Factors Affecting Foreign

Investor Choice in Types

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# of U.S. Real Estate

***Abstract**.* **Using transaction level data, we present the first analysis of the way that foreign investors choose among different types of United States real estate. Our findings, based on the conditional logit model analysis for the 1980–91 period are consistent with the hypothesis that foreign investors behave in a traditional profit maximizing, risk minimizing fashion. In choosing among investments in four major categories (apartment, office, retail and industrial) foreign investor choice is most sensitive to changes in capitalization rates, market activity and current rent levels.**

Introduction

As the globalization of national markets has progressed over the last decade, foreign ownership of United States assets has increased significantly (Graham and Krugman, 1989). Researchers cognizant of this trend have explored a variety of issues in this common, broader theme. A quick review of the relevant literature indicates two broad investment categories receiving a more than proportional share of interest in both the academic and popular venues: real estate and sources of corporate capital.[1] This study adds to a growing interest in the former category by modeling foreign investor choice among alternative types of U.S. real estate.

The participation of foreign investors in the markets for real property in the U.S. has been spectacular. The National Association of Realtors estimates that offshore ownership of domestic real estate more than doubled between 1982 and 1987, from $11.4 billion to $24.5 billion (Graham and Krugman, 1989:23). Another measure of the activity of foreign participation in domestic real estate markets is provided by the U.S. Dept. of Commerce, Bureau of Economic Analysis (BEA). According to BEA figures, commercial property assets of U.S. non-stock affiliates of foreign-owned firms increased 450% between 1980 and 1988.[2]

This article examines a particular subset of the foreign direct investment in U.S. real estate mosaic. It does not address the level of capital inflows into the U.S. real estate market and takes as given its allocation among major asset groups: corporate equities, manufacturing capacities, technologies and real property. More specifically, it examines investor choices made after the investor has already decided to buy a piece

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of U.S. real estate. That is, we model the question of which type of U.S. property foreign investors purchase.

We investigate foreign investor choice among different types of U.S. real estate investments (apartment, office, retail and industrial), using as explanatory variables the observed characteristics of each type of income producing property. We adopt a discrete choice approach in which different individual assets are assessed in terms of their risk/return characteristics. We test (by type of property) for the importance of profitability, vacancy rates, sector activity, riskiness, capitalization rates and rent per square foot in determining the real estate investment decisions made by foreign investors.

The paper is organized as follows. The second section presents an overview of the foreign direct investment in U.S. real estate. The third section explains the research methodology. The fourth section discusses the empirical results. The last section is the conclusion.

Overview of Foreign Direct Investment in U.S. Real Estate

There are two sources of data on foreign direct investment in the U.S. spanning multiple source countries. The BEA provides compilations of the stock of foreign investment representing cumulative asset acquisitions. Owing to its stock nature, the BEA data does not allow unique identification of the flow of real estate investment. A second drawback is that all types, or modes, of investment are treated equally. For example, a foreign entity acquiring real property through a merger or acquisition is indistinguishable from a second foreign entity acquiring real property via an outright purchase. These aggregation biases preclude the use of the BEA data for efficient exploration of the topics in this article.

A second data source on foreign direct investment is provided by the International Trade Administration, U.S. Department of Commerce (ITA).[3] The ITA provides a transaction level record listing various characteristics of each transaction. Two of these characteristics are the mode of investment (new plant, plant expansion, joint venture, merger, other and real property) and the name of the U.S. firm involved. The first characteristic allows us to examine only those transactions motivated by an explicit desire to purchase real property in the U.S. The second of these characteristics permits us to identify the type of real estate investment. Unlike the BEA data, the ITA data permits unique identification of the flow of investment into the U.S.

The ITA reports 2,507 instances of investment in real property from 1977–91. Over 60% of these purchases occurred before 1982.[4] A set of criteria were developed to categorize each investment transaction by use type based on key words in the name of the involved U.S. firm listed by the ITA—often a building name or address. If a name and use could not be identified, the observation was classified as ''other,'' a catchall category containing approximately one-third of all observations. The remaining transactions were typed as apartment, office, retail, industrial, farmland or hotel/motel.

Exhibit 1
Instances of Foreign Direct Investments, 1977–91

Type	1977–79	1980–82	1983–85	1986–88	1989–91
Apartment	36	84	54	22	9
Office	84	193	116	97	17
Rental	37	66	49	27	11
Industrial	9	26	12	1	3
Total	397	1181	511	322	96

Four identifiable categories (apartment, office, retail and industrial) were chosen for analysis for a number of reasons. Primarily, these four types are the most important because they represent the lion's share of all transactions and they are frequently mentioned in the popular and academic literatures. Furthermore, common factors that would affect the relative desirability of each of these types as a component in a real estate portfolio are readily identified and quantified.[5]

Exhibit 1 provides a summary description of transactions in the first four categories. We observe a decline in all types of transactions over time. The most frequently chosen investment type was office buildings in each subperiod.[6]

The Research Methodology and Variables

After having made the decision to purchase U.S. real estate, the foreign investor must determine what type of real estate to acquire after comparing the relative characteristics (and implied profitability) of the different types. We therefore explicitly model a situation where a foreign investor (i) faces a choice (j) of four alternatives: $j = 1$, apartments; $j = 2$, offices; $j = 3$, retail; and $j = 4$, industrial.

We use McFadden's (1974) conditional logit model that is based upon the revealed preferences of foreign investors to analyze empirically the investment choice process. The conditional logit methodology is widely used by economic researchers since it provides explicit estimation of an implicit choice process that takes place when rational economic agents pursue optimization of a stated objective (profit maximizing) function. Another appeal of the conditional logit modeling technique is that it permits straightforward calculation of (direct and indirect) elasticities without a dependence on specified functional forms.[7]

Foreign investors are assumed to be profit maximizers. Profits, π_{ij}, from the real estate investment of foreign entity i in real estate type j ($j = 1,2,3,4$) are formulated as:

$$\pi_{ij} = \beta'X_j + e_{ij}, \tag{1}$$

where X_j is a vector of observable characteristics for use type j, β is a vector of estimated parameters of conformable dimension and e_{ij} is a random error term.

We posit that foreign investor i implicitly has the opportunity to invest in each of the four types, calculates profits, π_{ij}, under the four possible courses of action and chooses type k from the j ($j = 1,2,3,4$) choices such that $\pi_{ik} \geq \pi_{ij}$ for $j,k = 1,2,3,4$ and $j \neq k$. That is, foreign investor i will select type k if its expected profits, π_{ik}, are the highest among the available choices.

McFadden (1978) has shown that if the error terms in Equation (1) are independently and identically distributed according to a Weibull distribution, then the probability that investor i will choose property type j is given by:

$$P_{ij} = \exp\{\beta'X_j\} / \Sigma_k \exp\{\beta'X_k\} \qquad (2)$$

Thus, the probability of choosing a particular type of investment depends on that type's characteristics, or attributes, and implied profits relative to other, rival use types. The parameters of the conditional logit model are estimated using maximum likelihood techniques as described in Greene (1993).

Once the vector of parameters β is estimated, two types of elasticities can be obtained (a formal derivation appears in the Appendix): a direct and an indirect elasticity. Consider, for example, a percentage change in the m'th explanatory variable for the j'th choice type. The direct elasticity shows the percentage change in the probability that type j is chosen in response to a percentage change in the m'th explanatory variable for the j'th choice type. The direct elasticity is given by:

$$\frac{\partial \ln P_j}{\partial \ln x_{jm}} = \beta_m x_{jm}(1 - P_j).$$

However, the effects of a change in the m'th explanatory variable for the j'th choice type will cause changes in the probabilities that all other choices are selected as well. Because of a substitution effect, we would expect that a change in one characteristic of apartments would cause a change in the likelihood that investors choose offices, for example. This natural extension of the conditional logit model allows us to make a comparison among available choices.

Because of the substitution effect, we would expect that a change in one characteristic of apartments would cause a change in the likelihood that investors choose offices, for example. The percentage change in the probability that type j is chosen given a percentage change in the m'th explanatory variable for alternative choice k (where $j \neq k$) is called the indirect elasticity. The indirect elasticity is given by:[8]

$$\frac{\partial \ln P_j}{\partial \ln x_{km}} = -\beta_m x_{km} P_k.$$

In estimating the model, the input for the dependent variable is the number of foreign investments in each real estate type. The explanatory variables are type characteristics that can be grouped into two broad categories: market influences and financial

characteristics. Thus, our model relates annual investment transactions to the causal factors over the 1980–91 and 1985–91 periods depending on data availability in the characteristics of the choices. The dependent and independent variables are aligned with the same period.

Market influences are captured in the amount of construction activity and the vacancy rate for each type of investment. The construction activity level (*ACT*) is the amount of annual new construction put in place (in $1987). Both vacancy rates (*VAC*) and activity levels (*ACT*) are published in *The Statistical Abstract of the United States* for the four investment types we consider. In addition to the level of activity, we include a variable showing the growth rate in activity (*GACT*), defined as the percentage change in *ACT* over the prior two years. The inclusion of *GACT* in the model is an attempt to ascertain whether or not foreign investors may form expectations concerning changes in the activity level in some real estate markets.

We would expect that both *ACT* and *GACT* exert favorable influences, and thus would make a type of investment activity more desirable to foreign investors. In the context of the conditional logit model, we would expect the β coefficients of *ACT* and *GACT* to be positive implying a direct elasticity greater than zero.

The financial characteristics of the various real estate types are measured by the Russell-NCREIF property indexes, which were calculated and published by the National Council of Real Estate Investment Fiduciaries (NCREIF) in conjunction with the Frank Russell Company.[9] The profit measure (*PROF*) is the average monthly appreciation in the value of the index over the prior two years (*PROF*). *PROF* would, to a certain extent, capture any tendencies by foreign investors consistent with ''trend chasing'' behavior of the type identified by Mei and Saunders (1997). We would expect that higher profits would make a particular real estate type more attractive to foreign investors. The Russell-NCREIF indexes also provide a measure of risk. We compute the standard deviation in the monthly index values over the prior two years for each investment type in each year to compute a risk proxy. The risk measure thus obtained (*RISK*) is expected to negatively influence the desirability of any type of real estate in an investor's portfolio.

The average price and rent per square foot (*PPSF* and *RPSF*) by sector were obtained from *National Real Estate Index, Market History Reports*, 1985–92. This data set is developed from information on properties actually bought and sold during the period. As expected, these two financial variables were highly correlated indicating that higher rents are consistent with higher prices. For reporting purposes, we include only the variable measuring rent per square foot (*RPSF*). It is hypothesized that as *RPSF* rises for any investment type, so does the number of real estate transactions made by foreign investors.

Another financial variable indicative of investor risk preferences is the average sector capitalization rate (*CAPR*) also developed by the *National Real Estate Index*. *CAPR* is defined, for each sector, as net operating income divided by price. Capitalization rates are often used in real estate analysis to indicate investor perception of current

market risk. A sound investment strategy would require a higher capitalization rate for riskier properties. Thus, we would expect to see a negative relationship between foreign investor purchases in a particular real estate sector and *CAPR* relative to other sectors, a result consistent with the ''prudent man'' rules.[10] It should be noted that *CAPR* proxies the current risk level, while the *RISK* variable measures risk components over time.

Empirical Results

Model Estimation

We present two estimated variants of our conditional logit model in Exhibit 2. Version One covers the 1980–91 period and is based on 787 recorded transactions. Version Two covers the 1985–91 period, the only period for which information on *RPSF* and *CAPR* are available. The second version is based on 232 instances of foreign investment in U.S. real estate recorded by the ITA.

For the first version of the model, the results are interesting and are largely consistent with expectations. There are two competing interpretations for the relationship of

Exhibit 2
Empirical Results of the Logit Model Coefficients

Variable	Version One 1980–1991	Version Two 1985–1991
Panel A: Market Effects		
VAC	0.149*	0.049
	(10.5)	(0.5)
ACT	0.456*	0.488*
	(3.4)	(2.2)
GACT	0.015**	0.006
	(5.7)	(0.6)
Panel B: Financial Influences		
PROF	208.168*	155.164*
	(5.9)	(1.9)
RISK		−0.146*
		(−2.6)
RPSF		−0.070*
		(1.8)
CAPR		−1.382*
		(−2.0)
Log Likelihood	−922.33	−235.76
Restricted Log Likelihood	−1091.00	−321.62

*Significant at the 95% level. *VAC* is vacancy rates; *ACT* is activity level; *GACT* is growth in activity level; *PROF* is profitability; *RISK* is risk proxy; *RPSF* is rent per square foot; and *CAPR* is capitalization rate. *t*-Stats are in parentheses.

vacancy rates and foreign investment. First, high growth areas typically encourage expansion of construction, which is likely to lead initially to higher vacancy rates. As a result, high vacancy rates can be viewed as a proxy for market potential and thus encourage foreign investment in that type of real estate as opposed to other types.

Alternatively, slow and inactive real estate markets may have high vacancy rates. Our results concerning vacancy rates are consistent with the first interpretation.[11] This is particularly true when the activity level variables (*ACT* and *GACT*) are simultaneously considered because both of these variables coefficients are positive. Data also suggest that new construction was strong in the 1980s regardless of rising vacancy rates. In addition, construction levels did not fall until after 1990. It can be seen clearly that the coefficient of *VAC* is positive and significantly different from zero.

Activity level (*ACT*) and growth in activity level (*GACT*) are both significant and positive. These results suggest that properties in the active sectors appeal to foreign investors.

The profitability variable is highly significant, a result that is consistent with expectations. The risk measure is significant and has the expected negative sign.

In the second version of the analysis (*i.e.*, 1985–91), where the variables *RPSF* and *CAPR* are included, consistent results emerge. *VAC* and *GACT*, however, are not significant in the second version for the following two reasons. First, since Version One is estimated using a larger sample, there is more precision in the individual estimates. In addition, in the Second Version, *RPSF* and *CAPR* appear that are correlated with vacancy rates within the defined type categories of real estate. Such a correlation will render less precision and hence larger standard errors for the *VAC* coefficient.

The most important financial variables appear to be *RPSF* and *CAPR*, indicating that as rent falls and capitalization rates rise, the number of transactions falls. Rents and capitalization rates serve foreign investors well in two areas: first, given active competitive markets, they clearly send a signal to investors regarding current market conditions; second, their accuracy is unquestioned and they are readily available. These traditional market price indicators, used by appraisers, appear to be at least as important as actual profitability measures.

Sector profitability affects the number of transactions positively and its effect is significant. However, it is about two-thirds as significant as the effect of the capitalization rate and rent per square foot. The emphasis on market indicators of price (reflected in *RPSF* and *CAPR*) rather than profitability may explain the lack of positive effect from adding real estate to a portfolio (Ziobrowski and Curcio, 1991) because these related financial factors are ignored. *RISK* was found to be significant and negative, as expected. The results imply that foreign investors take risk consideration into their real estate investment decisions.

The positive coefficients for *GACT* and *PROF* (both of which represent past, recent trends) are consistent with the notion that foreign investors in particular sectors of

real estate base their plans on recent trends in those sectors. Our results then corroborate those of Mei and Saunders (1997) who identified ''trend chasing'' behavior by domestic investors in real properties in the U.S.

Although the coefficients estimated by the model have the correct signs, it is desirable to examine further the adequacy of model fit. Unfortunately, the econometrics literature does not reach a consensus on a single summary goodness of fit measure in conditional logit models. In Exhibit 2, along with the coefficient estimates we present two calculations of the log of the likelihood function for each version of the model. The first is the log likelihood function calculated at the coefficients presented in Exhibit 2, the second is restricted by the assumption that all coefficients are equal to zero. The differences between the two are similar to the differences in other studies using the conditional logit model.

An additional, more intuitive, measure of goodness of fit appears in Exhibit 3. Panels A and B show, for Versions One and Two respectively, the number of transactions by investment type along with the actual and estimated percentage of investments in each real estate type.[12] In order to further aid in the interpretation of how the model fits the data, we present a Mean Absolute Percentage Error (MAPE) statistic by summing the absolute values of the difference between the actual and estimated sample percentages for each sector and averaging them over the four sectors. The MAPE for Version One is 2.8% and for Version Two is 8.2%. The MAPE for Version One, 2.8%, implies that the average error of the model in placing an investor's choice of sector is 2.8%.

On the basis of predicting the type of real estate chosen, Version One is superior to Version Two.[13] On balance, our goodness of fit measures are clearly in line with those established in the literature. The MAPE statistics support that our model is good.

Exhibit 3
Analysis of Model Fitness

	Type 1 Apartment	Type 2 Office	Type 3 Retail	Type 4 Industrial
Panel A: Adequacy of Fit—Version One				
Sample No. of Cases	169	423	153	42
Actual Percentage	21.5	53.8	19.4	5.3
Estimated Percentage	21.6	51.9	15.7	10.8
Panel B: Adequacy of Fit—Version Two				
Sample No. of Cases	40	166	44	7
Actual Percentage	15.6	64.6	17.1	2.7
Estimated Percentage	8.7	81.0	8.8	1.5

Note: Mean Absolute Percentage Error for Version One is 2.8% and for Version Two is 8.2%.

Further support of the model's validity is provided by the correct signs and significance of the explanatory variables.

Elasticity Estimation

While the coefficient estimates provide useful information concerning the workings of the conditional logit model, the estimated elasticities are likely to be found more useful from a policy perspective because they enable us to identify quantitatively the sensitivity of investment in a particular type to changes in the independent variable.

Exhibits 4 and 5 present both the direct and indirect elasticities derived in Versions One and Two. The elasticity estimates in Exhibit 4 show, for example, that if *PROF* increases by 1% among type 1 (apartment) investments, two things happen. First, the probability of its own type investment (apartment) being chosen increases by 1.6%. Second, the probability of each other type of investment being chosen decreases by 0.5%.

In this analysis, it appears that *PROF* is the most important variable that attracts foreign investments in terms of direct and indirect elasticities. This result is intuitive and reasonable. *ACT* and *RISK* are the second most important variables.

Exhibit 4
Estimated Elasticities—Version One

RHS[a]	Type 1 Apartment	Type 2 Office	Type 3 Retail	Type 4 Industrial
Panel A: Direct Elasticities[b]				
PROF	1.647	1.004	1.608	2.155
VAC	0.697	0.713	0.554	0.651
ACT	0.867	0.572	0.914	0.810
RISK	−0.837	−0.554	−0.884	−1.327
GACT	0.054	0.104	0.048	−0.017
Panel B: Indirect Elasticities[c]				
PROF	−0.451	−1.167	−0.388	−0.122
VAC	−0.191	−0.828	−0.134	−0.037
ACT	−0.238	−0.664	−0.221	−0.046
RISK	0.229	0.644	0.213	0.074
GACT	−0.015	0.121	−0.012	0.001

Note: *VAC* is vacancy rates; *ACT* is activity level; *GACT* is growth in activity level; *PROF* is profitability; *RISK* is risk proxy; *RPSF* is rent per square foot; and *CAPR* is capitalization rate.
[a] Right-hand variable.
[b] Change in *RHS* variable for type *j*.
[c] Change in *RHS* variable for type *k* causes changes in other types of *j*.

Exhibit 5
Estimated Elasticities—Version Two

RHS[a]	Type 1 Apartment	Type 2 Office	Type 3 Retail	Type 4 Industrial
Panel A: Direct Elasticities[b]				
PROF	0.791	0.214	1.225	1.060
VAC	0.304	0.286	0.232	0.272
ACT	1.112	0.544	1.288	0.790
RISK	−0.590	−0.209	−1.182	−1.002
GACT	−0.005	0.013	0.755	0.012
RPSF	0.480	0.548	0.784	0.292
CAPR	−10.153	−3.987	−10.325	−12.418
Panel B: Indirect Elasticities[c]				
PROF	−0.146	−0.390	−0.253	−0.039
VAC	−0.056	−0.522	−0.048	−0.008
ACT	−0.205	−0.993	−0.266	−0.022
RISK	0.109	0.381	0.244	0.028
GACT	0.001	−0.024	−0.016	−0.003
RPSF	−0.089	−0.999	−0.162	−0.008
CAPR	1.871	7.272	2.133	0.347

Note: *VAC* is vacancy rates; *ACT* is activity level; *GACT* is growth in activity level; *PROF* is profitability; *RISK* is risk proxy; *RPSF* is rent per square foot; and *CAPR* is capitalization rate.
[a] Right-hand variable.
[b] Change in *RHS* variable for type *j*.
[c] Change in *RHS* variable for type *k* causes changes in other types of *j*.

Exhibit 5 reports the elasticity estimates for the Second Version. The results can be interpreted similarly. A 1% increase in the profit rate in apartments will increase investment by 0.8% in that sector, while decreasing other types of investment by 0.1%.

One interesting result is that *CAPR* appears to be the most important variable in influencing foreign investment, followed by the *PROF*. *CAPR* is a risk proxy for the current period. Our results are consistent with the fact that foreign investors attempt to minimize risk while maximizing profits. Hence, the result is intuitively appealing.

Conclusion

Between 1976 and 1991, foreign investors purchased over $50 billion in U.S. real property. Of this amount, $28 billion was purchased between 1980 and 1985. After 1989, there was a significant and continuing drop in foreign investments in the U.S. real estate market, a result reflecting a worldwide recession.

Using an appropriate data set constructed by the ITA, we model one important aspect of the foreign investment boom in U.S. real estate during the 1980s: factors motivating

foreigners to purchase different types of real estate. We use a conditional logit model to estimate the revealed preference of foreign investors in choosing real estate investment among apartments, offices, retail sites and industrial use buildings.

Our empirical results confirm widely held expectations. A sector's activity level, profitability, risk, rents and capitalization all significantly affect the probability that any real estate type is chosen. Of additional interest, we find that foreign investors may be subject to trend chasing behaviors. Estimates of elasticities suggest that foreign investors attempt to minimize risk while maximizing their profits.

Appendix

In the conditional logit model, the coefficients, β, are not directly related to the marginal effects as in the conventional regression model. To obtain the marginal effects (*i.e.*, the change in the probability of investing in a particular real estate type resulting from a unit change in the explanatory variable) we need to differentiate Equation (2) with respect to X to yield:

$$
\begin{aligned}
\partial P_j / \partial x_{jm} &= [\exp\{\Sigma_p \beta_p x_{jp}\} / \Sigma_j \exp\{\Sigma_p \beta_p x_{jp}\}]\beta_m \\
&\quad - \{[\exp\{\Sigma_p \beta_p x_{jp}\}]^2 / [\Sigma_j \exp\{\Sigma_p \beta_p x_{jp}\}]^2\}\beta_m \\
&= P_j \beta_m - P_j^2 \beta_m \\
&= P_j \beta_m (1 - P_j).
\end{aligned}
\tag{A1}
$$

Similarly,

$$
\begin{aligned}
\partial P_j / \partial x_{km} &= \exp\{\Sigma_p \beta_p x_{jp}\}\exp\{\Sigma_p \beta_p x_{kp}\} / [\Sigma_j \exp\{\Sigma_k \beta_k x_{jk}\}]^2 \beta_m \\
&= -P_j P_k \beta_m.
\end{aligned}
\tag{A2}
$$

If we multiply both sides of Equation (A1) by x_{jm}/P_j, and both sides of Equation (A2) by x_{km}/P_k, we obtain the elasticity expressions shown in the text.

Notes

[1] Japanese investors have been responsible for as much as 25% of the volume of stocks traded on the New York Stock Exchange in the late 1980s (Madura, 1992:26).

[2] *Survey of Current Business*, October 1983 and July 1990 issues.

[3] The ITA defines foreign ownership as 10% or more of the voting securities of an incorporated business enterprise. Their reports were obtained from generally available public sources, transaction participants, and miscellaneous contacts.

[4] This study does not analyze transactions by source country. However, some summary statistics provide an interesting backdrop for the current analysis. Over 50% of all purchases were made by investors from three countries: Canada, Great Britain and Japan. In the early 1980s, Canada and Great Britain played the relatively larger roles; in the late 1980s, Japan was the largest investor in U.S. real estate. This change may be due to changes in relative economic conditions, exchange rates and/or changes in the balance of payments between the U.S. and each source

country. The level of Japanese investment is also influenced by the passage of the Yen/Dollar agreement in 1984, which liberalized and opened Japanese financial markets allowing for fewer restrictions on capital outflows.

[5] The markets for hotels/motels and farmland are arguably driven by factors quite different than those affecting the chosen four categories. Hotels/Motels are concentrated along geographic and industrial lines. Farmland is also purchased on characteristics unrelated to space use. Furthermore, all available observations of transactions involving farmland and hotels/motels were located in less than three states. This last observation is consistent with the hypothesis that the selection of these types of investment is motivated by a different set of factors.

[6] Since our data is concerned with the number of transactions, these observations are consistent with the fact that Japanese investors in U.S. real estate have a predisposition towards purchasing large, highly visible, ''trophy'' properties.

[7] Most standard based regression techniques use ''reduced form'' equations sometimes even when no behavioral model is specified. Further, in order to obtain a robust estimation of elasticities using standard regression techniques, modelers face numerous constraints when using pooled time-series cross-section data.

[8] One slight drawback to the choice process underlying the conditional logit methodology is a symmetry that exists in the indirect elasticities. While a change in the m'^{th} explanatory variable for type 1, for example, will impact the probability that types 2, 3 and 4 are chosen, the model averages that impact across types.

[9] The Russell-NCREIF indexes are developed from information submitted by NCREIF members on properties held in their portfolios. The indexes measure appraiser-determined changes in value plus the cash flow from the property during the calendar year. While the index does not measure actual transaction prices, it does measure Class A properties of the type that institutional and, presumably, foreign investors usually purchase. Appropriate indexes are available (on a monthly basis) for all years from 1980 to 1992 for each sector except apartments. For that sector the index for all properties was used prior to 1989, when the apartment index was first published.

[10] We thank a reviewer for pointing this out.

[11] In numerous unreported runs of the conditional logit model the vacancy rate was replaced with its moving average yielding results similar to those reported in Exhibit 2.

[12] The estimated percentages are obtained substituting the estimated coefficients and the sample means of the variables into Equation 2.

[13] Version Two clearly over predicts the most frequently occurring investor choice. This may well be a characteristic that the conditional logit model shares with the logit model as indicated by Greene (1993). We must also recognize that Version Two is based on far fewer observations than Version One.

References

Graham, E. M. and P. R. Krugman, *Foreign Direct Investment in the United States*, Institute for Washington, DC: International Economics, 1989.

Greene, W. H., *Econometric Analysis*, New York: MacMillan Publishing Company, 1993.

Madura, J., *International Financial Management*, New York: West Publishing Co, 1992.

McFadden, D., Conditional Logit Analysis of Qualitative Choice Behavior, in *Frontiers in Econometrics*, O. Zarembka, New York: Academic Press, 1974.

Modeling the Choice of Residential Location, in *Spacial Interaction Theory and Planning Models* by A. Karquist, L. Lindquist, F. Snickars and J. Weibull, editors, New York: North Holland, 1978.

Mei, J. and A. Saunders, Have U.S. Financial Institutions' Real Estate Investments Exhibited ''Trend-Chasing'' Behavior? *Review of Economics and Statistics*, 1997, 75:2, 248–57.

U.S. Department of Commerce, International Trade Administration, 1984, 1986, 1987, 1988, 1990, *Foreign Direct Investment in the United States*, Washington, DC: U.S. Government Printing Office.

Ziobrowski, A. J. and R. J. Curcio, Diversification Benefits of U.S. Real Estate to Foreign Investors, *Journal of Real Estate Research*, 1991, 6, 119–42.