

Diversification Potential from Real Estate Companies in Emerging Capital Markets

***Executive Summary.** This study uses the Emerging Markets Data Base from the International Finance Corporation to examine emerging market real estate as an asset class using data on companies classified as real estate firms by SIC codes. It documents the paucity of such firms until very recent years and notes some limitations in their use as proxies for the underlying real estate investment opportunities. Nevertheless, the results indicate that real estate in emerging markets provides diversification benefits to common stock portfolios and real estate portfolios. Emerging market real estate has experienced high risk in recent years, but the returns from emerging market real estate have generally low correlations with the returns on portfolios of developed-market stocks and/or real estate. This study also describes investment restrictions that limit foreign access to direct investment in emerging market real estate. The relaxation of such restrictions in the case of other asset classes has been met with significant increases in market values. Finally, institutional facts about emerging markets that have acted to limit public ownership of real estate assets within those markets are described.*

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INTRODUCTION

Previous research has shown that real estate investment can reduce the risk level of portfolios containing mostly stocks and bonds. In real estate-only portfolios, benefits of diversification have been noted across geographic areas, property types and economic regions. Opportunities for real estate diversification across countries have also been documented.¹

Recently, a great deal of interest has developed in emerging capital markets (EMs). Institutional investors, such as pension funds and insurance companies, have begun creating or increasing commitments to emerging markets in their equity and debt portfolios. Emerging markets potentially offer substantial diversification benefits to investors holding U.S.-only or industrialized country portfolios.² Therefore, the flow of portfolio capital to emerging markets has seen an unprecedented expansion; from just \$150 million in new investment in 1984, portfolio equity flow rose to about \$40 billion in 1994, according to statistics in the *Emerging Stock Markets Factbook 1995*. Although interest is rapidly increasing in investment opportunities in emerging markets, little is known about real estate as an investment vehicle in those markets.

The International Finance Corporation (IFC) defines an EM as a capital market in a developing nation. Developing countries are defined for IFC purposes as nations with per capita gross national product (GNP) of \$8,625 or less at year-end 1995.

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These countries contain over 80% of the world's population, but have less than 15% of the world's equity market capitalization and about 20% of the world's GNP. Many of these countries have recently begun to ease restrictions against private enterprise, to privatize state-owned assets and reduce trade barriers. These newly liberalized economies are thought by many to offer the prospects of significantly greater economic growth than most developed markets. The relatively high population densities in many emerging markets and high growth rates in GNP suggest that they may provide significant potential for real estate investment.

This study is the first to examine the risk and return attributes of real estate companies in emerging capital markets. It examines the diversification possibilities offered by real estate companies in EMs and finds that, similar to real estate companies in developed countries, real estate companies in EMs experienced lackluster performance over the six years examined, 1989-1995. On the other hand, the EM real estate companies also experienced relatively low correlations with real estate in developed markets and with stock markets in emerging markets and developed markets.

However, there remain substantial restrictions against real estate investing in emerging markets, although the broad trend is toward the relaxation of economic restrictions. A more lasting impediment may be the ownership structure of real estate in the EMs.

The next section presents the risk and return attributes of real estate companies in EMs and provides comparisons with companies in developed markets. The third section focuses on portfolio diversification using EM real estate, developed-market real estate, and developed-market common stock investments. Section four discusses issues regarding access to real estate investments in EMs. The final section contains concluding remarks.

RISK AND RETURN ATTRIBUTES OF EMERGING MARKET REAL ESTATE

In this section, the International Finance Corporation's (IFC's) Emerging Markets Data Base (EMDB) is used to examine value-weighted portfolios of emerging market companies. The equity portfolio includes all companies from twenty-six

emerging markets with available data from the IFC. The twenty-six emerging markets are listed in Appendix Exhibit A. The EM real estate portfolio is also based on value-weighted portfolio returns. The real estate portfolio consists of all companies in the EMDB classified as real estate companies (based on SIC codes) by the IFC. Only nine of the markets included any companies classified as real estate companies. Although these companies have extensive real estate holdings, some derive much of their income from real estate development activities.³ Issues regarding the data are discussed in section four. Details regarding the return calculations are provided in Appendix 1.

For developed markets, equity market and real estate data compiled by Salomon Brothers are examined.⁴ The analysis of developed-market performance is based on indices. The developed-market equity and real estate indices are referred to herein as developed market (DM) equity and developed market real estate, respectively. The DM equity and real estate indices are based on data from a total of about 6,000 companies in twenty-two countries. Companies with available capitalization greater than \$100 million are included. Each stock is weighted by its float. Float is that portion of total equity in a company that is available for investment as opposed to total equity capital. Restricted shares are excluded from float. Float excludes from these items: corporate cross holdings, private control blocks, government holdings, and legally restricted shares. The developed market common equity and real estate returns are based on float-weighted indices.

Exhibit 1 shows risk and return measures based on performance experienced from July 1989, through June 1995. Common stocks outperformed real estate during the given time period in DMs and in EMs. DM equities had lower standard deviations for monthly returns and higher mean monthly returns (using arithmetic or geometric mean returns) than did DM real estate. EM equities outperformed EM real estate in a similar manner. The DM equity index experienced a .74% average monthly return while the DM real estate index experienced only a .24% average monthly return. The monthly geometric mean for DM equity during this time period is 0.66%, versus .08% for DM real estate. The DM real estate index experienced a higher standard deviation for monthly returns than the DM equity

index (5.71% versus 4.10%, respectively). As shown in the last line of Exhibit 1, a \$1,000 investment in the DM equity index beginning in July 1989 would have grown to \$1,608 by the end of June 1995, a compound average gain of 8.24% per year. The same investment in the DM real estate index would have grown only to \$1,057 over the same time period, a compound average gain of only .93% per year.

Similar to the results for the DM indices, common equity in emerging capital markets also outperformed real estate companies in those markets. The EM equity index experienced a .66% average monthly return while the real estate companies in

EMs experienced a .36% average monthly return.⁵ The monthly geometric mean for EM equity during this time period was .49%, versus a *negative* .19% for EM real estate. Real estate companies in EMs experienced almost twice the variation (as measured by standard deviation in returns) as the equity (10.69% versus 5.94%). An investment of \$1,000 in the EM equity index beginning in July 1989, would have grown to \$1,420 by the end of June 1995, a total gain of 42%. A similar investment in the EM real estate index would have ended with an \$875 value over the same time period, a loss of 12.5% of its value.

Exhibit 1: Risk and Return Characteristics of Real Estate and Equity Indices July 1989 - June 1995

	(A) Developed Markets Equity Index	(B) Emerging Markets Equity Index	(C) Developed Markets Real Estate Index	(D) Emerging Markets Real Estate Index
Monthly Return Geometric Mean	0.66%	0.49%	0.08%	-0.19%
Monthly Return Arithmetic Average	0.74%	0.66%	0.24%	0.36%
Monthly Return Standard Deviation	4.10%	5.94%	5.71%	10.69%
Terminal Value of \$1,000 Investment (E)	1,608	1,420	1,057	875

(A) The Developed Markets Equity Index is float weighted based on equity data for about 6,000 companies in 22 countries compiled by Salomon Brothers.

(B) The Emerging Markets Equity Index consists of returns on a value-weighted portfolio made up of companies from 26 emerging markets based on data collected by the IFC.

(C) The Developed Markets Real Estate Equity Index is float weighted based on equity data for real estate companies in developed markets compiled by Salomon Brothers.

(D) Emerging Markets Real Estate Index consists of returns on a value-weighted portfolio made up of companies from 9 emerging markets based on all available real estate data collected by the IFC.

(E) Terminal Value assumes \$1,000 invested in July 1989, and that all gains are reinvested in the same asset class until June 1995.

Exhibit 2 illustrates the performance of the various indices in greater detail over the six-year period studied. It shows that the performance of EM real estate varied dramatically across the period. EM real estate companies registered very high gains through August 1990, outpacing all the other asset categories examined. They then fell sharply through December 1990. The companies showed very high returns during July 1993 through January 1994, and then they entered a nearly uninterrupted decline through the end of the period. Note that the EM real estate companies entered this latter decline nearly a year before the collapse of the Mexican peso in December 1994. Thus, this market is subject to very dramatic turns, producing a high monthly standard deviation of returns.

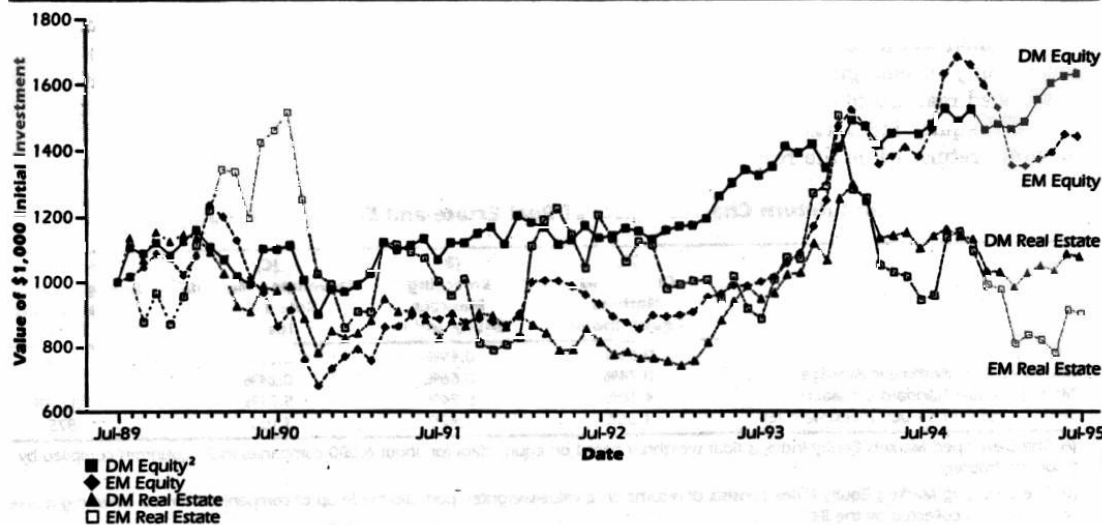
Exhibit 3 shows that real estate companies in EMs experienced returns comparable to DM real estate companies in most of the developed nations included in the Salomon database. Real estate indices in Canada, Italy, the Netherlands, Spain, Sweden, Japan, and the United Kingdom experienced a lower return than did the EM real estate index. On the other hand, real estate indices in Australia, Belgium, France, Hong Kong, Singapore, Switzerland, and the U.S. experienced a higher return than the real estate EM index. Although the EM real estate index ranks near the middle in return performance, it is the third most volatile real estate index in spite of being diversified across nine EM economies.⁶ Only the real estate indices for Sweden and Japan experienced a higher standard deviation of monthly returns than

the EM real estate index (13.91% and 10.84%, respectively, versus 10.69%).

Overall, common equity outperformed real estate during the six years ending in June 1995. Focusing on performance across real estate markets,

EM real estate companies experienced similar returns to DM real estate companies, but EM real estate companies experienced higher return variation than did DM real estate companies.

Exhibit 2: Equity and Real Estate Compounded Performance,¹ July 1989 - June 1995



¹ Values shown are the compounded value of \$1,000 initial investment made at the beginning of July 1989, and held through the subsequent dates. All portfolio gains are assumed to be reinvested in the same portfolio.

² DM designates portfolios constructed from equity or real estate from all developed markets in the study.

DIVERSIFYING WITH EM REAL ESTATE COMPANIES

International diversification benefits have been well documented for both common stock and real estate markets.⁷ Diversification opportunities within real estate portfolios have been reported across geographic areas, property types and economic regions. Real estate markets in a given locale tend to have high systematic risk within the locale but tend to have a comparatively low correlation with markets in other regions. Hence, there may be diversification opportunities available from real estate companies in EMs for real estate investors in DMs.

The diversification benefits of EM real estate are examined using the stock prices of real estate companies rather than by directly observing the values of the underlying real estate. This procedure

is applied because there are no readily available data on the real estate values themselves. Such a procedure probably biases the results toward higher estimated correlations than would be obtained from the underlying real estate assets themselves. Securitized real estate returns appear to be influenced both by movements in the stock markets in which they are traded and by changes in the values of the underlying real estate.⁸ Hence, the use of securities representing ownership in real estate can be expected to reflect greater volatility than the underlying assets and to experience a higher covariance with the equity market than would the real estate assets themselves.⁹ However, the literature on this issue does not reflect a consensus. Ross and Zisler (1991) postulate that the volatility of securitized real estate prices overstates real estate risk and that true real estate

Exhibit 3: Real Estate Performance in Emerging and Developed Markets, July 1989 - June 1995

(A) Market Name	(B) Monthly Return Geometric Mean (%)	(C) Monthly Return Arithmetic Mean (%)	(D) Monthly Return Standard Deviation (%)	(E) Compounded Value of \$1,000 (%)
Emerging Markets	-0.19	0.36	10.69	875
Developed Markets	0.08	0.24	5.71	1,057
Europe	-0.27	-0.13	5.23	824
Europe, Pacific/Asia	0.14	0.34	6.34	1,109
Asia Pacific	0.34	0.63	7.86	1,275
North America	-0.33	-0.25	3.89	790
Australia	0.22	0.30	4.14	1,168
Belgium	0.09	0.31	6.73	1,069
Canada	-3.02	-2.70	8.06	110
France	0.09	0.21	4.95	1,068
Hong Kong	1.98	2.43	9.90	4,106
Italy	-2.45	-2.02	9.13	168
Japan	-0.70	-0.12	10.84	604
Netherlands	-0.62	-0.54	4.10	637
Singapore	1.25	1.58	8.20	2,439
Spain	-0.87	-0.43	9.24	534
Sweden	-1.39	-0.50	13.91	365
Switzerland	0.53	0.69	5.80	1,464
United Kingdom	-0.24	-0.01	6.69	844
United States	-0.07	0.00	3.87	951

(A) Real Estate in Emerging Markets is composed of listed real estate companies from 9 EMs in the IFC database. The remaining markets (and regions) are based on data for real estate firms in developed markets compiled by Salomon Brothers.

(B) Geometric Mean is calculated using data from July 1989 through June 1995.

(C) Arithmetic Mean is calculated using data from July 1989 through June 1995.

(D) Monthly Return is calculated using data from July 1989 through June 1995.

(E) Compounded Value assumes \$1,000 invested in July 1989, and that all gains are reinvested in the same asset class until June 1995.

returns are between REIT and appraisal-based returns. Giliberto (1990, 1993) and Geltner (1990) report common factors for securitized and unsecuritized real estate returns. Certainly, the underlying asset and securities based upon it are related. Barkham and Geltner (1993) provide evidence that price changes in unsecuritized real estate follow changes in securitized returns, i.e., market prices change in the more liquid security market before changes are realized in the real estate market itself.

Subject to those caveats, the data can be used to examine the extent to which returns from real estate companies covary with their local stock market. Also, given the covariation, one can examine whether a positive investment in EM real estate would be included among the efficient alternative portfolios based on a particular DM's portfolio. Column B of Exhibit 4 shows the correlation between DM real estate companies and DM common equity returns within each developed market examined. The first entry in Column B is the

correlation between EM equities and EM real estate companies: .54. This value compares to a correlation of .84 between DM real estate returns and DM equity returns, as is seen in the second entry in Column B under the title "Developed Markets." Within individual markets, however, real estate and equity return correlations vary widely, suggesting a wide range of potential real estate diversification benefits.

Column C of Exhibit 4 shows that all DM real estate indices have a lower correlation with the EM real estate index than with their respective DM equity index. This suggests that EM real estate companies may assist in reducing the risk faced by real estate investors in developed nations. For example, an investor holding a diversified portfolio of North American real estate can potentially benefit from EM real estate due to a correlation coefficient of 0.25 between their returns. A European portfolio had a correlation of just 0.21 with EM real estate.

Exhibit 4: Real Estate Return Correlations

(A) Market Name	(B) Correlation Real Estate vs Equity Index	(C) Correlation Real Estate vs EM Real Estate	(D) Minimum Portfolio Variance Weights of EM Real Estate (%)	(E) "Cutoff" Value of Correlation Shown in Column (C)
Emerging Markets	.54	1.00	50.00	1.00
Developed Markets	.84	0.35	10.85	0.53
Europe	.86	0.21	13.03	0.49
Europe, Pacific/Asia	.83	0.34	15.75	0.59
Asia Pacific	.75	0.35	27.61	0.73
North America	.72	0.25	4.37	0.36
Australia	.82	0.12	9.71	0.39
Belgium	.52	0.30	20.55	0.63
Canada	.60	0.26	31.76	0.75
France	.74	0.10	14.89	0.46
Hong Kong	.97	0.48	42.71	0.93
Italy	.66	0.25	39.61	0.85
Japan	.92	-0.06	50.67	0.38
Netherlands	.54	0.11	9.97	1.00
Singapore	.92	0.52	23.85	0.77
Spain	.75	0.22	40.78	0.86
Sweden	.66	0.00	62.91	1.00
Switzerland	.64	0.39	9.51	0.54
United Kingdom	.82	0.20	23.31	0.63
United States	.69	0.21	5.77	0.36

(A) Real Estate in Emerging Markets is composed of listed real estate companies from 9 EMs in the IFC database. The remaining markets (and regions) are based on data for real estate firms in developed markets compiled by Salomon Brothers.

(B) The correlation between the real estate index in each market and that market's common equity index. The correlation is calculated using monthly return data from July 1989 through June 1995.

(C) The correlation between the real estate index in each market and the real estate index for emerging markets. The correlation is calculated using monthly data from July 1989 through June 1995.

(D) This is the weight of emerging market real estate making up the minimum variance real estate portfolio.

(E) The upper bound on the correlation such that EM real estate is included in the minimum variance real estate portfolio. EM real estate would be included in the minimum variance real estate portfolio as long as the correlation calculated in column (C) is less than the critical value shown in column (E).

The low correlations can help to reduce the risk of DM real estate portfolios. Exhibit 5 shows the risk and return of portfolios constructed by investing in DM real estate and in EM real estate companies. The point "DM RE" consists of a 100% investment in the DM real estate portfolio (comprised of all DMs in the study), and the point "EM RE" represents a 100% investment in EM real estate. The portfolios in between those two extremes represent successive 5% changes in the portfolio allocations. Notice in particular that the portfolio containing only developed market real estate (DM RE) is dominated in risk-return space (i.e., there are other portfolios that have both lower risk and higher mean returns). Although the EM real estate index experienced a relatively high standard deviation of monthly returns, an investor

in the DM RE index can reduce overall portfolio risk by investing in EM real estate companies.

The minimum variance portfolio for an investor holding the DM RE index and adding EM real estate is achieved by investing about 11% in the EM real estate index. Clearly, during the time period examined, DM real estate investors could have achieved a better risk-return trade-off by including EM RE in their portfolios.

More direct evidence of the value of EM real estate is found by calculating the minimum variance combination of each DM's real estate index portfolio with EM real estate. Let W^*_{EM} refer to the weight of the EM real estate portfolio in its minimum variance combination with a portfolio from a particular market. The minimum variance weight is given by:

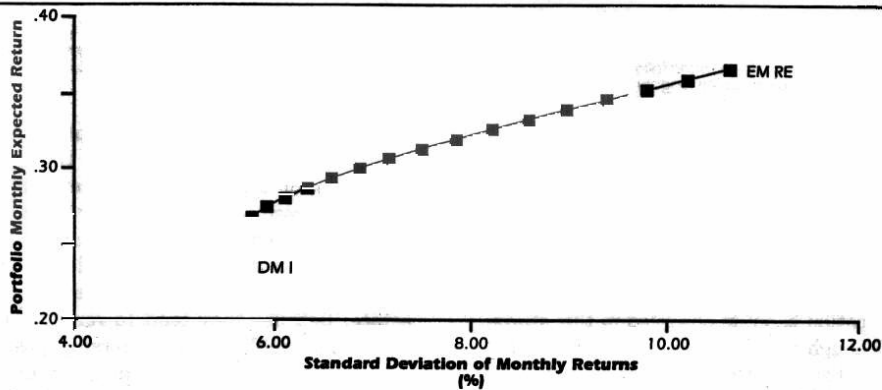
$$W^*_{EM} = \frac{\sigma^2_D - \rho_{EM,D} \sigma_{EM} \sigma_D}{\sigma^2_{EM} + \sigma^2_D - 2\rho_{EM,D} \sigma_{EM} \sigma_D} \quad (1)$$

Column D of Exhibit 3 shows the minimum variance weights of EM real estate in combination with various alternative portfolios. For example, a U.S. investor in real estate would find that a 6% allocation to EM real estate would produce the minimum variance portfolio. On the other hand, a Belgian, Canadian or British minimum variance combination would include 20.55%, 31.76%, or 23.31%, respectively, invested in EM real estate, and in other developed nations (such as Japan and Sweden) the EM allocation would be even greater (up to 62.91%).

Given the minimum variance weight from equation (1), the correlation necessary to include EM real estate at a positive level in efficient portfolios in combination with the various alternative

DM portfolios can be calculated. The solution is simply to find ρ such that $W^*_{EM} \geq 0$. The worst case assumption is that EM real estate has greater volatility and lower expected return than the alternative portfolio. Under this assumption, the upper bound on the correlation for including EM real estate in the minimum variance portfolio (and, hence, in efficient portfolios in general) is $\rho = \sigma_D/\sigma_{EM}$. Column E of Exhibit 3 shows the values of this "cutoff" correlation value for each of the markets included in the study. If the standard deviation estimates are accurate, EM real estate would be included as long as the correlation is less than the critical values shown. When we compare columns C and E, we note that in general there is room for significant estimation error in ρ before it is no longer advisable to include EM real estate in a real estate portfolio for most of the developed markets studied.

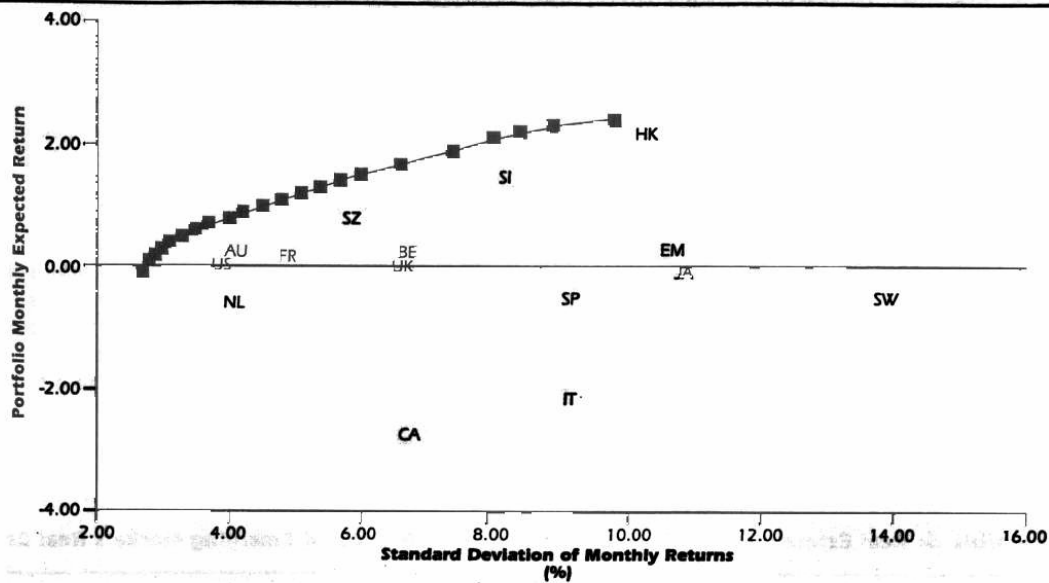
Exhibit 5: Real Estate Portfolio Risk and Return,¹ Developed and Emerging Markets Real Estate



¹ Portfolio expected return and standard deviation are based on historical data over July 1989 through June 1995. The expected return is based on the arithmetic average of monthly returns, and the standard deviation is also calculated using monthly returns.

Exhibit 5 is based on a rigid DM portfolio. It assumes that an investor who includes DMs in the portfolio must include each DM in proportion to the market value of all assets in that market as represented by its float value (i.e., the market value of assets estimated to be available to the investors). Exhibit 6 extends the analysis by permitting asset allocations on an individual country basis and shows the efficient frontier for this

broader opportunity set. It also shows the relative position in risk-return space of various developed-market real estate portfolios and the portfolio of EM real estate. By relaxing the assumption of fixed relative weights, Exhibit 6 permits a much broader range of portfolio choices. The minimum variance portfolio in Exhibit 6 includes a small allocation to EM real estate (around 1%).

Exhibit 6: International Real Estate,¹ Efficient Frontier

¹ Portfolio expected return and standard deviation are based on historical data July 1989 through June 1995. The expected return is the arithmetic average of monthly returns, and the standard deviation was calculated using monthly returns. All returns are for real estate portfolios in the following markets: AU = Australia; BE = Belgium; CA = Canada; FR = France; HK = Hong Kong; SZ = Switzerland; UK = United Kingdom; US = United States; and EM = Real Estate in Emerging Markets.

Unfortunately, dollar allocations based upon historical returns often do not produce optimal results based on future portfolio performance.¹⁰ Thus, the use of ex post parameter estimates for ex ante portfolio allocations remains an open issue. Research must await improved data availability in order for one to examine the sustainability of the diversification benefits observed in this study.

Although there may be large potential diversification benefits from investing in real estate companies in EMs, there are problems investors face beyond those related to dollar allocation decisions and poor historical data. These problems are the subject of the next section.

ACCESS TO REAL ESTATE INVESTMENTS IN EMERGING MARKETS

There are numerous impediments to foreigners who wish to invest in real estate in an EM. The limited number of available companies for this study is indicative of the problem of limited access.¹¹

Perhaps the most important impediment to investing in EM real estate is the institutional structure of real estate markets in emerging nations. Those markets are characterized by concentrated economic wealth in the hands of large family-owned or controlled holding companies. These private companies hold vast amounts of real estate. Because they tend to remain private and not to sell publicly the ownership positions they hold in the underlying assets, much of the important real estate in emerging markets is simply not available to the market. Family groups are often a product of long histories of economic and political instability in combination with poorly developed security markets. The problem becomes circular. Family groups are reluctant to sell their assets in public markets that are not well developed, and the markets do not develop fully as long as a large fraction of available assets are held off the market.

Emerging markets are also characterized by a much higher percentage of economic assets owned by the government in comparison to developed

markets. The recent trend has been to move away from state ownership, but currently a relatively large amount of assets are in the hands of governments in most EMs.

EMs also impose legal restrictions on the ownership of real estate by foreign individuals and corporations. Most make a distinction between direct ownership of real estate by foreigners and foreign ownership of domestic companies that own real estate.¹² Appendix 2 provides a summary of both these types of restrictions for the EMs that are included in the EMDB and that have real estate companies in this study's sample.

Most of the restrictions imposed by EM countries on land ownership by foreigners are in agricultural and extractive resource properties and along borders and seacoasts. However, most of the countries permit foreign ownership or long-term leases in the types of development properties that typically would be categorized as income-producing real estate, such as rental housing, retail, office, and industrial properties. These property types encompass most of the securitized real estate in developed markets. Thus, the restrictions imposed by EM governments do not unduly restrict foreign access to real estate.

CONCLUSIONS

Currently, little is known about real estate in emerging capital markets. This study reports the risk and return attributes of real estate companies in EMs. These companies have experienced comparable returns to real estate companies in developed markets, but with higher volatility in returns. Low correlations between returns from EM real estate companies and returns from real estate companies in developed nations provide potential diversification benefits for international real estate investors. The results further indicate that the risk associated with the real estate portfolios of each of the developed markets included in the study would have been reduced by including at least some investment in EM real estate.

Due to data limitations, this study estimated the performance characteristics of EM real estate by using companies listed on the Emerging Markets Data Base of the International Finance Corporation (using SIC codes). The use of such

companies may tend to understate the relative value of EM real estate in diversifying portfolios of developed-market real estate.

Also enumerated in this study are investment restrictions and institutional factors that presently limit access to EM real estate for foreign investors. The trend is toward the lowering of formal barriers to real estate investment, but the ownership structure remains an important impediment.

Some important issues remain. This study needs to be extended with a longer time period to guard against results that are time-period specific. A larger sample of companies is needed since relatively few companies in the Emerging Markets Data Base fit the category of real estate companies, and those that were included represent only nine of the twenty-six markets covered by the EMDB. Finally, a future study needs to have access to more detailed information about the nature of the companies included in the sample to address whether the companies represent real estate itself or specific aspects of the real estate business, such as development or other activities.

NOTES

1. Norman, Sirmans and Benjamin (1995) review several studies focused on diversification benefits from real estate. Eichholtz (1996) compares the international diversification benefits for real estate to those available using only stocks and bonds.
2. Barry and Lockwood (1995) review recent research in the literature on emerging capital markets.
3. For companies that had data in Worldscope through the Dow Jones News Retrieval Service, 100% of their companies' income was generated in the country in which they were listed.
4. Steven P. Laposo from Price Waterhouse LLP provided these data for this study.
5. It is interesting to note that DM equity outperformed equity in EMs during the period examined. EM equity has typically been characterized as providing higher returns along with higher risk. EMs did experience higher returns in the second half of the 1980s but not in the first half of the 1990s. Furthermore, for the longer period beginning in December 1975, EMs experienced lower mean returns than U.S. equity indices. See Barry, Peavy and Rodriguez (1997).
6. However, the size of the emerging market portfolio is relatively small due to data limitations.
7. For example, Solnik (1974) and Lessard (1976) provide early evidence of the benefits of global equity diversification in developed markets, and Errunza (1977) provides similar evidence regarding developing (emerging) markets. Bailey and Stulz (1990) is a more recent example.

Eichholtz (1996) examines diversification opportunities in international real estate markets, focusing on developed markets.

8. In a similar vein, Bekaert and Urias (1994) report that the observed diversification benefits of EM portfolios for portfolios of developed-market stocks are not provided by closed-end funds of emerging market stocks. In other words, the underlying stock indices from EMs appear to offer very substantial benefits in terms of diversification, but closed-end funds of those same markets do not provide benefits at the same level as do the underlying markets.
9. An alternative is to use appraised values to examine the issues. However, returns based on appraisals are not based on market transactions and suffer from appraisal-based smoothing. Nevertheless, Goetzman and Ibbotson (1990) suggest that appraisal-based indices more closely reflect changes in real estate values than do real estate security prices, but Ennis and Burik (1991) claim that the volatility of REIT returns is consistent with true real estate volatility. In any event, appraisals are less well developed in EMs. Consistent data on appraisals were unavailable for this study.
10. Pagliari et al. (1995), report that using historical risk and return inputs for ex ante real estate portfolio allocation analysis may lead to suboptimal results in the sense that the selected portfolio may not lie on the ex post efficient frontier. This is a well-known result in the empirical literature on mean-variance analysis of common stock portfolios. See, for example, Bawa, Brown and Klein (1979) and the numerous references therein. Harvey (1994) suggests that emerging market return predictability can be used to produce forecasted inputs for portfolio optimization. He shows that ex-post performance is enhanced when conditional information for emerging markets is employed in the optimization process.
11. Investors may find barriers to information even for the companies with return data. Investors might not be familiar with the languages, accounting systems, or taxation systems found in emerging markets. Legal requirements for disclosure of financial information are often less stringent in EMs than in the U.S.
12. Bonser-Neal et al. (1990) examine investment restrictions and their relation to premia on closed-end funds that invest in particular countries. They show that the restrictions significantly affect fund values. As restrictions are relaxed and access to the markets increased, the premia on closed-end funds decline.
13. Some of the companies have multiple classes of shares. Each class of shares issued by a company is treated as if it were a separate company.
14. IFC Global Indices try to capture the market movements by including 60%-75% of the total capitalization of all shares listed on a given stock exchange.
15. The information in this appendix was obtained from three reference sources: International Finance Corporation (1993), National Trade Data Bank, and JLW Property Consultants (1994). See References for a complete citation.

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Appendix Exhibit A: Markets Included in IFC Emerging Markets Database

Market Name	Date Data Available ^a
Emerging Markets Equity Index December, 1975 ^b	
Europe	
Greece	December, 1975
Hungary	December, 1992*
Poland	December, 1992*
Portugal	January, 1986
Turkey	December, 1986
Latin America	
Argentina	December, 1975
Brazil	December, 1975
Chile	December, 1975
Colombia	December, 1984
Mexico	December, 1975
Peru	December, 1992*
Venezuela	December, 1984
Middle East	
Jordan	January, 1978
East Asia	
China	December, 1992*
Taiwan	December, 1984
Korea	December, 1975
Philippines	December, 1984
South Asia	
India	December, 1975
Indonesia	December, 1989*
Malaysia	December, 1984
Pakistan	December, 1984
Sri Lanka	December, 1992*
Thailand	December, 1975
Africa	
Nigeria	December, 1984
South Africa	January, 1994*
Zimbabwe	December, 1975

^a Data for this study covers July 1989 through June 1995. The asterisks identify individual emerging markets that were added to the emerging market portfolios as the IFC released data for new markets.

^b An Emerging Markets Composite Index and Regional Indices are available from the IFC starting December 1984. However, it is possible to create value-weighted portfolios based on the IFC data dating back to December 1975.

Appendix 1

This appendix provides details regarding the data in emerging markets and return calculations. Exhibit A shows the markets included in the value-weighted common equity portfolios of emerging market companies. The equity portfolio includes all companies from twenty-six emerging markets with available data from the IFC. The portfolio making up the EM real estate index consists of all companies with available data in the EMDB classified as real estate companies (based on SIC codes) by the IFC.¹³

CONSTRUCTION OF EMERGING MARKET INDICES

Indices were developed for emerging capital markets overall and also for the real estate across emerging markets. The returns were calculated after adjusting the EMDB for certain timing problems in the reporting of dividends, stock dividends, splits, and other recapitalizations, and then we constructed indices based on those adjusted returns.

INDIVIDUAL RETURN CALCULATIONS

Individual local returns were calculated for each company that had data available from the IFC. Similar to firm returns found in CRSP files, prices for return calculations are adjusted to reflect stock splits, stock dividends, new issues, and rights issues. The reported return series includes dividends paid during the return period. The return calculation for stock *i* in month *t* can be expressed as follows:

$$R_{it} = \frac{S_t P_t [1 - (RIS_t SP_t) / S_{t-1} PRIS_t + RIS_t SP_t] + D_t S_t - P_t S_{new-t-1}}{S_t P_{t-1}} \quad (1)$$

where:

- S_t = number of shares outstanding at time *t* (including new shares from stock splits and stock dividends),
- P_t = price per share at time *t*,
- RIS_t = number of new shares from rights issues during period *t*,
- SP_t = subscription price for the right issue,
- $PRIS_t$ = pre-rights issue price per share at time *t*,
- S_{new-t} = number of other new shares issued during period *t*, and
- D_t = cash dividends paid during period *t*.

Given that subscription prices for new issues are not available, the current value associated with new issues is subtracted in the return calculation.

In several cases, the IFC recorded dividend, stock split and rights issue information at a date later than their associated ex-dates. This may be due to late notification to the IFC. For this study, all information of this nature was back-dated to the correct ex-date. Local returns were converted to U.S. dollar-based returns based upon exchange rate information available in the IFC data files.

INDEX CONSTRUCTION

The constructed indices are based on value-weighted portfolios. Value-weighted return series were calculated for emerging markets overall and for all companies classified as real estate by the IFC. The value-weighted return for a given portfolio is calculated as the weighted average of the returns of the individual stocks in the portfolio as follows:

$$R_{pt} = \sum_{i=1}^N W_{it-1} r_{it} / \sum_{i=1}^N W_{it-1} \quad (2)$$

where:

- R_{pt} = rate of return on the portfolio in period *t*,
- r_{it} = rate of return on security *i* in period *t*, and
- W_{it-1} = total value of security *i* at the end of period *t-1*.

The weight assigned to a security's return is its percentage of total market capitalization from the end of the previous period. This is how CRSP value-weighted portfolio returns and other common value-weighted return series are calculated. Given that new companies appeared as the emerging markets grew (and some disappeared), the number of firms in a given portfolio is not constant. The number of firms in a portfolio at a given point in time depends on the number of firms with valid returns.

The process of calculating individual rate-of-return data and then computing value-weighted returns resulted in returns very much like those reported by the IFC for its Global Index.¹⁴

Appendix 2: Limitations on Portfolio Investment and Direct Ownership of Real Estate by Foreigners¹⁵

Argentina

The market is considered 100% open for portfolio investment. Some corporate limitations apply. Argentina permits unlimited foreign ownership of real estate except in restricted areas along the border and the seacoast.

China

China restricts portfolio investment in publicly traded companies to less than majority ownership. Foreign institutions may purchase B-Class shares on the Chinese Exchange and H-Class shares on the Hong Kong Stock Exchange and other classes of shares offered on exchanges in the U.S. and U.K. However, investment and trade laws in China are changing. "Land use rights" is the form of ownership that can be transferred, assigned, leased, and mortgaged in practically the whole of mainland China to domestic and overseas buyers alike. Recent amendments to the Constitution of the PRC reformed land use rights including a provision for the assignment and sale of land use rights in the secondary market. Land use rights are obtained by a grant from the state or by assignment from the current land user. Land use rights for real estate development are typically for terms of fifty-seventy years.

Jordan

This is the only Arab country in the EMDB. The market is considered generally open to portfolio investment up to 49% of listed companies' capital. There are selective limitations on the extent to which non-Arab investors may own Jordanian companies. Non-Arabs are not permitted to own land in Jordan.

Indonesia

Effectively, foreign ownership of Indonesian companies is limited to 49%. In Indonesia, the concept of full-ownership is not recognized. Land tenure is divided into primary elements of land rights. Hereditary rights in land are available only to Indonesian citizens. Foreign individuals or wholly owned foreign companies may only lease land and build on it. Foreign corporations established under the foreign equity entity law of Indonesia can acquire "Right to Build" and "Right to Exploit" (cultivate) titles.

Malaysia

With the exception of bank and finance company stocks, foreign investors may acquire 100% ownership of most companies. Malaysia has no prohibition against foreign ownership of property, although approval must be obtained from the Foreign Investment Committee. Acquisition of land by non-citizens and foreign companies is restricted. Foreigners may acquire land for the purposes of building or agriculture only with the approval of the state. No such approval is required in the case of industrial land.

Philippines

Foreign portfolio investment is limited to 40% ownership. To ensure compliance, Philippine companies typically issue two classes of stock, A-shares for nationals only, and B-shares open to anyone. Land ownership is restricted to Philippine citizens or corporations with at least 60% Filipino ownership.

Portugal

The market is considered 100% open for portfolio investment.

Sri Lanka

The market is considered 100% open, except for banks, which are 49% open. Some companies limit foreign investment. In Sri Lanka, foreigners are free to transact in property but have to obtain prior Exchange Control Approval and pay 100% of the purchase price.

Thailand

There are many national laws in addition to company by-laws that limit foreign ownership of stocks. The Foreign Board of the Stock Exchange of Thailand was set up to help non-nationals avoid purchasing shares that might exceed allowable limits. Limits on foreign portfolio investment range from 15% to 65%. Foreigners cannot own land in Thailand without special permission by the Board of Investment or unless the land is on government-approved industrial estates. Petroleum concessionaires may own land necessary for their activities. Exceptions may be granted to joint-ventures with no more than 40% foreign participation. Many foreign businesses sign long-term leases and then construct buildings on the leased land. There are other special situations in which foreigners can obtain limited rights in real estate. Non-Thais are allowed to own up to 40% of a condominium building without the need for permanent residence.
