

Global property investment and the costs of international diversification

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Abstract

There is a trade-off between the costs and benefits of international diversification. This paper shows that the costs for property investors can be reduced substantially through investments in public real estate companies, which concentrate on their local, domestic market. We compare the performance of 18 international operating property companies over the sample period 1984 through 1995 with the performance of property companies operating on their domestic market. We find that the international companies underperform the domestic companies. We also find this difference is not due to factors such as transaction costs, leverage, and currency. © 2001 Elsevier Science Ltd. All rights reserved.

1. Introduction

International investment can be a very effective way to spread the risk of a property portfolio.¹ Property markets are locally driven, which would suggest that the diversification benefits to be reaped from foreign property holdings can be substantial. Indeed, Eichholtz (1996a) has shown that property markets have lower degrees of international correlation than stock and bond markets, and that international property investment is more effective in reducing overall portfolio risk than is the case for international investment in stocks and bonds. Nevertheless, while stock investors quite commonly invest abroad, property investors rarely acquire property beyond their local borders, with UK and Dutch investors as notable exceptions.

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¹ This issue has been thoroughly documented by, among others, Grauer and Hakansson (1987), Liu and Mei (1996), Eichholtz (1996b) and Eichholtz et al. (1998).

This may be caused by the fact that the direct property markets, the private markets for buildings and land have higher information and transaction costs than the public stock markets. We expect that the less informed out-of-town investors may pay too much for properties, and tend to buy more lemons than their better-informed local competitors at these private markets. This would translate into lower risk-adjusted returns. International investors always face a trade-off between diversification benefits and information costs. If information costs are so high that all potential benefits of international diversification are mitigated international investment may then not occur. Transaction costs may also imply a stronger focus on the home market.

If this argument is valid, the home bias of property investors will surely diminish with the development of the global property share market. Public markets may be more informationally efficient than the private property market, and hence may allow investors to build up foreign property exposure without the information and monitoring costs that doing so in the direct property market would entail. This implies that the benefits of international diversification can be reaped at much lower costs.

The past 15 years have seen a strong worldwide growth in the number and size of the publicly listed real estate companies. The number of listed property companies has increased from 140 at the end 1984 to 360 in December 1995, while market value during the same period rose from \$30 billion to approximately \$300 billion. Listed property companies now exist in at least 30 countries.² Publicly listed real estate companies come in two varieties: those which only invest in their own countries, and those which also invest abroad. This enables us to test our hypothesis that property companies which are only active in their own country provide a superior performance to property companies, which are active across the border.

In this paper we start in Section 2 with an overview of the development of the international real estate securities market in the last 15 years. In Section 3 we describe the data we use, which is from the GPR Global Real Estate Securities Database, and we present a first comparison between international real estate companies and portfolios of domestic companies. Section 4 is about research methods. We present different performance measures, and the way we use them for our purposes. Results are presented in Section 5, while section Section 6 explains the results. Section 7 concludes the paper.

2. The international real estate securities market

The last decade has seen a remarkable growth in the number and size of the listed real estate securities. The performance of the real estate securities markets has dif-

² All information is from the Real Estate Securities Database of Global Property Research (GPR). The database contains information about some 600 publicly listed real estate companies in 30 countries all over the world. In Europe—Austria, Belgium, Denmark, France, Germany, Ireland, Italy, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, and the United Kingdom; in North America—Canada and the United States; in the Far East—Australia, Hong Kong, Indonesia, Japan, Malaysia, New Zealand, the Philippines, Singapore, Sri Lanka, and Thailand; and in the rest of the world—Argentina, Israel, Mexico, and South Africa. For all property companies, the performance is tracked. More information about these indices can be found in Eichholtz and Koedijk (1996a,b).

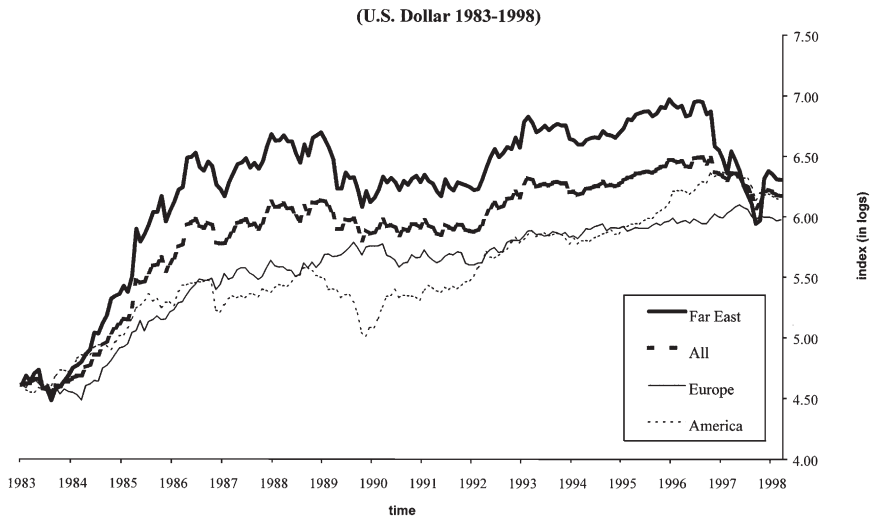


Fig. 1. Continental indices.

ferred markedly across continents. Fig. 1 presents the GPR real estate securities indices for North America, the Far East and Europe. The indices are market-weighted total returns in US dollars and only consist of property companies that invest in the domestic market. Survivorship bias is always an issue if the return of a company is evaluated against a benchmark. Global Property Research argues that their index is largely free of survivorship bias as they have checked for the existence of different property companies over the years and leave companies in the index for 12 months after the market capitalization dropped below the threshold level of 50 million US dollars. From Fig. 1 we see clearly that the market in the Far East performed best, but that it also experienced the highest volatility. After 1993 the Far Eastern market was strongly influenced by the performance of the Hong Kong market, whereas at the end of the 1980s, Japan dominated the market. North America and Europe show a less volatile performance. Table 1 shows that the annualized standard deviation of

Table 1
Summary statistics continental indices, 1984–1998^a

	North America	Europe	Far East	Global
Average return	10.44	9.23	11.64	10.67
Standard deviation	15.10	13.34	30.73	17.92
Correlation coefficients				
Europe	0.26			
Far East	0.29	0.33		
Global	0.43	0.58	0.94	

^a The upper panel of this table gives annualized average returns and standard deviations of the GPR-LIFE Global Real Estate Index and of three continental sub-indices. The lower panel gives correlation coefficients between the continental sub-index returns.

the real estate securities returns in the Far East was 30.6 percent in the sample period, while it was only around 14 percent in Europe and North America.

Table 1 also provides information on average returns and return correlation coefficients between real estate securities markets. The Far Eastern property securities markets generated an average annualized return of 11.2 percent, while North America showed a 10.1 percent average annualized return in the sample period. Table 1 also shows that the correlation coefficients between the continents are positive but rather low, with an average of around 0.3. This suggests a strong risk reduction potential for international real estate diversification and confirms earlier results by Giliberto (1990), Gordon (1992) and Eichholtz (1996b).

3. International and domestic property companies

As we mentioned earlier, most property companies invest only or mainly in their own country. However, there are also a number of listed property companies with an international real estate portfolio. Many of these companies have been around for a long time. Before the expansion of the global real estate securities market, investing in these companies was the only practical way private and small institutional investors could build up international real estate exposure. This was probably the main reason for some property companies to follow an international investment strategy.

Before investigating the performance of these companies, we will first describe them in more detail. First, we have to decide where to draw the line between domestic and international property companies. We classify a company as domestic if it invests at least 75 percent of the portfolio in the country in which it has its main stock market listing. By the same definition, internationals invest at least 25 percent of their portfolio in one or more foreign countries.³ Based on this classification, we select all 36 international property companies from the GPR Global Real Estate Securities Database. Appendix A gives an overview of these companies.

In the next step we reduce the number of internationals in our sample to 18 for two reasons. First, we exclude international Hong Kong property companies investing in mainland China since the close links between the two countries make it reasonable to assume that those companies are really domestic. Secondly, we leave out companies that do not meet all the criteria for inclusion in the GPR Global Real Estate Index.⁴ Table 2 lists the remaining 18 international property investment companies sorted by country. The table also provides sample statistics and basic information about their size and portfolio mix. All numbers are in nominal dollar terms.

As the table shows, most internationals originate from the Netherlands and the United Kingdom. Both countries have a long tradition of international investment,

³ Internationals, therefore, elude both the companies that invest only in one foreign country and the companies that diversify by investing in more foreign countries. The cut-off point of 75% is rather arbitrary, but tests where we use a different cut-off point do not influence the results qualitative.

⁴ The most important criteria for a company to be included in the index are a market capitalization of \$50 million and at least 12 monthly datapoints.

Table 2
Basic statistics international property companies

Company	Country	Return ^a	St. dev. ^a	First month	# observations ^b	Portfolio mix ^c			# Countries ^d	Market Cap ^e
						Far East	Europe	North America		
North America										
1 Markborough	Canada	-2.96	12.07	8/90	64	0	11	89	3	264
2 Revenue Properties	Canada	-1.30	7.60	1/92	48	0	0	100	2	128
Europe										
3 Immobilière Hotelière	France	-0.17	9.96	4/89	80	35	51	14	14	142
4 CS Euroral	Germany	0.62	2.56	2/93	35	0	100	0	5	180
5 German City Estates	Netherlands	-1.06	7.17	1/91	60	0	100	0	1	67
6 Innovest	Netherlands	0.33	6.10	1/86	101	0	67	33	5	286
7 Rodamco	Netherlands	0.67	4.65	1/84	144	12	43	45	12	4333
8 Radkreek Holding	Netherlands	-1.42	7.71	1/85	132	0	0	100	1	19
9 Schroders International Property Fund	Netherlands	0.53	4.22	12/91	49	0	100	0	7	1621
10 VIB	Netherlands	0.53	4.04	12/85	129	0	76	24	6	920
11 Wereldhave	Netherlands	0.51	5.22	1/84	144	0	87	13	8	832
12 Fabège	Sweden	-1.67	16.97	1/91	60	0	100	0	2	91
13 Hufvudstaden	Sweden	0.64	11.63	1/84	36	5	95	0	6	861
14 Capital and Regional Properties	United Kingdom	0.90	9.12	1/87	96	0	82	18	2	103
15 Hammerson	United Kingdom	0.28	9.45	1/84	144	0	79	21	6	1470
16 MEPC	United Kingdom	0.56	8.00	1/84	80	10	71	19	3	2429
17 Slough Estates	United Kingdom	0.65	9.06	1/84	132	4	82	14	7	1273
Far East										
18 City Developmentals	Singapore	2.07	12.52	1/84	84	84	14	2	11	5385

^a Monthly average US-Dollar returns and standard deviations are based on continuous time calculations through December, 1995.

^b This is the number we use in the further calculations. The end of the sample period is not equal for all international property companies since individual companies may have ceased to exist or ceased to be international.

^c Portfolio mix in percentages at December 31, 1995 or at last day of the sample.

^d Number of countries invested in at December 31, 1995 or at the last day of the sample.

^e Market capitalization in millions of US-Dollars at December 31, 1995 or at the last day of the sample.

not only in property, but also in stocks, bonds and other assets. Columns 3, 4, 5 and 6 of Table 2 give mean returns, standard deviations, the first month for which we have an observation and the number of observations over which the statistics have been calculated. The average monthly returns of the international property companies have varied greatly in the sample period. The best performer was City Developments, with an average monthly return of 2.07 percent. There were 6 companies with a negative return in the sample period. Volatility's also differ substantially. Returns of German and Dutch property companies have been most stable with standard deviations of 2.56 and 4 to 8 percent respectively. Companies like Fabège (Swedish), City Developments (Singapore) and Markborough (British) have a much more volatile performance, with standard deviations of 16.97, 12.52 and 12.07, respectively.

The next five columns in Table 2 give information about the portfolio mix of the internationals, the number of countries they invest in and the market capitalization. These columns show that there are great differences in the portfolio composition of the international property companies. Some have all their assets in only one continent, or are very concentrated in only one continent, while others, like Rodamco (Dutch), Immobilière Hotelière (French) and MEPC (British) are truly globally diversified. The number of countries in which assets are held varies from 1 to 14. In that regard, Immobilière Hotelière (French), Rodamco (Dutch), and City Developments (Singapore) are most diversified. The market caps of the internationals are higher than the average market cap of domestic property companies. That is, in December 1995 the international property companies had an average market capitalization of almost \$1200 million, whereas the domestic companies had about half: \$700 million. This could indicate that internationals were partly established to benefit from scale advantages. City Developments (Singapore), Rodamco (Dutch) and MEPC (British) are the largest international companies. The table does not show a clear relationship between the number of countries invested in and the sample statistics, or the market size of the companies.

To get a first impression of the performance of these international property companies relative to the performance of the domestic companies, and to get a basic insight into our question of whether direct or indirect international property investment is better, we construct two indices combining the returns of all companies within each group. Fig. 2 presents graphs of these two indices. This chart clearly shows that the domestic companies have performed much better on an overall basis. Both indices are set at 100 in December 1983, but while the international index stands at 252 in December 1995, the domestic index has risen to 545 in the same month. This corresponds with annual average returns of 7.72 percent for the international index and 14.13 percent for the domestic index, or a return difference of 6.41 percent.

Table 3 gives annualized returns and standard deviations for the complete sample period and three 4 year sub-periods. Between 1984 and 1995, the standard deviations of the global index, the international index and the domestic index are 17.69 percent, 17.25 percent and 18.46 percent, respectively. The sample statistics for sub-periods show that the superior average return of domestic property companies relative to the internationals is rather consistent over time. Domestic companies have a higher average return than the internationals in all three sub-periods that we investigate. In the first and

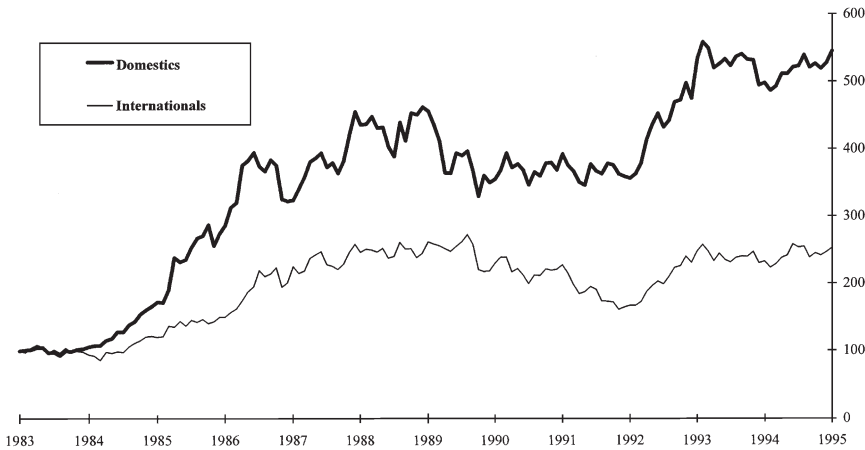


Fig. 2. International and domestic indices.

Table 3
Sample statistics internationals and indices^a

	1984–1995		1984–1987		1988–1991		1992–1995	
	Mean	St. dev.	Mean	St. dev.	Mean	St. dev.	Mean	St. Dev.
Global	13.67	17.69	28.01	19.77	4.74	18.50	8.25	13.86
Internationals	7.72	17.25	20.28	19.34	0.26	16.61	2.63	15.35
Domestics	14.13	18.46	29.35	21.09	4.83	19.48	8.20	13.48

^a The table gives annualized sample statistics for the whole period and three different sub-periods based on monthly logarithmic returns in US Dollars and presents them in percentage terms.

second sub-periods, the higher returns for the domestic indices come with higher standard deviations, but in the last sub-period the internationals have a standard deviation of 15.35 percent, which is higher than the 13.86 percent for the global index and 13.48 percent for the domestic indices. In all these periods, the internationals are outperformed on a risk-adjusted basis. The results imply that the difference in performance between internationals and domestic property companies is not due to lower risk taken by the former. Thus, we may conclude that the worse performance of the internationals relative to the domestic property companies is evidence in favour of our hypothesis that internationals suffer from an information disadvantage that adversely affects their performance. In the next section we set up the empirical framework to investigate this issue more formally.

4. More formal tests of the price for information

The previous section has given some preliminary evidence of the superior performance of domestic property investment companies relative to the internationals. How-

ever, the above comparison is rather crude, since it may well be that the total combined portfolio of the internationals has a different composition than the combined portfolio of the domestic companies. The difference in performance we find between these two groups could therefore be a consequence of diverging portfolio compositions instead of investment strategies. In fact, as can be seen from Table 2, internationals as a group invest relatively little in the Far East, and as we showed in Table 1, the returns in this continent have been much higher than in the other continents. To deal with this, we build for each international real estate company a mimicking index including only domestic companies, with the same combined portfolio composition as that particular international company. This mimicking index reflects the performance the international company would have had if it had not bought, managed and sold its properties itself but had selected local (domestic) property companies to do that for it. In this approach, we therefore compare real estate portfolios that are equal in composition. They only differ in how they are built up: through direct international real estate investment or through indirect investment. Comparing these portfolios directly tests our hypothesis.

For all property companies we collect monthly performance data from January 1984 through December 1995. We take share prices at the last day of the month and reinvest all dividends. All indices are constructed in US dollar terms. The information about the portfolio allocation of the internationals is collected from the annual reports. Hence, we change the composition of the mimicking indices annually at the reporting day in the annual report. We collect portfolio information about the geographical spread of investments on the country level. However if a company only presents the composition on a continental level we use that. In most cases the annual reports present the geographical spread of the portfolio in terms of asset value. If the reports do not present the value of the investments directly, we use the square footage of the properties as a proxy. This information is available for all companies in the sample, and the only assumption that we have to make is that the value of each square foot is equal over the different countries.

First, we construct a total return index for each international property company:

$$I_t = I_{t-1} \left(1 + \frac{P_t - P_{t-1} + DV_t}{P_{t-1}} + \frac{P_t + DV_t}{P_{t-1}} R_{sit} \right), \quad (1)$$

in which P_t is the stock price at the end of month t , DV_t is the dividend in month t , R_{sit} is the depreciation of the dollar relative to the company's home currency, and $I_{t=0}$ is 100.

Then, we calculate a customized mimicking index for each international property company, based on the returns of the domestic property companies, but with the portfolio weights of that particular international:

$$I_t = I_{t-1} \left(1 + \sum_{i=0}^{i=nt} (w_{it} * R_{it}) \right), \quad (2)$$

in which w_{it} is the percentage invested in country or continent i in month t by the international company, R_{it} is the return of domestic index i , expressed in US dollars,

$I_{t=0}$ is 100, and nt is the total number of countries in which the company has invested in month t .

We compare the internationals with their customized indices using two performance measures: the Sharpe ratio and Jensen's alpha. Both measures are derived from the Capital Asset Pricing Model. The Sharpe measure gives an indication of the return in respect to the total risk of an asset measured by the standard error of the returns. A higher ratio indicates a better performance since it implies a higher return for a given level of risk. The following formula represents the Sharpe ratio:

$$S = \frac{R_i - R_f}{S_i}, \quad (3)$$

in which R_i is the average return of the individual company or index, R_f is the risk free rate, and S_i is the standard deviation of the return.

For each international and its corresponding customized index, we calculate the Sharpe measure. As we denominated all share prices in US dollars we use the US risk free rate. As a proxy for the latter we use the 1-month T-bill rate.

The Jensen Alpha determines whether a company out- or underperforms the market or an index by investigating whether the performance is significantly different from what we would expect from the security market line. It measures the performance difference by α in Eq. (4):

$$R_{it} - R_{ft} = \alpha_i + \beta_i(R_{mt} - R_{ft}) + \varepsilon_{it} \quad (4)$$

where R_{it} is the return of the international property company, R_{ft} is the risk free rate, R_{mt} is the return of the market index, and ε_{it} is an error term.

In asset pricing tests it is always difficult to determine which market index to use. In the first test we use our mimicking index as the market index. Doing this enables us to compare the performance of international property companies with the domestic property companies directly. We present the results in Section 5 and in Section 6 we extend the tests to account for possible biases.

5. Results

In this section we present the results of the performance tests and see whether there is indeed a cost to diversification in markets with private information. Before presenting the Sharpe Ratio and the Jensen Alpha, we present and discuss Fig. 3, which compares international and domestic property companies while correcting for the country allocation of the internationals. In Fig. 2 we presented the performance of all domestic companies versus the performance of the 18 internationals. We explained that the better performance by the domestic companies could be due to overweighing the Far East market, as the internationals did not invest as much in the Far East. Therefore, we re-calculate the index of the domestic companies with a correction for country allocation decisions. It is simply the market weighted summation of all mimicking indices. Fig. 3 shows that the internationals are still outper-

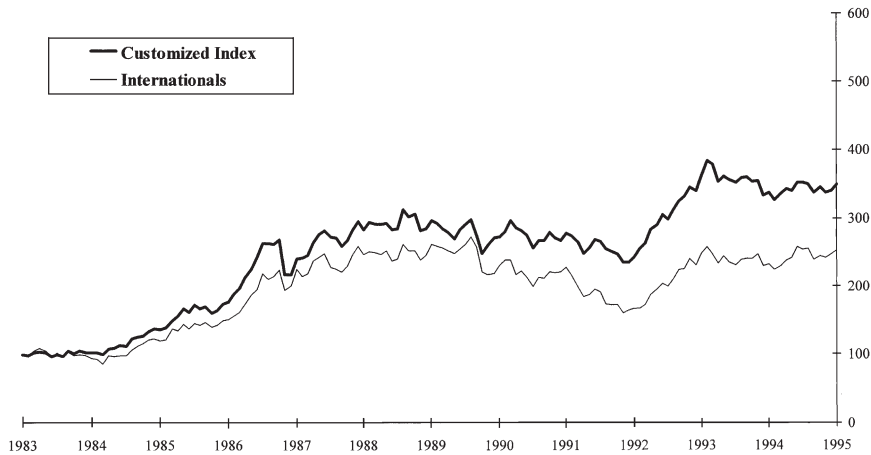


Fig. 3. Internationals versus aggregate customized index.

formed by the domestics. The index of the internationals is exactly the same and increases from 100 in 1984 to 252 in 1995, whereas the aggregate mimicking index increases from 100 in 1984 to 348 in 1995. The average annual returns are 7.7 percent and 10.4 percent respectively. If we make the comparison with Fig. 2, we see that the internationals are still outperformed by the domestic companies, but that indeed some of the difference was due to the country allocation. The remaining average difference of 2.7 percent annually is an indication of the cost of international diversification in non-public markets. This result suggests that international diversification is not a free lunch in private markets.

Table 4 presents the summary statistics for these two indices. This once again shows that the domestic property companies outperform the internationals. We also present in this table the Sharpe ratio of the combined international index and of the aggregate mimicking index. These are 0.12 and 0.31 respectively, which is further evidence for the better performance of the domestics.

To get a more detailed picture of this outperformance, we present Sharpe ratios for the individual international property companies versus the ratios for the corresponding mimicking indices in Fig. 4. The Sharpe measures of the internationals are given on the horizontal axis, while the Y-axis gives the Sharpe measures of the corresponding mimicking indices. Thus, a dot to the right of the 45-degree line implies superior performance for the internationals. The figure shows that only 4 internationals show this superior performance relative to their customized index. The other 14 are beaten by it. The outperformers are Fabege and Hufvudstaden (Sweden), City Developments (Singapore), and Schroders (Netherlands). It seems that the Swedish companies were able to deal with the crash of the domestic real estate market very effectively. Using a one-sample binomial test, we investigate whether the outperformance of the domestic mimicking portfolios is significant. We find a test statistic of 5.56, which has a χ distribution with one degree of freedom and which therefore implies significance at the 97.5 percent level. As a summary measure

Table 4
Performance at portfolio level^a

	1984–1995			1984–1987			1988–1991			1992–1995		
	Mean	St. dev.	Sharpe	Mean	St. dev.	Sharpe	Mean	St. dev.	Sharpe	Mean	St. dev.	Sharpe
Internationals	7.72	17.25	0.04	20.28	19.34	0.20	0.26	16.61	-0.11	2.63	15.35	-0.02
Customized	10.41	15.44	0.09	21.90	18.47	0.24	3.63	14.91	-0.06	5.69	12.04	0.05
Difference	2.70			1.62			3.37			3.06		

^a The table gives annualized monthly summary statistics (mean and standard deviation) in percentages for the portfolio of the international property companies and the market-weighted combination of all customized indices. The Sharpe ratios are calculated on a monthly basis.

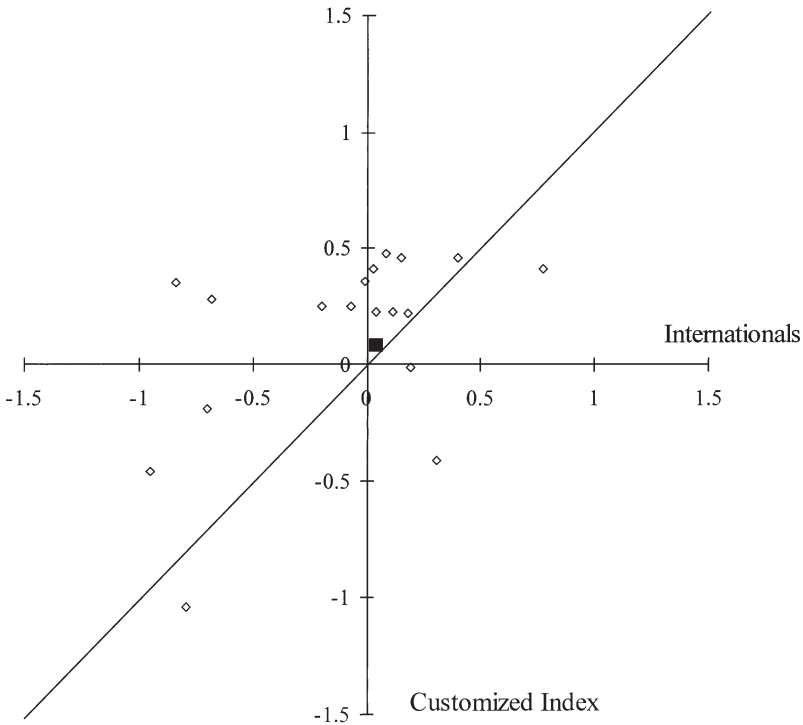


Fig. 4. Sharpe ratios, 1984–1995.

we also present in Fig. 4 the Sharpe ratios of the overall portfolios of indirect and direct real estate investment. This is the solid point in the graph.

Table 5 presents the results of the regression of Eq. (4). It clearly shows that most companies have a negative Jensen α , which suggests that the internationals are outperformed by their own domestic customized indices. However, only Sarakreek has an α that is significantly negative. There are five companies that have a positive α , but none of these values is significant. Three out of the four companies that had a higher Sharpe ratio than their mimicking index have a positive α as well. Only Fabege had a higher Sharpe ratio, but a lower Jensen α . CS Euroreal and Capital & Regional Properties have a positive α , but had a lower Sharpe ratio than their corresponding index.

To test whether the α 's together are significantly different from zero we use a methodology developed by Gibbons et al. (1989). The test statistic reads as follows: $J = \hat{\alpha}'(\text{Var}(\hat{\alpha}))^{-1}\hat{\alpha}$, where $\hat{\alpha}$ is a vector of the estimated α 's for all international property companies. If we calculate the statistic for the whole sample period we get a value of 34.02 which has a χ distribution with 18 degrees of freedom and is therefore significant at the 5 percent level. This means that the international property companies indeed underperform the domestic property companies.

Table 5
Performance^a

	Jensen Alpha 1984–1995						
	α	t	β	$t_{\beta=0}$	$T_{\beta=1}$	n	R^2
Markborough	-2.40	-1.92	1.57	5.76	2.10	64	0.35
Revenue Properties	-1.57	-1.35	0.27	0.85	-2.26	48	0.02
Immobilière Hotelière	-0.72	-0.65	0.49	1.74	-1.81	80	0.04
CS Euroreal	0.05	0.15	0.67	6.32	-3.08	35	0.55
German City Estates	-1.62	-1.82	0.73	2.78	-1.01	60	0.12
Innovest	-0.36	-0.59	0.91	5.28	-0.54	101	0.22
Rodamco	-0.03	-0.07	0.44	4.71	-5.96	144	0.14
Sarakreek Holding	-1.96	-2.90	0.17	1.20	-5.76	132	0.01
Schroders	0.24	0.52	0.75	6.22	-2.04	49	0.45
VIB	-0.22	-0.71	0.66	7.38	-3.80	129	0.30
Wereldhave	-0.28	-0.75	0.73	7.32	-2.67	144	0.27
Fabege	-2.24	-0.85	0.42	3.35	-4.71	60	0.16
Hufvudstaden	2.05	1.04	0.32	3.59	-7.75	36	0.27
Capital and Regional Properties	0.17	0.21	0.99	6.46	-0.08	96	0.31
Hammerson	-0.71	-1.37	1.56	13.86	5.00	144	0.58
MEPC	-0.38	-1.15	1.18	21.06	3.19	80	0.76
Slough Estates	-0.19	-0.39	1.23	15.76	2.99	132	0.66
City Developments	1.28	1.80	1.02	9.36	0.17	84	0.52
Internationals Index	-0.21	-1.05	0.98	21.37	-0.53	144	0.76

^a This table gives the results of the estimation of Eq. (4). Column 2 gives the estimation of α in percentages. Column 3 gives the corresponding t -statistic. Column 4 gives the β estimation. Column 5 gives the t -statistic for β equal to zero and column 6 gives the t -statistic for β equal to one. Column 7 gives the sample length and column 8 the R^2 .

6. Explanation of the test results

In this section we discuss our test results. We will give several possible explanations and discuss and test their impact on our information hypothesis.

6.1. Transaction costs

A possible difference in performance might be caused by the transaction costs. Even though there is quite a huge literature on index tracking, which means that the funds don't have to buy all funds in the index to have roughly the same return characteristics as the index itself, they still have to buy many individual property companies to mimick the portfolio.⁵ The cost to mimick the portfolio was not

⁵ Another possible explanation for the difference in performance could be the service international property companies offer investors. By buying the shares of international property companies investors don't have to face transaction costs to purchase different properties themselves. It could be possible that they are willing to pay a premium for this service.

included in the analysis so far, whereas for the international property companies these costs are already reflected in the stock returns. To correct for this possible bias we calculate the monthly changes in the weights of the portfolio.

$$\Delta W = \frac{\sum_{i=1}^N |W_{i,t} - W_{i,t-1}|}{N}, \quad (5)$$

in which N is the number of datapoints that we have, w is the weight of the particular property company in a single country. In our sample we have a total of 1702 datapoints (from 18 companies with a maximum of 144 months), which gives a W equal to 1.36%. This means that 0.86% of the total portfolio is bought and sold each month. If we annualize this figure we get a 16.32% change in the portfolio each year. This number does not incorporate the initial purchase of the portfolio or possible expansion of the portfolio. To estimate the cost involved with this change in the portfolio we surveyed some banks in Europe and asked them for the transaction cost they use in their calculations. For Europe they use 0.50% as an estimate for the cost to buy stocks, 0.75% for stocks in the United States, and 1.00% for stocks in the Far East. If we combine these figures with the change of the portfolio we get a total cost figure of maximum 0.20%, which we should subtract from the difference between the internationals index and the mimicked index. This means that the calculated difference of 2.7% should be reduced to 2.5%, which is still a very significant number. The cost to mimic the portfolio is therefore not a possible explanation for the underperformance of the international property companies.

6.2. Currency and leverage effects

The international property companies might influence the performance by hedging some of the currency risk and by using debt to finance the properties as well. We calculated the mimicked index in all previous tests on an unhedged basis. This means that these indices do not incur the cost to hedge the portfolio. Furthermore, the internationals as well as the domestic property companies might use debt to finance the operations, which might influence the results. To correct for these effects several tests are possible. We chose, to be consistent with our previous tests, to expand Eq. (4) in the following way:

$$R_{it} - R_{ft} = \alpha_i + \beta_i(R_{mt} - R_{ft}) + \gamma_l R_{bj,t} + \gamma_{yen} R_{yen,t} + \gamma_{DM} R_{DM,t} + \varepsilon_{it}, \quad (6)$$

in which the last three R terms are added to the equation. The first variable corrects for the leverage and the last two for the currency. We estimate this equation for each fund with OLS as all variables are orthogonal to the error term. For $R_{bj,t}$ we use the monthly yield on the all lives government bond index for the United States calculated by Datastream. $R_{yen,t}$ and $R_{DM,t}$ represent the logarithmic return on exchange rates between the US dollar with the Japanese Yen and the German Mark respectively. We chose these currencies as they capture most variation in the exchange rate market.

Table 6 presents the results of the estimation of Eq. (6) for all funds. For the three factors, we extend the model with, we present the t -statistics to see whether they influence the analysis. The first factor is the yield on the U.S. government bond, correcting for leverage effects. For none of the companies is the coefficient significant. Furthermore, in contrast to expectation its value is negative for only seven companies. We had expected that the value would be negative since the property companies are financing their operations with debt. In this case an increasing yield would have a negative effect on performance. The currency effects are larger. The German Mark, in particular, has a significant impact on the performance of 6 companies and the Japanese Yen on one. In our sample 10 companies have a negative coefficient, which means that the performance is negatively affected if the exchange rate increases.

The use of the correcting factors has an effect on our measure of outperformance as well. First of all none of the companies give a significant out- or underperformance anymore. Secondly, the number of companies with a positive value of α increased to seven. This means that the factors indeed do explain parts of the performance of the property companies.

To see whether there is still information left in the error term, we use the Q -statistic. The critical value for 10 lags is 18.31. In Table 6 we see that we reject the hypothesis of white noise for three companies. These companies are Schrodgers, Wereldhave and Hammerson. The return of all other property companies is explained by the explanatory variables.

6.3. Size effects

An effect that gives investors the possibility to reduce the cost of information is to grow in size. Our hypothesis is that international property companies can overcome the information disadvantage as they grow larger. In this way they can become so big that they are actually a local player. As a fact we can show that there exists a positive correlation between market capitalization and the α of a property company by doing the following regression:

$$\alpha_i = \gamma_0 + \gamma_1 X_i + \eta_i, \quad (7)$$

in which α_i is the result of Eq. (4) for company i , and X_i is the average market size of property company i . We assume that the market capitalization is a good proxy for the size of the portfolio, which is relatively rough as internationals have different debt ratios.

The results for regression for Eq. (7) show that the value of γ_1 is significantly positive at the 5 percent level. This means that a property company can benefit from scale advantages to deal with the information problems more effectively. This could be a reason for the higher market capitalization of internationals compared to domestic companies as shown in Section 3.

Table 6
 Estimation of the extended model^a

	α	β	t_{lev}	t_{Yen}	t_{dm}	R^2	Q_{stat}
Markborough	-8.56 (-0.77)	1.61 (5.64)	0.55	-0.14	0.36	0.35	12.08
Revenue Properties	9.32 (0.70)	0.22 (0.62)	-0.82	-0.11	1.08	0.07	11.02
Immobilière Hotelière	-5.99 (-0.66)	0.93 (2.60)	0.61	1.55	0.86	0.10	5.43
CS Euroreal	-1.22 (-0.69)	0.14 (1.54)	0.70	0.30	-7.51	0.87	2.40
German City Estates	5.02 (0.60)	0.45 (0.30)	-0.77	1.07	-0.32	0.15	7.64
Innovest	1.43 (0.31)	0.64 (3.31)	-0.46	-1.84	-1.14	0.31	11.35
Rodamco	0.52 (0.34)	0.28 (3.53)	-0.54	-0.16	-6.40	0.44	17.30
Sarakreek Holding	-7.00 (-1.59)	0.19 (1.32)	1.15	-0.73	0.49	0.03	12.06
Schroders	-0.67 (-0.14)	0.60 (4.40)	0.16	0.77	-3.84	0.61	14.88
VIB	-2.00 (-1.03)	0.38 (3.60)	0.85	-0.54	-3.22	0.41	19.71
Wereldhave	-0.99 (-0.55)	0.42 (3.30)	0.32	-1.14	-3.14	0.37	11.21
Fabege	17.31 (0.73)	0.37 (2.83)	-0.86	-1.14	1.53	0.21	30.02
Hufvudstaden	32.86 (1.71)	0.35 (3.62)	-1.61	0.69	-0.83	0.34	13.10
Capital and Regional Properties	-4.04 (-0.62)	1.00 (6.23)	0.65	-0.28	-0.24	0.31	13.03
Hammerson	-2.67 (-1.01)	1.53 (12.97)	0.72	-1.11	0.01	0.58	13.80
MEPC	-1.48 (-0.87)	1.16 (19.44)	0.63	-0.58	-0.42	0.76	20.10
Slough Estates	-1.15 (-0.46)	1.24 (15.12)	0.36	-2.21	2.39	0.67	8.37
City Developmental	6.21 (1.14)	1.01 (8.99)	-0.91	0.10	0.33	0.52	18.10
Internationals Index	-0.13 (-0.14)	0.89 (20.33)	-0.22	-0.56	-4.11	0.81	8.12

^a This table gives the results of the estimation of Eq. (6). Column 2 and 3 give the estimation α and β . The t -statistics are in parenthesis. Columns 4 through 6 give t -statistic for the leverage effect, the exchange rate with the Japanese Yen, and the German Mark. Both exchange rates are stated in foreign currency per 1 U.S. dollar. Column 9 gives the R^2 and the last column the Q -statistic. We calculated this value with 10 lags, which gives a critical value of 18.31 with a confidence level of 95%. The statistic is χ -distributed. For our sample this means that for most companies the error terms are white noise.

7. Conclusion

There is a trade-off between the costs and benefits of international diversification. This paper shows that the costs for property investors can be reduced substantially through investments in public real estate securities, which concentrate on their local, domestic market. We compare the performance of 18 international operating property companies over the sample period 1984 through 1995 with the performance of property companies operating on their domestic market. We find that the international companies underperform the domestic companies. We further find that this difference is not due to factors such as transaction costs, leverage, and currency. Size appears to be the only factor that can improve the performance of the international property companies.

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