

## **International diversification for Asia-Pacific Property Investors 1980-2001**

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### **Abstract**

In this paper we examine the construction of international indirect property portfolios available for Australian, Japanese and Singaporean investors during three overlapping periods, 1980-88, 1986-94 and 1992-2001. The purpose of this analysis is to consider whether the rewards from international property diversification of this form are sufficient to compensate for the higher cost of internationalization for domestic investors. We use two covariance optimization algorithms to give *ex post* results, but to provide some evidence that has some relevance *ex ante* we also construct equally-weighted portfolios across the markets available for each period examined.

It seems clear from our analysis that there is a strong case for investors in the Australia, Singapore and Japan to invest in internationally diversified property securities portfolios rather than just in their own domestic sectors.

### **International diversification for Asia-Pacific Property Investors 1980-2001**

Sirman and Worzala(2003) discuss several studies (Webb and Rubens,1989, Giliberto,1989,Ziobrowski and Curcio,1991,Worzala and Vandell,1995, Newell and Webb,1996,Quan and Titman ,1997 and 1999 and Stevenson(1998)) which use proxies for direct UK property investment to make the case for adding this to internationally diversified portfolios.

McAllister(1999) has analysed trends in direct international property investment by British investing institutions in the 1980s and 1990s and concludes that the property market is less integrated than the other securities markets . In this paper we examine the construction of international indirect property portfolios available for Singaporean and Japanese investors during three overlapping periods, 1980-88,1986-94 and 1992-2001. The purpose of this analysis is to consider whether the rewards from international property diversification of this form are sufficient to compensate for the higher cost of internationalization for domestic investors. While we use two covariance optimization algorithms these give *ex post* results, and to provide some evidence that has some relevance *ex ante* we also construct equally-weighted portfolios across the markets available for each period examined. We provide our analysis using the domestic currencies of Singapore and Japan as the numeraire for each set of portfolios constructed as it is likely that potential investors from those countries in overseas markets will be making the comparison with the domestic returns from the same sector in order to be persuaded to invest.

### **Methodology**

We take month end data for the time periods concerned for all of the listed property sectors listed in Table 1. The source was Datastream

We use two covariance optimisation algorithms- the Markowitz expected return/variance algorithm (MPT) and the Elton, Gruber and Padberg fixed correlation heuristic (EGP) and compare these both with the returns on the domestic listed

property sector for our selection of countries and with an equally weighted portfolio denominated in the Singapore dollar and the Japanese yen respectively.

We construct portfolios first using the traditional Modern Portfolio Theory method, the Markowitz expected return/variance algorithm. One of the limitations of this approach is the inherent assumption that the variance of portfolio returns is the correct measure of investment risk and that the investment returns of all securities and assets may be represented adequately by the normal distribution. A second limitation of the normal distribution assumption is that within the context of portfolio investment decisions the tails of the normal distribution decay exponentially towards zero, which implies that large realisations in asset returns are unlikely. There is empirical evidence (e.g. Lucas and Klassen (1998)) that suggests that asset returns generally exhibit leptokurtic behaviour, or fatter tails than the normal distribution.

To provide an additional measure to deal with these limitations we include in our portfolio performance measures, semi-variance which measures only negative deviations and excludes positive gains. Markowitz (1951) said “Semivariance seems more plausible than variance as a measure of risk, since it is concerned only solely with adverse deviations.”

We construct portfolios using the Elton, Gruber and Padberg fixed correlation heuristic. They developed a successful portfolio heuristic by using a single average correlation coefficient. They demonstrate that this approach will provide stable portfolio allocations and more diversification than a standard optimiser which they suggest should provide more diversified portfolios than MPT.(Elton, Gruber and Padberg (1976))

Finally in order to provide evidence that has some relevance *ex ante* rather than merely *ex post* we construct equally-weighted portfolios across the markets available for each period examined. If this construction provides consistently better results over the three periods than investment in the domestic sector of the three countries alone it will be very difficult to deny that a strong case exists for international diversification

Table 1

	Markets	
1980-88	1986-94	1992-2001
Belgium	Malaysia	New Zealand
France	added	Philippines
Hong Kong		Portugal
Italy		Spain
Japan		Germany
Netherlands		added
Norway		
Singapore		
UK		
USA		

## Results

Table 2 Australia 1980-88

	MPT	EGPC	Equal weights	Australia
Annualised return	22.20	24.36	23.69	21.44
Monthly return	1.68	1.83	1.78	1.63
Standard deviation	3.59	4.23	4.33	5.04
Semi-deviation	1.75	1.97	2.67	4.48
R/Variance	.40	.37	.32	.2093
R/Semivariance	.82	.80	.44	.3088

Weightings		
Australia	32.59	19.13
Belgium		6.53
Japan	12.49	16.0
Netherlands	37.24	21.29
Norway	10.77	10.89
UK		7.49
US	6.89	18.71

Table 2 suggests that for the 1980-88 period an Australian property sector investor would have been advantaged by diversifying internationally, and with either the EGPC or equally-weighted portfolios would have significantly improved returns while also reducing the risk. Australia is just under one-third of the weight in the MPT portfolio but only a 19.13% weight in the more balanced EGPC portfolio

**Table 3 Australia 1986-94**

	MPT	EGPC	Equal weights	Australia
Annualised return	21.54	25.14	16.67	13.84
Monthly return	1.63	1.88	1.29	1.08
Standard deviation	5.87	7.02	5.66	5.90
Semi-deviation	3.76	4.53	3.54	4.21
R/Variance	.24	.23	.24	.14
R/Semivariance	.37	.36	.29	.19
Weightings				
Australia	38.25	20.98		
Belgium	29.50	21.34		
Hong Kong	5.68	22.45		
Singapore	26.55	25.20		

The results in Table 3 again support the conclusion made from the analysis of the previous period's results that an Australian investor would have advantaged both in terms of return and risk from internationally diversified portfolios. Australia is a higher weight than previously in the MPT and EGPC portfolios and again the EGPC portfolio provides a more balanced investment scenario.

**Table 4 Australia 1992-2001**

	MPT	EGPC	Equal weights	Australia
Annualised return	14.45	15.16	9.34	14.09
Monthly return	1.13	1.18	.74	1.01
Standard deviation	2.57	2.88	3.94	3.62
Semi-deviation	1.34	1.48	2.44	2.02
R/Variance	.33	.32	.12	.34
R/Semivariance	.65	.63	.20	
Weightings				
Australia	46.84	41.62		
France	19.05	10.72		
Netherlands	0	4.30		
Portugal	7.32	0		
UK	.11	9.55		
US	26.67	33.81		

For the period reported in Table 4 an Australian property investor would have done marginally better by focusing just on the Australian property sector, although a higher

annualized rate of return would have been achieved from the diversified EGPC portfolio

**Table 5 Singapore 1980-88**

	MPT	EGPC	Equal weights	Singapore
Annualised return	18.33	17.85	18.75	12.93
Monthly return	1.41	1.37	1.44	1.01
Standard deviation	3.38	3.43	4.45	11.45
Semi-deviation	1.63	1.68	2.74	7.23
R/Variance	.34	.33	.26	.06
R/Semivariance	.71	.67	.43	.11
Weightings:				
Australia	8.96%	7.89%		
Belgium		7.90		
Japan	15.77%	13.20		
Netherlands	41.07	36.79		
Norway	14.30	9.77		
Singapore	2.27	0		
UK	0	5.72		
US	17.60	18.71		

Table 5 reports the results for the 1980-88 period. The optimum MPT and EGPC portfolios as well as the equally-weighted portfolios can be seen to improve materially the returns for lower risk than investing in the Singapore sector alone. The EGPC portfolio provides a more reasonably distributed portfolio than the MPT portfolio. This supports one of the main arguments made in favour of using the EGPC paradigm. The equally-weighted portfolio also offers a much higher return to both variance and semivariance than the Singapore portfolio alone.

**Table 6 Singapore 1986-94**

	MPT	EGPC	Equal weights	Singapore
Annualised return	22.92	22.61	12.83	30.45
Monthly return	1.74	1.71	1.01	2.24
Standard deviation	7.12	7.20	5.21	10.74
Semi-deviation	4.46	4.74	3.60	6.51
R/Variance	.21	.20	.15	.18
R/Semivariance	.33	.31	.21	.30
Weightings				
Australia		6.64%		
Belgium	44.07%	30.56%		
Hong Kong	9.34%	22.33%		
Singapore	46.59	40.46		

Table 6 reports the results for the 1986-94 period. Singapore's property sector has a significantly higher return than any of the other portfolios constructed, but its return to

variance is lower because of the much higher standard deviation for Singapore. The portfolio from EGPC offers a more evenly weighted portfolio across the same number of countries than the MPT portfolio. It is noticeable that now Singapore has a significant weight in both optimal portfolios in this period, in contrast to the first period. The equally-weighted portfolio offers lower returns but also lower risk than the Singapore portfolio.

**Table 7 Singapore 1992-2001**

	MPT	EGPC	Equal weights	Singapore
Annualised return	12.74	13.85	6.11	6.55
Monthly return	1.00	1.08	.49	.53
Standard deviation	3.22	3.66	3.69	12.62
Semi-deviation	1.80	2.07	2.46	7.83
R/Variance	.23	.23	.06	.002
R/Semivariance	.42	.40	.10	.004
Weightings				
Australia	16.97	22.33		
France	17.10	2.45		
Hong Kong	2.06	.61		
Portugal	7.25	0		
UK	0	11.83		
US	56.60	62.77		

Table 7 reports the results of the third period, 1992-2001. This time the EGPC provides a less diversified portfolio than the MPT does. For a higher return the Singapore investor also receives less risk in the international portfolios.

## Japan

**Table 8 Japan 1980-88**

	MPT	EGPC	Equal Weights	Japan
Annualised return	21.24	18.82	11.69	22.75
Monthly return	1.618	1.448	.9260	1.72
SD	6.0797	5.189	4.57	9.24
Semi-Deviation	2.8988	2.705	3.24	4.47
Skewness	1.1251	.507		
R/Variance	.2256	.2315	.2852	.1598
R/SV	.4731	.4441	.2093	.3304
Weighting:				
Australia		3.73		
Belgium		10.22		
Japan	52.22	40.46		
Norway	32.61	21.95		
USA	15.17	23.63		

Table 5 reports the 1980-88 results for Japanese investors. In this period the Japanese domestic property sector returned more than the optimal international portfolios but the return to variance and the return to downside risk were significantly better for the international portfolios. Even the equally-weighted portfolio had a higher return to variance than the Japanese domestic sector. The EGPC portfolio provides a substantially more diversified portfolio than does the MPT portfolio.

**Table 9 Japan1986-84**

	MPT	EGPC	Equal Weights	Japan
Annualised return	18.8897	18.9898	12.124	1.52
Monthly return	1.4253	1.4594	.958	.1255
SD	7.5472	7.7183	6.3214	10.88
Semi-Deviation	4.7312	4.9765	4.4259	6.6388
R/Variance	.1598	.1571	.2165	-.0111
R/SV	.2548	.2437	.1608	-.0573
Weighting				
Belgium	47.51	39.33		
Hong Kong	6.08	21.29		
Singapore	46.41	39.37		

Table 6 reports the Japanese results for 1986-94. Here the Japanese returns were meagre and the returns to both variance and semi-variance negative. Japan no longer ranks in the optimum portfolios which both put most of the weighting in the Belgian and Singapore markets.

**Table 10 Japan 1992-01**

	MPT	EGPC	Equal Weights	Japan
Annualised return	14.178	14.2493	4.6366	-2.45
Monthly return	1.11	1.1163	.3784	-.2067
SD	5.8845	5.9421	4.9364	7.90
Semi-Deviation	3.6116	3.6631		5.5279
R/Variance	.1469	.1464	.0765	-.0573
R/SV	.2393	.2374	.0392	-.0020
Weighting				
Australia		6.65		
Hong Kong	1.51			
Portugal	4.80			
USA	93.69	93.95		

Table 7 reports the 1992-2001 results for Japanese investors. Again the Japanese results are negative and Japan does not rank in the optimum portfolios. The US completely dominates both optimum portfolio constructions.

#### *Ex ante versus ex post*

So far we have considered primarily the *ex post* results in our discussion. While these do successfully make a case for considering international diversification, if the equally-weighted portfolios constructed provide consistently better results over all three periods for Singapore and Japan, the case would be overwhelming. In the case of Japan the return to variance for the equally weighted portfolio in all three periods exceeds that for the Japanese domestic sector alone. These results suggest that the general case for diversification internationally even on an *ex ante* basis can be sustained for property securities.

#### **Conclusions**

We have constructed international indirect or property securities portfolios for Australian, Singaporean and Japanese investors based in their respective currencies for three overlapping periods; 1980-88;1986-94 and 1992-2001. We have used two covariance optimisation algorithms-the Markowitz expected return/variance algorithm(MPT) and the Elton,Gruber and Padberg fixed correlation heuristic (EGPC). We have provided also the return to semivariance which is the return to downside risk.

As these results provide *ex post* results we also construct equally-weighted portfolios which enable us to examine the *ex ante* case for international diversification.

For the three countries for the first two periods considered the internationally diversified portfolios constructed using MPT and EGPC were markedly superior to the performance of the domestic sectors of the economies concerned. For all countries for at least two of the three periods an equally weighted portfolio outperformed the domestic sector as well.

It was usually the case that the EGPC portfolios offered wider diversification than the MPT portfolios. For all international portfolios for all periods the return to downside risk was very strong in relation to that in the domestic economy sectors.

While the results demonstrate in most time periods that internationally diversified property securities portfolios for the investors of all countries performed better than the domestic sectors the weightings and the components of the portfolios varied to such an extent over time that an investor might see international diversification as requiring too much change in portfolio composition over time.

We also considered the performance of equally weighted portfolios over the same three periods based in the same three currencies which allows us to make some suggestions about *ex ante* performance. For the Japanese investor in all periods.

It seems clear from our analysis that there is a strong case for investors in Singapore and Japan to invest in internationally diversified property securities portfolios rather than just in their own domestic sectors. With respect to the Australian portfolios only in the last period considered would the equally weighted portfolio not been a better result.

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