allocation strategy and an all-inclusive optimization technique for assessing the benefits from including real estate income trust funds (REITs) in an international stock portfolio. Using an ex-post mean-variance analysis, it 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. Based on a within-industry allocation, 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. Furthermore, 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, in this paper, the diversification strategy is based on both types of international markets.

However, given the current global financial crisis triggered mainly by irresponsible and abusive mortgage lending practices, the securitization of risky mortgage loans, speculative real estate investment behavior and the subsequent real estate market bubble, investors may think twice before investing in real estate financial devices. Nonetheless, including REITs in an international portfolio could provide risk-return benefits over the long-term. Current research, practitioners, and investors as well should benefit from further insight.

DATA

This paper considers the following sectors: 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), the correlations between industries are lower (.44) than those among countries (.59) in the case of established markets. (Please see Table 1). They also display more stability over time.

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. This contrasts with the results of Grandmont-Gariboldi (2005), but supports 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

Because investors from different countries measure returns in function of their home currency, the exchange-rate adjusted returns are calculated based on a U.S. investor's perspective. The monthly exchange-rate adjusted return of an investment in the asset of country i from the perspective of the jth 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, international portfolios are constructed with the Morningstar's Encorr 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.

To assess the potential benefits from diversifying by sector across countries, the normality of distribution of the efficient portfolios is tested. The results show that normality cannot reasonably be assumed even when using log-returns. Hence the Graham-Harvey (1994) Measure is applied. It is a nonparametric equal-variance method designed to compare a portfolio's performance with a reference portfolio with the same unconditional variance.

The methodology used in this paper is based on a bi-level asset allocation:

(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. In the same manner, the returns of the expanded portfolios Ees, Eem, Eesem are set to equal that of the portfolio (D) to observe potential risk reduction. Figure 1 displays an example of the comparative frontiers. As would be expected, in the case of REITs, the international frontiers dominate the domestic portfolio. They also provide a larger opportunity set, thus offering investors a wider range of risk-return preferences. This suggests that U.S. investors would benefit from including international assets in their REIT portfolios. For the sake of brevity, in this paper the comparative frontiers of the four other sectors are excluded. 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.

Table 2 shows the composition of the equal-standard deviation international portfolios within each industry at the risk level of the domestic asset. As it can be observed, the combination of established and emerging markets results in superior return improvement compared to the other diversification strategies. Incremental returns over the domestic portfolios could be achieved by increasing the risk level along the dominant frontier (Please see Figure 1). In addition, as shown in Figure 4, the risk of a REITs international portfolio can be reduced by the inclusion of Canadian REITs. The Ees portfolio that is set at the risk level of .15 consists of more than 50% of Canadian REITs. As shown in Table 2, the U.S. REITs portfolio presents a risk of .27. Also, Figure 5 illustrates that 84% of the Eesem portfolio set at the risk level of .20 consists of Canadian REITs. The results suggest that U.S. investors should include Canadian REITs in their portfolio for the purpose of risk reduction.

(2) At the second level, within each of the diversification strategies D, Ees, Eem, and Eesem, an optimization on the five sectoral efficient portfolios is performed to obtain the following set of efficient frontiers: $D_{C, F, M, R, T}$, Ees $_{C, F, M, R, T}$, Eem $D_{C, F, M, R, T}$, and Eesem $D_{C, F, M, R, T}$, with $_{C, F, M, R, T}$ representing respectively each of the five sectors. The optimizer outputs are used to evaluate the incremental returns from expanding the domestic portfolios into international markets at the lowest and highest risk levels at which these portfolios can be compared for both

sets of domestic and international frontiers. Figure 2 depicts the domestic and international frontiers. The dominant frontier $Eesem_{C, F, M, R, T}$ suggests potential benefits from the combination established and emerging markets in an international portfolio diversified across industries and across countries. Table 3 shows the composition of the domestic and international portfolios, which are set at the lowest and highest risk level at which they can be compared. Notwithstanding the massive U.S. financial institutions' foreclosure proceedings starting in 2007, the burst of the housing bubble covering the period 1997-2006, and the subsequent financial crisis resulting from sub-prime mortgage practices, financial institutions' mortgage-back securities exposure and high financial leverage, the percentage allocation of REITs in the lower-risk optimal portfolios suggests potential benefits from including this asset class in an international portfolio.

(3) Finally, the efficient frontiers D_{AI}, Ees_{AI}, Eem_{AI}, and $Eesem_{AI}$ are constructed based on an all-inclusive sectoral allocation across countries. For instance, the Eem_{AI} frontier represents the outcome from optimizing on all the U.S and emerging-market sectoral indices. These frontiers serve as the basis for evaluating the return improvement and risk reduction from international diversification. As shown in Figure 3, adding emerging markets to an international portfolio provides incremental risk-return benefits.

Compared to the bi-level allocation, the dominant $Eesem_{AI}$ frontier in the all-inclusive methodology displays a larger opportunity set and allows higher risk taking for risk-tolerant investors. In addition, the composition of the domestic efficient portfolio, as shown in Table 3 and Figure 6, suggests that even U.S. REITs can contribute to reduce the risk of a U.S. portfolio. Also, as depicted in Figures 7, 8, and 9, REITs constitute at least 20% of the lower-risk international portfolios, but only 7% and 8% of the higher-risk Eem_{AI}, and $Eesem_{AI}$ portfolios respectively. It can be worth mentioning that Canadian REITs represent 23% and 15% of the Ees_{AI}, and $Eesem_{AI}$ lower-risk portfolios respectively while U.S. REITs do not appear in any of all the international diversification strategies. This does not come as a surprise since the Canadian real estate market posed a lower risk compared to its U.S. counterpart. In fact, Canadian REITs do not appear in the higher-risk portfolios. (Please see Figures 10 & 11).

The outcome of the all-inclusive allocation can also be explained by the low country correlations in the REITs industry. Among the five sectors examined, REITs display the lowest average country correlation. This suggests that they can play a significant role in providing diversification opportunities.

In the overall, the analysis suggests that U.S. investors would benefit from including REITs in their international portfolios. The results in this paper also indicate 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. 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. In addition, the model used in this paper ignores transaction and information costs, and it assumes no taxes. The higher costs of

investing in assets of 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 different conclusions. In fact Grandmont-Gariboldi [2005] found statistically significant gains from diversifying by industry across countries. Contrasting with the observations in this paper, the data distribution in that research met the assumptions underlying the statistical parametric tests that were performed. In this paper a nonparametric methodology is used for the ex-post analysis. Future research and investors would benefit from further insight. For instance, incorporating investment costs and fiscal planning in investment strategies could enhance the practical applications of the methodologies. Also, more realistic results could be achieved by using other factors in market segmentation, such as growth and value stocks, small, medium, and large capitalization stocks. 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 see if taking the perspective of investors from other countries could lead to different results.

CONCLUSION

Based on monthly sectoral stock data for the period of January 2000 - March 2009 and taking a U.S. investor's perspective, this paper applies a bi-level asset allocation strategy and an all-inclusive optimization technique for assessing the benefits from including real estate income trust funds (REITs) in an international stock portfolio. Using an ex-post mean-variance analysis, this research 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 within-industry allocation results in potential benefits from expanding the domestic REITs portfolio into international markets. Based on the bi-level allocation, international REITs represent an important part of the efficient international portfolios. They also contribute to portfolio risk reduction. In the all-inclusive allocation, Canadian REITs prevail over all the national assets of that category in the lower-risk portfolios only, suggesting that they play a significant role in reducing the risk of international portfolios. The results suggest that, notwithstanding the real estate crisis that occurred during the period covered in this paper, on the long run efficient U.S. investors should include REITs in their domestic and international portfolios. Current research, practitioners, and investors could benefit from further investigation taking the perspective of investors from other countries.

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Table 1

Comparative Average Country and Industry Correlations and Descriptive Statistics

	Between Countries			Between Industries			
	ES*	EM*	ES & EM	ES		EM	
CORRELATIONS							
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		
Average							
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%
DESCRIPTIVE STATISTICS	**Mean**	**SD**			**Mean**	**SD**	
Established Markets				Emerging Markets			
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

Within-Industry Allocation

	CONSUMER				FINANCIALS				MATERIALS				REITS				TELECOMMUNICATIONS			
	Easem	Eam	Eas	D	Easem	Eam	Eas	D	Easem	Eam	Eas	D	Easem	Eam	Eas	D	Easem	Eam	Eas	D
	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
CANADA	20		29		22				21				45		15					
FRANCE																				
GERMANY																				
JAPAN																				
SWTZ.	29																			
UK			6																	
USA	28	57	36	100		15		100				100				100				100
CHINA	12	10			49	50			11	15							56	57		
BRAZIL	6	15			30	29			24	34										
CHILE	5	13							44	51										
INDIA																	44	43		
MALAYSIA														43						
MEXICO		6																		
PHILIPPINS																				
SWTZ.			28										7		85					
S.KOREA																				
TAIWAN																				
THAILAND						5.81							48.23	56.8						
Total	*100*	*100*	*100*	*100*	*100*	*100*	*0*	*100*	*100*	*100*	*0*	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*0*	*100*
Return	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
S.D.	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

Table 3

Composition of the Equal-Standard Deviation Portfolios

Within- and Between-Industry Allocation and All-inclusive Allocation

ALLOCATION	LOWER-RISK PORTFOLIOS								HIGHER-RISK PORTFOLIOS							
2nd Level	CONS	FIN.	MAT.	REITS	TEL.	Tot.	RET.	SD	CONS	FIN	MAT.	REITS	TEL.	Tot.	RET.	SD
$D_{C,F,M,R,T}$	0.97		0.03			1.00	0.03	0.13			1.00			1.00	0.04	0.25
$Ees_{C,F,M,R,T}$	0.89			0.11		1.00	0.09	0.13	0.11		0.00	0.89		1.00	0.11	0.25
$Eem_{C,F,M,R,T}$	0.66		0.07	0.18	0.09	1.00	0.10	0.13		0.07	0.93			1.00	0.22	0.25
$Eesem_{C,F,M,R,T}$	0.73	0.04	0.05	0.10	0.08	1.00	0.12	0.13		0.97	0.03			1.00	0.22	0.25
All-Inclusive																
D_{AI}	0.85	0.04		0.11		1.00	0.01	0.11			1.00			1.00	0.04	0.25
Ees_{AI}	0.51	0.09	0.16	0.23	0.01	1.00	0.08	0.11	1.00					1.00	0.17	0.25
Eem_{AI}	0.29	0.12	0.18	0.22	0.20	1.00	0.12	0.11	0.16	0.32	0.45	0.07		1.00	0.25	0.25
$Eesem_{AI}$	0.33	0.11	0.18	0.27	0.11	1.00	0.13	0.11	0.16	0.31	0.43	0.08	0.01	1.00	0.25	0.25

FIGURE 1

WITHIN-INDUSTRY ALLOCATION

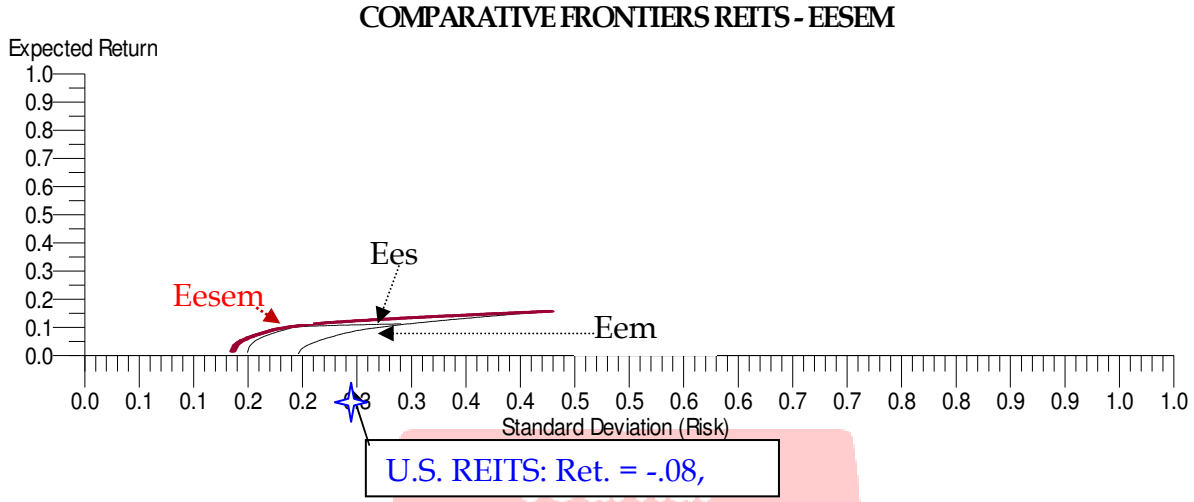
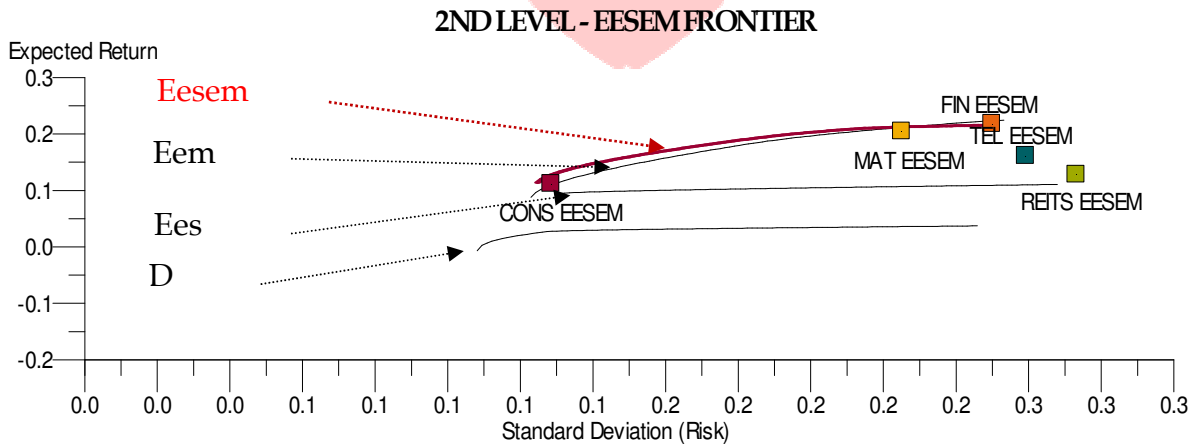


FIGURE 2

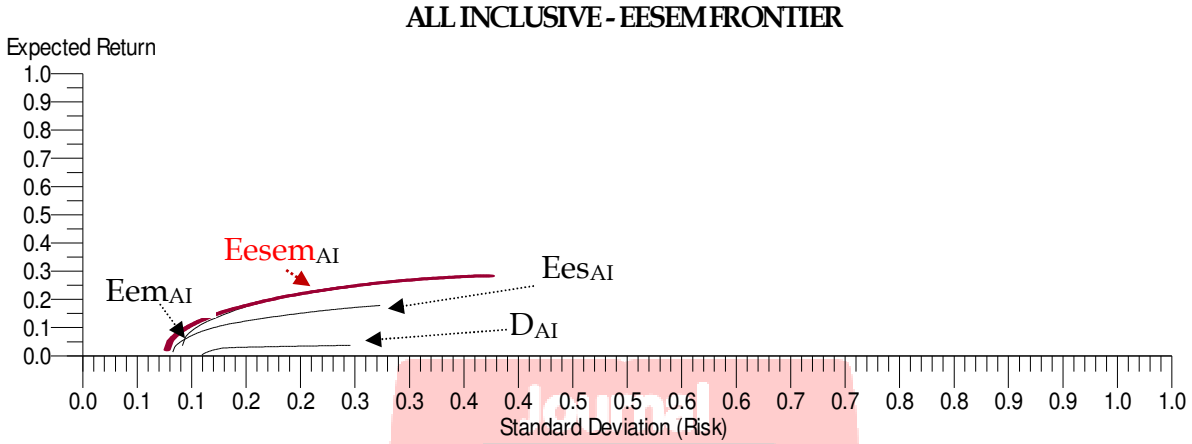
BI- LEVEL ALLOCATION



On the significance

FIGURE 3

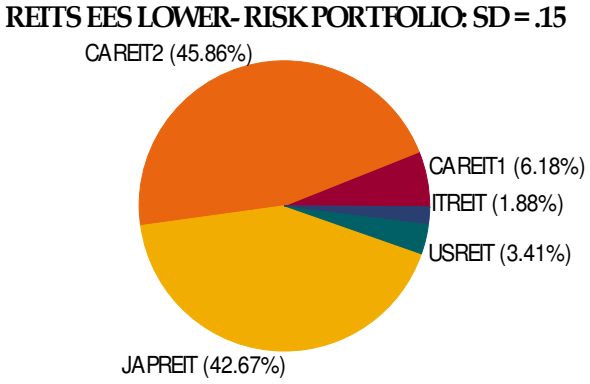
ALL-INCLUSIVE ALLOCATION



COMPOSITION OF THE EFFICIENT PORTFOLIOS

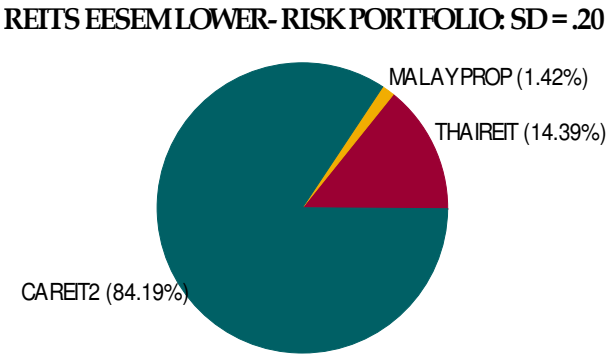
WITHIN-INDUSTRY ALLOCATION

FIGURE 4



On the significance

FIGURE 5



ALL-INCLUSIVE ALLOCATION

FIGURE 6

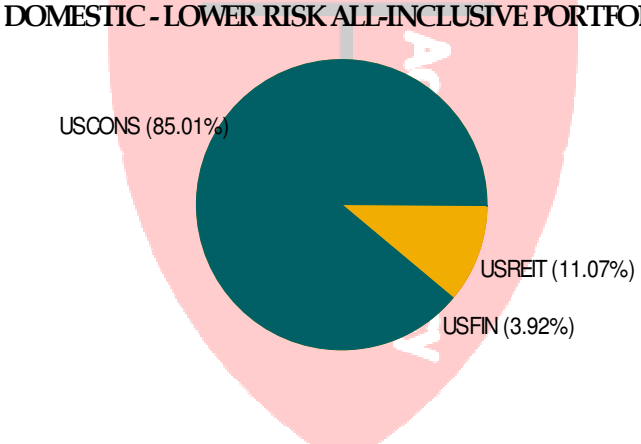
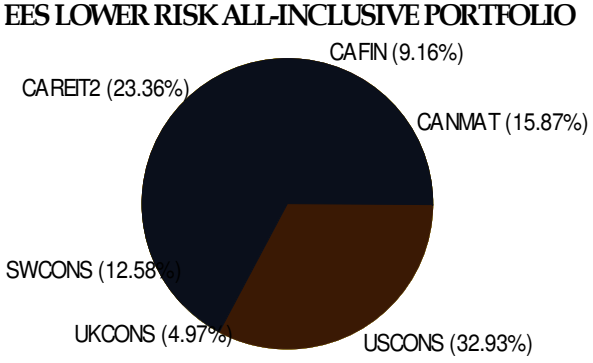


FIGURE 7



On the significance

FIGURE 8

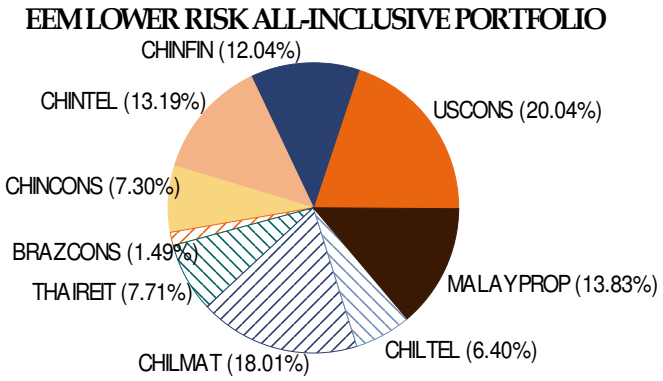


FIGURE 9

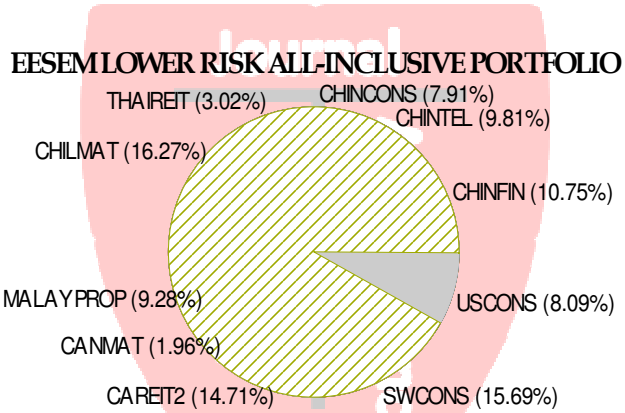
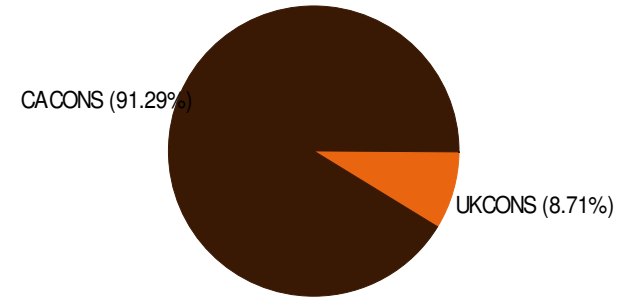


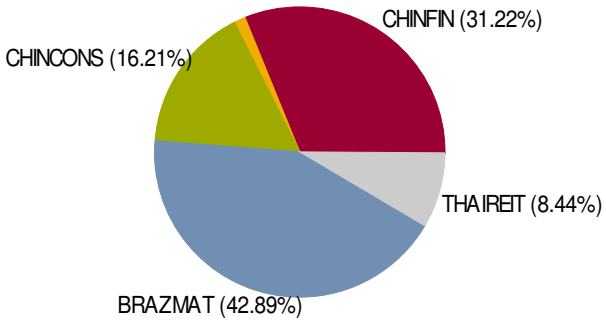
FIGURE 10



On the significance

FIGURE 11

EESEM HIGHER- RISK ALL-INCLUSIVE PORTFOLIO



On the significance