THE SIGNIFICANCE AND PERFORMANCE OF LISTED PROPERTY COMPANIES IN DEVELOPED AND EMERGING MARKETS IN ASIA

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ABSTRACT

Together with shares and bonds, property and property securities have become major global investment classes. Compared with other continental markets, listed property companies take a higher percentage in the Asian stock markets, reflecting a more significant potential role in investment activities. There are a number of studies assessing property investment in Asia with regard to individual countries for both developed and emerging markets. This paper presents a profile and performance analysis of the listed property companies in Asia in terms of their market maturity (developed, emerging and lesser emerging sectors) from the perspective of US investors in 13 countries in Asia over Jan. 1999 – Dec. 2009. This includes the developed markets (Japan, Hong Kong, Singapore), emerging markets (Malaysia, Korea, Taiwan, Thailand) and the lesser emerging markets (China, India, Indonesia, Philippines, Sri Lanka, Vietnam) with the sub-sector of the less emerging markets in Asia potentially providing enhanced property investment opportunities.

Keywords: listed property companies, Asia, developed markets, emerging markets, lesser emerging markets, sector index, performance analysis.

INTRODUCTION

With the increasing significance of property securities exposure in financial investment, Asian property markets have been brought onto the radar of regional and international investors recently. These markets are always at the highest percentage in security market, compared with other continental markets. The significance of Asian property in global context is clearly evident with its market value in excess of 48% global market (Macquarie, 2010) and property securities account for in excess of 11% of stock markets compared to average world of in excess of 5% (EPRA, 2010).

This continent sees its countries at various levels of maturity in terms of complexity, size, transparency as well as market growth stage. Experienced through financial turbulence, investors may become conservative to have investment exposure to less emerging markets with more volatility and uncertainty.

Previous studies of real estate investment in mixed asset portfolio context on intercontinental basis with various related components have proved the benefits of including international property in mixed-asset portfolio (eg: Bardham et al, 2008; Bond et al, 2003; Conover et al, 2002; Eichholtz et al, 1998; Hoesli et al, 2004; Ling and Naranjo, 2002; Wilson and Zurbruegg, 2003; Worzala and Sirmans, 2003) and an internationally diversified property portfolio outperforms an international stock and bond portfolio (Eichholtz, 1996).

Further studies on particular Asian property markets also found diversification benefit of adding Asian property securities in diversified portfolios from regional and global context (eg: Addae-Dapaah and Loh, 2005; Bond et at, 2003; Gerlach et al, 2006; Jin et al, 2007; Liow, 2007, 2008; Liow and Adair, 2009; Liow and Sim, 2006; Mei and Hu, 2000, Ooi and Liow, 2004; Wilson et al, 2007; Wilson and Zurbruegg, 2004). Some studies found greater benefits with Asian property than with more traditional property markets (Bond et al, 2003), as well as diversification benefits from investing in property securities in several Asian countries (eg: Garvey et al, 2001; Liow and Adair, 2009). They found more weight of property securities in efficient international portfolios (Conover et al, 2002). The researchers also found higher growth potential from investment perspective in emerging markets however these benefits fade off in the long-term (Conner et al, 1999).

Given a high interest in Asian property market, studies of Asian country markets assessing performance in property investment could be named such as Singapore (eg: Liow, 2000, 2001a, 2001b; Ong, 1994, 1995; Sing and Low, 2000), Hong Kong (eg: Chau et al, 2001, 2003; Newell and Chau, 1996; Newell et al, 2004, 2007; Schwann and Chau, 2005), China (eg: Newell et at, 2004, 2005, 2007, 2009), India (eg: Newell and Kamineni, 2007), Vietnam (eg: Nguyen, 2010).

Major factors contributing to this increased international property exposure have included the need for diversified portfolios, potential for higher returns, lower cost of capital and favourable exchange rates (Worzala and Newell, 1997). On the other hand, researchers

found the instable (Addae-Dapaah and Kion, 1996) or decreasing (eg: Eichholtz, 1996) diversification benefits in diversifying investment portfolios due to the dynamics of the economy or the integration among markets over time.

While there are quite a number of studies on either individual or several country market, there is no study assess investment performance of those in the context of an extended market with similar characteristics. To get a deeper and systematic vision into these dynamic Asian property markets with regards to emerging markets versus developed markets, this paper presents sector profiles where country markets with similar characteristics are grouped together. Based on the similarities in terms of market maturities and risks, this paper groups the Asian countries into three sectors as developed markets (Japan, Hong Kong, Singapore), emerging markets (Thailand, Taiwan, Malaysia, Korea) and the lesser emerging markets (China, India, Indonesia, Philippines, Sri Lanka and Vietnam).

This continent sees all markets in developed sectors are transparent or highly transparent whereas most of markets in less emerging sector are semi- or low-transparent. Between these two ends is the emerging sector which sees all countries in transparency category with exception of Malaysia being ranked in high transparency. Similarly, the countries in more developed sector are ranked higher in terms of global competitiveness except that Thailand is ranked below China. With regards to market size, there are some contradictions in emerging and lesser emerging sectors. Due to the bigger size in their geography, China and India, being categorised in lesser emerging sector, have more number of listed property companies with bigger market cap than the other countries in emerging sector. And, Thailand and South Korea are ranked below some of the countries in lesser emerging sector in this criterion (see Table 1).

With a big size market, some of the cities in China and India are ranked higher in terms of transparency and business competitiveness. These cities are referred to as tier 1 in China and India. Whilst these tiers should have been categorised in sector 2 in the continent, the availability of data of these cities does not make this possible. As such, the potential bias is the inclusion of China and India tier 1 in sector 3 whereas their better positions are in sector 2, a higher rank than the other region in the country. This bias makes sector 3 somewhat more attractive than sector 2.

With these constructed sectors, the objectives of this study are to build a risk-adjusted performance index of Asian listed property companies into developed, emerging and lesser emerging markets and assess performance of each sector from the perspective of US investors. That means the US Dollar is the calculated currency in this study.

As such, this paper will observe Asian countries from a different aspect than the previous studies in which Asian countries will be categorised in sectors according to its level of market maturities and risks, with these categories setting basis for performance analysis from the perspective of US investors. This is believed to be the first study on Asian property companies in groups of their similar market maturities and risks. This may also be the first study to put Sri Lanka and Vietnam into consideration as one of continental

investment asset classes, with Sri Lanka (from July 2002) and Vietnam (from January 2007) expanding over shorter time series than the other observed markets.

DATA SOURCE AND METHODOLOGY

Data sources

To construct sector indices, this study uses monthly price index and market value index data series from the Datastream, with time span over the period of January 1999 – December 2009 in local currency. The exchange rates use the month end data series also employed from Datastream over the same period to adjust the price and market cap indices to a US Dollar basis. All the country markets are analysed over the full period except for Sri Lanka which covers a shorter period of June 2002 – December 2009 due to the matter of availability of data. Similarly, data about listed property companies in Vietnam are also limited especially of property sector. Because the property sector index for Vietnam market is unavailable, the construction of this index is needed. To construct property index for Vietnam market, this study uses price and market cap series of the property companies listed on the Ho Chi Minh City Stock Exchange from Bloomberg and from which a market cap weighted price index is constructed (see Table 2).

Methodology

To assess the performance for three sectors, the market cap weighted-average sector return index is constructed. The local currency price and market cap indices are converted into US Dollar basis using respective USD exchange rate series. These adjusted price indices are used to calculate return indices and then the sector index with the formula as follows:

$$RI_t = \left[\frac{\sum (R_{i,t} \times M_{i,t-1})}{\sum M_{i,t-1}} + 1 \right] \times base - value_{n-1}$$

Where:
RI_t: Sector Return Index at time t
$R_{i,t}$: Return index of country i at time t
$M_{i,t-1}$: Market value of country i at previous period (ie. time t-1).

This formula is based on the assumption that once the fund is invested in market i, it is hold for one period. As such, return is respectively reported on the capital of previous period. Figure 1 presents the return indices calculated for the three Asian property sectors, with base value being 100 from February 1999.

An analysis of overall performance of Asian individual country is done with profiles of return versus risk and return versus downside risk. To assess the performance of regional sector, the sector return indices built above are used to calculate the annualised return, risk, Sharpe ratio and downside risk to assess the risk-adjusted returns of the country market, sector performance from the perspective of US investors over the full period of

January 1999 – December 2009 and two sub-periods of Jan. 1999 – Jun. 2007 and Jul. 2007 – Dec. 2009 to assess the impact of the global financial crisis. With regards to the diversification benefits for diversified investment, the correlation matrix of sector indices with US asset classes are also presented and discussed. Further, the risk profiles are presented in the graphs of three-year rolling risk to assess the significance and stability of all asset classes in the observation. To further assess the investment risk, the skewness and kurtosis ratios and downside risk are also considered. Finally, an assessment of optimal investment portfolio combined all possible considered asset classes are presented and discussed.

MARKET SIGNIFICANCE AND PERFORMANCE ANALYSIS

Country performance analysis

Figure 2 depicts the mean return and risk of 13 countries over the full period of January 1999 – December 2009 where applicable. As can be seen from this graph, India best performed with highest return and average risk whilst Taiwan showed a market of highest risk and low return. The Philippines and Malaysia are the two countries of lowest return with average risk.

In the downside risk context, no countries are in the outlier. Figure 3 showed India of highest returns together with highest risk while Malaysia is positioned at lowest return and lowest risk. In the underperformed markets are Taiwan, the Philippines and Korea which have more investment risk but brought lower return. Vietnam is positioned as high return and low risk, however, over the short time span and thus somewhat considered low reliable.

Sector return indices

Figure 1 illustrates return indices of 13 Asian countries in 3 sectors according to their maturity level. The fluctuation of indices showed sector the most stable over the full period whereas sector 3 reached the highest peak at bull period and sector 2 almost at the least peak and lowest trough in the bear period.

Sector risk adjusted return analysis

Table 3 presents the risk adjusted performance of all observed asset classes over the full period of Jan. 1999 – Dec. 2009 in US Dollar currency. As can be seen from this table, the lesser emerging sector – sector 3 gave the highest annual return of 11.97% p.a. (with 9.13% p.a. ex Sri Lanka and Vietnam), outperforming the developed sector – sector 1 (8.28% p.a.) by more than 48% and emerging sector – sector 2 (6.63% p.a.) by more than 85%, with the emerging sector outperforming US real estate (2.39% p.a.) and US Stocks (-0.18 % p.a.). All the Asian real estate sectors outperformed the US T.Bill (2.91% p.a.) and US Bond (4.55% p.a.). Further, the sector 3 saw its enhanced performance when adding Sri Lanka and Vietnam markets into the sector composition (11.97% versus 9.13% p.a.).

On a risk-adjusted basis, the performance ranking among three sectors remains unchanged, with sector 3 (Sharpe ratio = 0.24) best performing. Not far behind is sector 1 (Sharpe ratio = 0.20) and ranked the third is sector 2 (Sharpe ratio = 0.10). US bond outperformed sector 3 (Sharpe ratio = 6.83) whereas US stocks and US real estate experienced loss (Sharpe ratio = -0.19 and -0.02 respectively). Overall all Asian property securities outperformed both US stocks and US real estate on both absolute and risk-adjusted return basis.

Regarding the analysis of symmetric distribution of returns, Table 3 presents the skewness (S), kurtosis (K) ratios observed asset classes. Sector 3 presented the most positive skewness (S=1.09) whereas the US real estate showed the other negative extreme (S = -0.91). All three sectors showed a positive skewness implying the mean return being closer towards positive tail. In other words, the mean returns are greater than the respective peaks. Sharing the same characteristics with three sectors are US Bill and US bond. At the opposite side, US stocks and US real estate showed a negative skewness (skewness stock = -0.66) with implication of mean returns being closer to the left tail and lower than the peak. Sector 1, US bill and US bond show the highest level of normal distribution among the observed asset classes.

Another aspect of tail thickness in distribution is kurtosis. All the assets showed positive excess kurtosis implied a leptokurtic except for US bill. Sector 3 and US real estate share a similar characteristic of highly leptokurtic (K= 6.72 and 6.69 for sector 3 and US real estate). Not far below leptokurtic level is sector 2 (K=5.3), sector 1 (K=1.24). Closer to normal distribution are US bond (K= 0.19) and US stock (K= 0.85) and US bill presented a platykurtic (K= -1.39) (see Table 3).

Given a highly asymmetric level in return distribution, a downside risk is calculated to assess the risk of returns being lower than its mean. As can be seen from Table 3, within the Asian property asset, sector 3 showed the highest level of downside risk (22.81%), not far below is sector 2 (22.37%), with sector 1 being the least risky asset (18.43%). The Asian property sectors also proved to be more risky than US assets, with US real estate being the most risky asset class (17.99%). US stock is seen to be significantly less risky (12.37%). Notably, US bond are even less risky than US bill (0.16% and 0.37% for US bond and US bill).

Diversification benefits

With superior returns from Asian property securities over US stocks and US real estate, it is necessary to assess the diversification benefits of property securities both within the region and from perspective of US investors.

The correlation matrix in Table 4 presents the diversification benefits for real estate only portfolio across Asian markets as well as a diversified portfolio from US investor's perspective. Over the period of Jan. 1999 – Dec. 2009, the correlation coefficient of three sectors with US real estate are significantly lower than that of US shares with US real estate (r=0.46; 0.35; 0.11; 0.62 for sector 1, 2, 3, US shares with US real estate respectively), with sector 3 being insignificantly correlated to US real estate. This implies

a potential benefit for a real estate only portfolio from US investor's perspective. As such, going to invest in sector 3 is better than going into sector 1 or 2 in terms of both diversification benefits and its risk adjusted return. The diversification benefits being illustrated via correlation of US shares or US real estate with sector 3 (0.07, 0.11 for US shares and US real estate respectively) is significant and correlations well lower than with sector 1 (0.64, 0.46) and sector 2 (0.53, 0.35). This reflects sectors 1 and 2 are highly integrated to the global markets and give fewer opportunities in investment diversification benefits.

From a real estate only across Asian markets, correlation coefficient of sector 1 with sector 3 (r=0.15) and sector 2 (0.16) is lower than correlation of sector 2 and sector 3 (r=0.61). This sees a diversification benefit of investment combining real estate in the developed markets and the lesser emerging market for Asian investors.

To more fully assess the change in portfolio diversification benefits for Asian real estate over Jan. 1999 – Dec. 2009, rolling three year correlation were assessed for each pair of assets (See Figure 4). A common feature seen from these charts is the highly volatile correlation in each pair of asset class.

From the context of Asian real estate, the increasing diversification benefits of combining sector 1 and 3 is more evident with its decreasing correlation ratio over this period (from collar of r=0.5 to 0.2). In contrast, there is a loss of diversification benefits in portfolios of sector 1 and 2 (from collar of r = 0.4 to 0.8).

From the perspective of US investors, both US stocks and US real estate saw a more stable and certain diversification benefit of including sector 1 than sector 2 or 3 which are increasing in fluctuation and uncertainty. The US bond investors see all three sectors of Asian property a fluctuation in correlations and a loss of diversification benefit during the GFC.

Efficient frontier and optimal efficient portfolios

Figure 5 and Table 5 present the efficient frontier of optimal investments from the perspective of the US investors. The optimal investment portfolio is constructed with minimum risk at each possible return. This sees the portfolio start from a combination of T Bill and Bond where composition risks are 0.1% with returns to 4.5%. Moving along the curve sees increasing returns together with potential risks ending at 100% investment in sector 3 at return of 12.3% with risk of 10.7%. These optimal investments see no room for Asian real estate sector 2, US shares or US real estate.

The impact of the GFC: sub-period performance analysis

To assess the impact of changing economic fundamentals on investment performance, Tables 6 and 7 present the performance of each asset classes over the two sub-periods of Jan. 1999 – Jun. 2007 and Jul. 2007 – Dec. 2009 respectively. During sub-period of Jan. 1999 – Jun. 2007, Asian real estate three sectors outperformed both the US real estate (14.30%, 10.8%, 18.93%, 9.78% on sector 1, 2, 3 and US real estate respectively) and US stocks (3.14% p.a.). On the risk-adjusted basis, sector 3 outperformed sector 1 and US

real estate at marginal difference (Sharpe ratio = 0.50; 0.49; 0.44 respectively). Sector 2 gave a lower risk-adjusted return of 0.28 whereas US stocks showed a loss (-0.02). Best performed in this period is US bond with Sharpe ratio = 6.93.

However, the impact of the GFC has made all asset classes fall in loss except for US bill and US bond. During the period of Jul. 2007 – Dec. 2009, sector 2 showed the smallest loss of -6.29%, with sector 3 -7.53% and sector 1 -9.75%. Significant loss is seen in US real estate (-19.01%) and US stock (-10.59%). The ranking on the risk-adjusted basis among three sectors remains unchanged (-0.13; -0.17; -0.29 for sector 2, 3, 1 respectively), with US stock loss greater that on US real estate (-0.54 versus -0.49).

To more fully assess the impact of the GFC on the diversification benefits, the figures in tables 8 and 9 present the changing in correlations across time with specific to periods before and during the GFC. Except for a marginally increasing diversification benefit from sectors 1 and 3 (0.15→0.14) which coincidently saw the initial presence of Vietnam in this period, the correlations in pair see the loss of diversification benefits over time (0.43 → 0.78 for sector 1-2, 0.13 → 0.17 for sector 2-3). This concludes a significant growth and integration among each pair of closely ranked sectors across Asian countries.

From the perspective of US investors, the loss of diversification benefits is shown in US shares with each of the Asian sectors over the GFC. The level of correlation of US shares with each sector increased over the second period (0.57→0.74; 0.49→0.59; -0.03→0.18 for sectors 1, 2, 3 respectively). Similarly, the loss of diversification benefits of US real estate with Asian sectors is also evident over the GFC (0.40→0.51; 023→0.42; -0.13→0.22 for sectors 1, 2, 3 respectively). The greatest loss is witnessed from the US shares and US real estate over two periods (0.36→0.87), highlighting the benefits from diversified investment for the US investors in Asian real estate markets.

To more fully assess the impact of the GFC on the Asian real estate investment dynamics over the Jan.1999 – Dec. 2009 period, a rolling three-year risk is assessed for all real estate sectors and US asset classes as shown in Figure 6. The risk taken by sector 3 showed a low and stable whilst other two sectors presented an initial higher but enhanced risk level during the period before the global financial crisis. Before the global financial crisis, all three sectors showed an attempt to decrease their risk with sector 1 taking the lowest risk.

The common feature of all asset classes is the increasing risk around July 2007. Risk in sector 3 started to rise since late 2006 whereas sector 2 saw its risk rising a bit later in 2007. It is also noticed that increasing risk of sector 3 marked by an addition of one vulnerable market (Vietnam) and further by the global financial crisis like the other sectors.

While the US T Bill risk fluctuates reflecting the US economic cycle, the US real estate experienced a stable risk, in a similar shape of sector 3. The US bond and US shares have fluctuated some what in the same style. All US asset classes are affected by the global financial crisis seeing their risks increase during the global financial crisis. Once again,

these charts reinforce the characteristics of real estate as a stable, long term investment until the global financial crisis actually affected the whole economy.

The significance and performance of less emerging markets, continental factors and integration trends in the continent: a summary analysis

Given the increasing growth and dynamics in the Asian countries as well as increasing interest from international investors in this continent, the lesser emerging markets are growing and developing constantly in terms of both quantity and maturity. This is evident through the increasing correlation in pairs of sectors across time. Noticing that the lesser emerging sector did not only outperform the sectors 1, 2 but also outperform sector 3 excluding Sri Lanka and Vietnam in terms of both absolute annual return and risk adjusted return (12.27% versus 9.13%, Sharpe ratio 0.25 versus 0.19, see Table 3). This determines the outperformance pervasively coming from the less developed countries. From the perspective of Asian investors, there is also diversification benefit from investing in an Asian real estate only portfolio.

A further study of this performance across time by comparison of sector 3 with and without Sri Lanka and Vietnam in sub-periods of before and during GFC periods shed light into this sector progress across time. In the first sub-period, the sector 3 excluding Sri Lanka and Vietnam showed less absolute annual return than it did when adding these two countries. On the risk adjusted basis, the sector excluding outperformed that including Sri Lanka and Vietnam. However, during the GFC period, this relationship has reversed. The sector 3 including Sri Lanka and Vietnam suffered less loss on both absolute returns and risk adjusted basis than that excluding Sri Lanka and Vietnam.

Given the newly emerging countries in the lesser emerging sector, adding these countries into the sector 3 gives it a low correlation compared to that seen before adding. In particular, the correlation of sector excluding Sri Lanka and Vietnam with sector 1, 2, US stocks, US real estate are 0.59; 0.66; 0.43; 0.33 significantly higher than when adding Sri Lanka and Vietnam (0.15; 0.16; 0.07; 0.11) (see Table 4) with neither of latter ones showing significant correlation, with correlation of less than 0.18 being considered no significant.

In both cases of the components of sector 3, the correlation enhanced across time (see Table 8, 9) with the sector 3 excluding Sri Lanka and Vietnam enhanced more significantly than when Sri Lanka and Vietnam are added. This suggests that sector 3 including Sri Lanka and Vietnam gives more diversification benefits to diversified portfolios on both continental and US investors basis.

The profile of return versus risk of individual country described all countries but the Philippines in sector 3 gave higher return than other countries with relatively lower risk. From a downside risk context, a higher volatility reduced the performance rank of sector 3 countries. This saw a higher rank for sector 1 countries than those in sector 2 and 3.

IMPLICATION AND CONCLUSION

This study presents analysis and assessment of Asian real estate in terms of sectors according to individual market maturities and risks from a perspective of US investors over a period of Jan. 1999 – Dec. 2009. Thirteen Asian real estate markets are categorised and grouped into three sectors, with sector 1 (Japan, Hong Kong, Singapore) being developed markets, sector 2 (Malaysia, Korea, Taiwan, Thailand) emerging markets and sector 3 (China, India, Indonesia, Philippines, Sri Lanka, Vietnam) lesser emerging markets.

Over the full period, all three sectors outperformed US stocks and US real estate on a risk-adjusted basis. However, a further detail analysis into sub periods showed a badly impact of the GFC on all three sectors, reflecting a significant integration and growth of Asian real estate in global wide market. The analysis of correlation from an Asian real estate only basis shows a lower correlation between sectors 1-3 and sectors 2-3 than sectors 1-2. Although this correlation increased over time, this determines a potential benefits for Asian investors from investment in Asian real estate only, especially with sector 3 in investment portfolio.

The correlations of sectors 1, 2, 3 with US shares and US real estate in pair each are significantly lower than that of US shares or US real estate, reflecting a diversification benefit for Asian real estate investment from the perspective of US investors. Further, the lesser emerging market provided increasing diversification benefit as opposed to the developed and emerging sectors which showed a decreasing diversification benefit.

The three year rolling of risk and correlation present a common characteristic of developed sector as high stability and maturity compared to the other two sectors also significantly being enhanced across time. The significance and integration of lesser emerging market sector is further highlighted from the optimal investment with sectors 1, 3 joining significantly and constantly in efficient frontier from US investment context.

The overall study concludes that from a various background and at a different level of maturity and growth rates, all Asian real estate markets are significantly growing and integrating into the global wide market, thus explaining an increasing interest from global investors. Investing in sector 1 to experience a stable and developed market sector or taking risk to invest in lesser emerging market sector depends on a bundle of investment strategies and objectives and a unique skill of selecting market(s) from specific sector(s) to not only out-perform the average sector index but also outperform the overall target index. It is also worth keeping in mind that this performance is based on US Dollar conversion directly which no exchange rate hedging is required. When investors have currency hedging tools, the optimal investment may result differently or sector 2 may be a good choice for investing.

Besides one’s investment strategies and objectives, investment performance heavily depends on the target countries especially when they are of lesser emerging market sector, with so much volatile factors and uncertainties coming from low transparency,

low liquid market and most importantly inexperienced or unsuitable governance policies in the increasing volatile world wide market. This paper is promising for a complete research where each sector is analysed with its individual components for a better review during the analysed period. Last but not least, this paper encourages both international investors on continental and intercontinental basis as well as Asian country governments a move forward for an expanding and growing real estate market in Asia.

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Table 1: Maturity profile by sector

	Transparency (2008)	Global competitiveness (2008)	Market size in World rank (2009)
Sector 1			
Hong Kong	Highly transparent	#11	2
Japan	Transparent	#9	3
Singapore	Highly transparent	#5	7
Sector 2			
Taiwan	Semi-transparent	#17	26
Malaysia	Transparent	#21	18
Thailand	Semi-transparent	#34	29
South Korea	Semi-transparent	#13	45
Sector 3			
China	Semi-transparent Low transparent	#30	4
India	Semi-transparent Low transparent	#50	10
Philippines	Semi-transparent	#71	24
Indonesia	Low transparent	#55	29
Vietnam	Low transparent	#70	42
Sri Lanka	N/A	#77	52

Source: JLL (2008), WEF (2008), Macquarie Securities (2009)

Table 2: Data sources by country markets

COUNTRY	DATA SERIES
US	US TREASURY CONSTANT MATURITIES 3 MTH US BOND YIELD GOVT.10 YR(ECON) DJTM UNITED STATES REAL ESTATE $ - PRICE INDEX DJTM UNITED STATES REAL ESTATE $ - MARKET VALUE
JAPAN	TOPIX REAL ESTATE - PRICE INDEX TOPIX REAL ESTATE - MARKET VALUE JAPANESE YEN TO US $ NOON NY – EXCHANGE RATE
SINGAPORE	SINGAPORE-DS REAL EST INV,SVS – PRICE INDEX SINGAPORE-DS REAL EST INV,SVS - MARKET VALUE SINGAPORE $ TO US $ (SG) - EXCHANGE RATE
HONG KONG	HONG KONG-DS REAL EST INV,SVS – PRICE INDEX HONG KONG-DS REAL EST INV,SVS - MARKET VALUE HONG KONG $ TO US $ NOON NY - EXCHANGE RATE
MALAYSIA	KUALA LUMPUR SE PROPERTIES - PRICE INDEX KUALA LUMPUR SE PROPERTIES - MARKET VALUE MALAYSIAN RINGGIT TO US $ NOON NY
THAILAND	THAILAND-DS REAL EST INV,SVS – PRICE INDEX THAILAND-DS REAL EST INV,SVS - MARKET VALUE THAI BAHT TO US $ NOONNY – EXCHANGE RATE
TAIWAN	DJTM TAIWAN REAL ESTATE – PRICE INDEX DJTM TAIWAN REAL ESTATE - MARKET VALUE TAIWAN NEW $ TO US $ NOON NY - EXCHANGE RATE
SOUTH KOREA	KOREA SE CONSTRUCTION - PRICE INDEX KOREA SE CONSTRUCTION - MARKET VALUE SOUTH KOREAN WON TO US$ (KO) - EXCHANGE RATE
CHINA	SHANGHAI SE REAL ESTATE - PRICE INDEX SHANGHAI SE REAL ESTATE - MARKET VALUE CHINESE YUAN TO US $ NOON NY - EXCHANGE RATE
SRI LANKA	SRI LANKA-DS REAL EST INV,SVS - PRICE INDEX SRI LANKA-DS REAL EST INV,SVS - MARKET VALUE SRI LANKAN RUPEE TO US$ NOON NY - EXCHANGE RATE
INDIA	S&P CNX CONSTRUCTION - PRICE INDEX S&P CNX CONSTRUCTION - MARKET VALUE INDIAN RUPEE TO US $ NOON NY - EXCHANGE RATE
INDONESIA	JAKARTA SE CNSTR.PROPERTY - PRICE INDEX JAKARTA SE CNSTR.PROPERTY - MARKET VALUE INDONESIAN RUPIAH TO US $ (TR) - EXCHANGE RATE
PHILIPPINES	PHILIPPINE-DS R/E HLD & DVLP - PRICE INDEX PHILIPPINE-DS R/E HLD & DVLP - MARKET VALUE PHILIPPINE PESO TO US $ (PH) – EXCHANGE RATE
VIETNAM	AUTHOR'S COLLECTION AND CALCULATION FROM HCMC STOCK EXCHANGE AND BLOOMBERG VIETNAMESE DONG TO US $ (TR) - EXCHANGE RATE

Figure 1: Return indices of Asia property three sectors

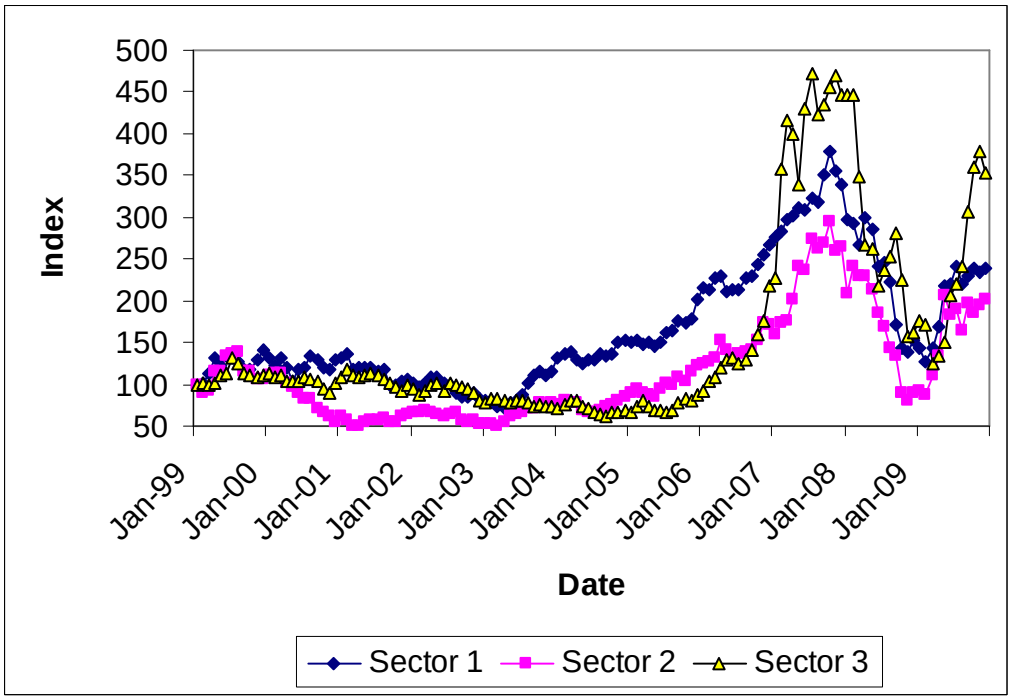

Figure 2: Returns – risk profile of 13 countries

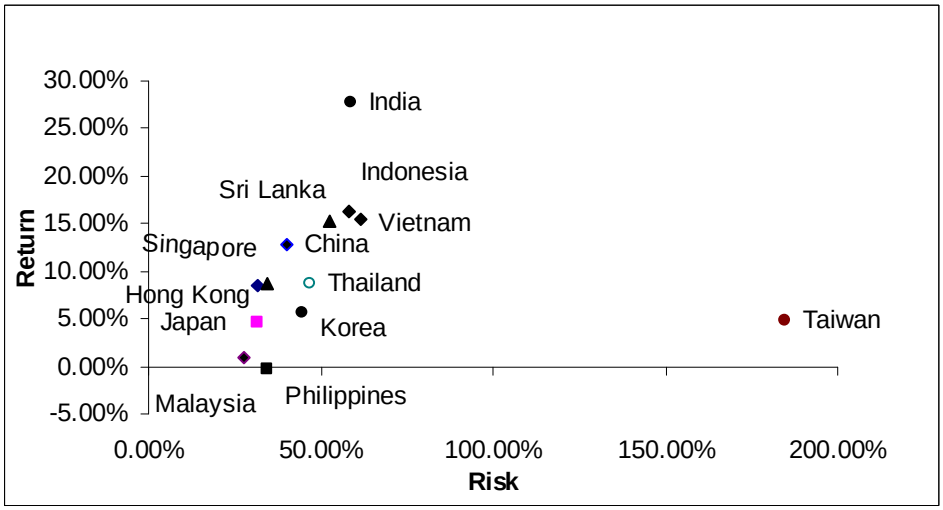

Figure 3: Return versus downside risk profile of 13 countries

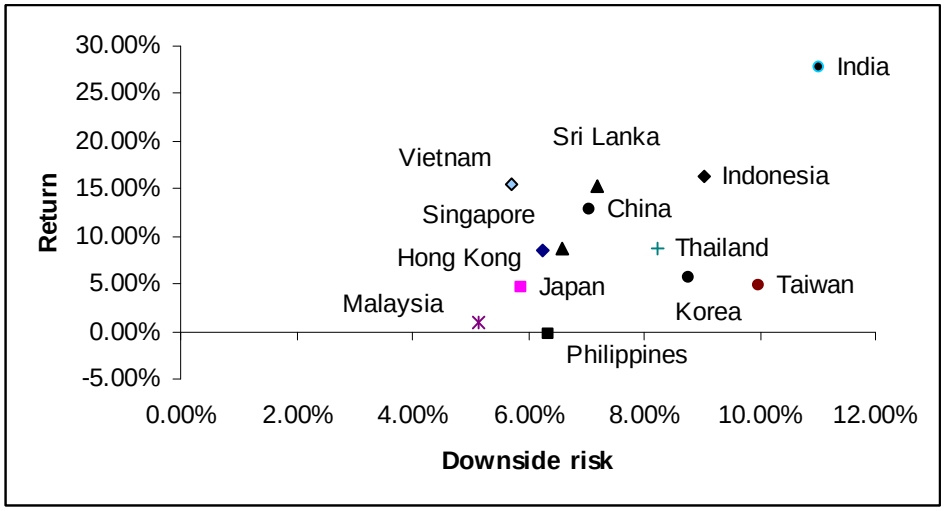

Table 3: Risk adjusted returns performance: Jan.1999 – Dec. 2009

	Sector 1	Sector 2	Sector 3	US T BILL	US BOND	US STOCK	US RE
An. Return	8.28%	6.63%	11.97% 9.13%*	2.91%	4.55%	-0.18%	2.39%
An. Risk	26.76%	36.10%	37.11% 32.65%*	0.54%	0.24%	16.42%	23.55%
Sharpe Ratio	0.2	0.1	0.24 0.19*	0	6.83	-0.19	-0.02
Skew	0.04	0.97	1.10 0.01*	0.11	0.24	-0.66	-0.91
Kurtosis	1.24	5.30	6.72 2.59*	-1.39	0.19	0.85	6.69
Annual Downside Risk	18.43%	22.37%	22.81% 21.74%*	0.37%	0.16%	12.37%	17.99%

*: Sector 3 excludes Sri Lanka and Vietnam

Table 4: Correlation matrix: Period Jan. 1999 – Dec. 2009

	SECTOR 1	*SECTOR 2*	*SECTOR 3*	*US T.BILL*	*US BOND*	*US SHARES*	*US R.E.*
SECTOR 1	1.00						
SECTOR 2	0.61*	1.00					
SECTOR 3	0.15 (0.59*)	0.16 (0.66*)	1.00				
US T.BILL	0.04	- 0.06	0.15 (0.16)	1.00			
US BOND	- 0.01	- 0.11	0.03 (-0.01)	0.80*	1.00		
US SHARES	0.64*	0.53*	0.07 (0.43*)	0.00	0.02	1.00	
US R.E.	0.46*	0.35*	0.11 (0.33*)	0.01	0.01	0.62*	1.00

*: significant correlation (P<5%)

( ): Correlations with sector 3 excluding Sri Lanka and Vietnam

Figure 5: Three year rolling correlation: Period Jan. 1999 – 2009

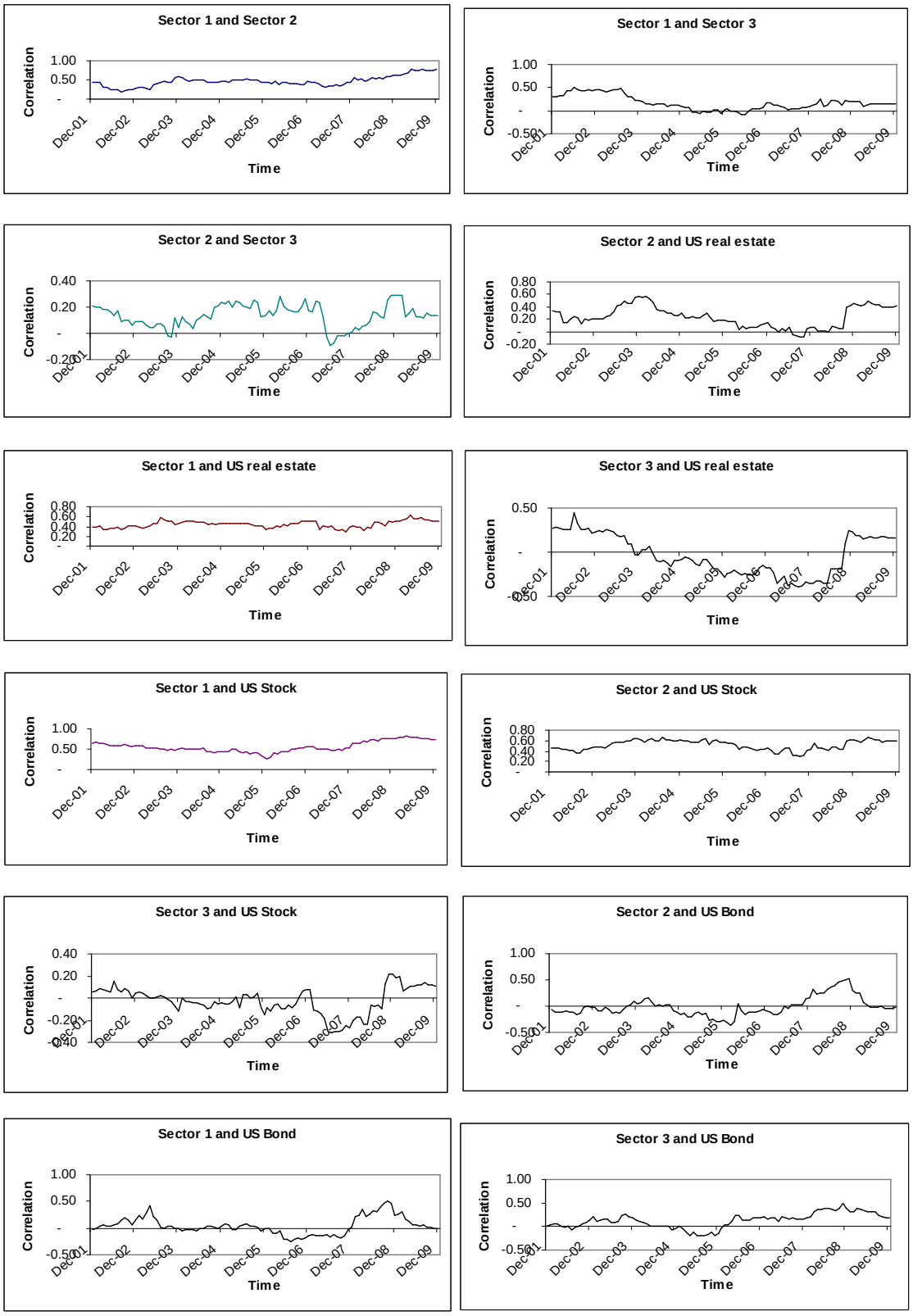

Figure 6: Efficient Frontier from the perspective of US investors

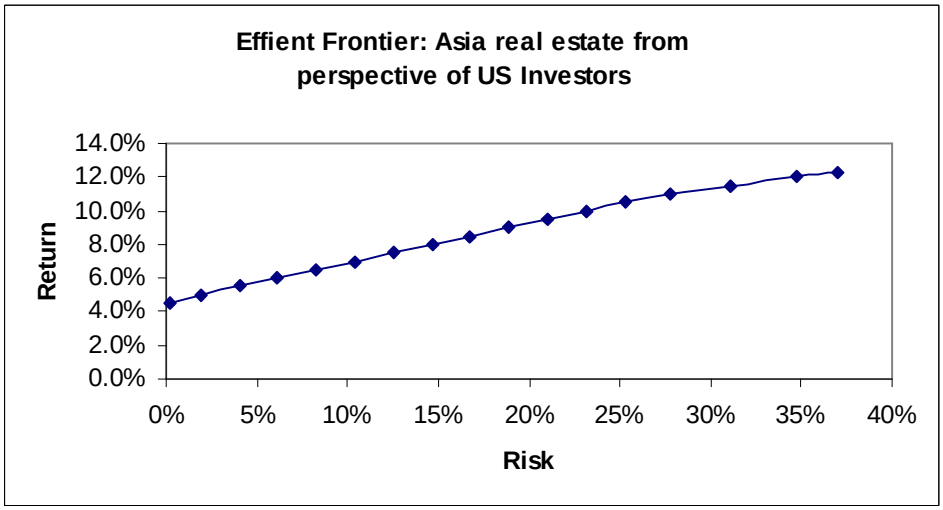

Table 5: Return, risk and components details from efficient frontier

Return	Risk	Portfolio components			
		Sector 1	Sector 3	US T BILL	US BOND
4.5%	0.2%			3%	97%
5.0%	1.9%	3%	4%		92%
5.5%	4.0%	7%	9%		84%
6.0%	6.1%	11%	14%		76%
6.5%	8.3%	15%	18%		67%
7.0%	10.4%	18%	23%		59%
7.5%	12.5%	22%	28%		50%
8.0%	14.6%	26%	32%		42%
8.5%	16.8%	29%	37%		34%
9.0%	18.9%	33%	42%		25%
9.5%	21.0%	37%	46%		17%
10.0%	23.1%	41%	51%		8%
10.5%	25.3%	44%	56%		
11.0%	27.8%	32%	68%		
11.5%	31.0%	19%	81%		
12.0%	34.8%	7%	93%		
12.3%	37.0%		100%		

Table 6: Risk adjusted returns performance: Jan.1999 – Jun. 2007

	Sector 1	Sector 2	Sector 3	US T BILL	US BOND	US STOCK	US RE
An. Return	14.30%	10.80%	18.93% 16.02%*	3.38%	4.82%	3.14%	9.78%
An. Risk	22.08%	26.85%	31.17% 24.04%*	0.50%	0.21%	14.35%	14.56%
Sharpe Ratio	0.49	0.28	0.50 0.53*	0.00	6.93	-0.02	0.44

*: Sector 3 excludes Sri Lanka and Vietnam

Table 7: Risk adjusted returns performance: Jul. 2007 – Dec. 2009

	Sector 1	Sector 2	Sector 3	US T BILL	US BOND	US STOCK	US RE
An. Return	-9.75%	-6.29%	-7.53% -11.22%*	1.34%	3.66%	-10.59%	-19.01%
An. Risk	38.80%	57.91%	52.96% 52.62%*	0.42%	0.17%	22.08%	41.51%
Sharpe Ratio	-0.29	-0.13	-0.17 -0.24*	0.00	13.75	-0.54	-0.49

*: Sector 3 excludes Sri Lanka and Vietnam

Table 8: Correlation matrix: Sub-period Jan. 1999 – Jun. 2007

	SECTOR 1	*SECTOR 2*	*SECTOR 3*	*US T.BILL*	*US BOND*	*US SHARES*	*US R.E.*
SECTOR 1	1.00						
SECTOR 2	0.43*	1.00					
SECTOR 3	0.15 (0.31*)	0.13	1.00				
US T.BILL	0.02	- 0.09	0.24* (0.25*)	1.00			
US BOND	- 0.08	- 0.17	- 0.03 (-0.04)	0.73*	1.00		
US SHARES	0.57*	0.49*	- 0.03 (0.24*)	- 0.04	- 0.04	1.00	
US R.E.	0.40*	0.23*	- 0.13 (0.18*)	- 0.04	- 0.07	0.36*	1.00

*: significant correlation (P<5%)

( ): Correlations with sector 3 excluding Sri Lanka and Vietnam

Table 9: Correlation matrix: Sub-period Jul. 2007 – Dec. 2009

	SECTOR 1	*SECTOR 2*	*SECTOR 3*	*US T.BILL*	*US BOND*	*US SHARES*	*US R.E.*
SECTOR 1	1.00						
SECTOR 2	0.78*	1.00					
SECTOR 3	0.14 (0.85*)	0.17	1.00				
US T.BILL	- 0.06	- 0.09	0.05 (0.03)	1.00			
US BOND	- 0.07	- 0.15	0.16 (-0.10)	0.84*	1.00		
US SHARES	0.74*	0.59*	0.18* (0.64*)	- 0.07	- 0.06	1.00	
US R.E.	0.51*	0.42*	0.22* (0.42*)	- 0.13	- 0.13	0.86*	1.00

*: significant correlation (P<5%)

( ): Correlations with sector 3 excluding Sri Lanka and Vietnam

Figure 6: Three year rolling risk: period Jan. 1999 – Dec. 2009