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Real Estate Income and Relocation

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This paper looks at the decision relationship between two major assets of the individual, residential real estate and human capital, the ability to generate income from labor. Empirical results indicate that labor income is not sufficient for defining income within the utility function; real estate income must also be included. The decision to relocate must be made after considering both the return and risk in the area's residential real estate as well as the potential income from salaries.

1. Introduction

The individual investor has a portfolio that is dominated by physical assets, notably real estate, rather than financial assets. Personal wealth is concentrated in illiquid, largely undiversifiable form, notably in single family houses. In 1986, 41.3% of household net worth was in owner-occupied housing, with a median equity of $40,597. An additional 9% of household wealth was in rental housing, and 4.4% in secondary homes. Median stock equity held, including pensions, was $3,892.[1] Households hold nondiversified human capital and real estate, and these two assets account for nearly all private wealth.[2] While households are theoretically able to participate in any real estate market, practical and institutional considerations restrict diversification.

With real estate holding this dominance, it is plausible that its income should influence personal choice decisions. One of these decisions is on where to live and work. An individual having a choice between locations, such as over competing job offers, evaluates the present value of income streams. Since real estate returns vary by location, a total income package facing an individual, of job and real estate, has a locational component. This paper evaluates to what extent individuals include this real estate income in their decision to relocate and to accept a job offer.

The total income an individual receives is divided into three components tied to location: a fourth, for income from financial assets, has no locational

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variation. The three sources of income are from a job, from a market return to real estate, and from a premium accorded to owner-occupancy. Since job income is in cash, individuals fully include it in allocation decisions. This paper tests whether the two returns to real estate are included in total income.

Real estate income, both market and owner-occupier forms, is the product of the rate of return and the quantity of equity held, and is divided into separate owner premium and investor components. The quantity of equity is constrained by the local real estate price level, and by institutional requirements on debt service and down payments. The market rate of return is available to any real estate landlord, regardless of place of personal residence. The premium rate of return comes from preferential treatment on capital gains and deductions accorded owner-occupancy by the tax code.

The model is sufficiently flexible to test whether households include only the locationally constrained return, or include all real estate income in their decisions. Also testable is whether one dollar of possibly illiquid real estate income is viewed as equivalent to one dollar of cash income.

In section 2 real estate income is constructed. From full information balance sheets and income statements on households, the rate of return and quantity of real estate that can be purchased are determined. Section 3 examines which of these three income components are included in decision making. The context is an empirical examination of a sample of jobseekers. An important advantage of the data set is having the actual job choices and locations faced, and knowing the final selection. The empirical results indicate that labor income is not a sufficient statistic in the income measure within the utility function: real estate income must be included in the relocation decision.

There are implications for individual and corporate relocations. The return and risk in residential real estate is sufficient to dominate other income from salaries. It is not uncommon for households to have losses in real estate markets that exceed labor income. This paper attempts to integrate the behavior of households in these two markets.

2. Real Estate Income

2.1. Locational Returns

The focus is on the two assets that most individual investors hold most: real estate and human capital. These assets do not have the properties that make for elegant results in financial assets. Diversification in real estate holdings and earning capacity is difficult, given wealth constraints and the inability to separate human capital from a person.

There are no futures markets for physical real estate or human capital. Short selling to hedge risk is not possible. There are transactions costs of

changing either jobs or houses. For houses, there are brokerage fees, moving expenses, discount points, escrow fees, and transfer taxes. Job changes entail commuting costs, loss or restriction of pension, vesting, employee stock ownership and option benefits, and the cost of relocation.

Results on securities in financial markets depend on no arbitrage, continuous trading, and the existence of derivative markets to permit shifting of risk. These assumptions do not hold in either real estate or human capital markets.

While the inclusion of real estate returns in total income is relevant for any decision, the objective is to compare locational choices for a person having more than one job offer. The jobseeker prices a standardized house H across locations. The price of the house of quality H at a given location is V. It produces a rent to value, or income capitalization rate of k. The house then rents for kV dollars. Nonhousing goods and services have a vector of prices and quantities q and X.

Income determination in real estate and labor markets depends on locational features that are not relevant in financial markets. The offer of a job effectively comes with rights to buy into the local real estate market as an owner-occupier. Without these rights, the individual wishing to buy in that location must rely on income from financial assets, or become an absentee landlord. These alternatives are limited, given the indivisibility of real estate purchases.

The individual wants to compare a cost of living across locations. The relevant comparison is on kV, rather than k. The index kV can be viewed as a hedonic price index of a house of standardized quality H. The direct utility function is $f^*(X : H)$, increasing in X and H and strictly quasiconcave. The individual has a choice over locations, each offering a package of a job and a real estate market. The indirect utility function f has level

$$\mathrm{f}(q,Z) = \max_X f^*(X : H) : kV + q \cdot X \leq Z \tag{1}$$

where $\cdot$ denotes an inner product. The indirect utility function is strictly quasiconcave, decreasing in prices and rents, and increasing in income Z.

A job offer pays a salary Y and comes with a requirement for residence. The local real estate market has a price level that permits the individual, using Y as the principal source of debt service, to purchase A dollar units of equity. In locations with more expensive real estate, fewer units of A can be purchased and serviced with a given income Y.

Total income is

$$Z = (1 - \tau)Y + g(eA) \tag{2}$$

where τ is the tax rate in the location and eA is real estate income. The function g permits real estate income from being viewed as not a one-for-one dollar substitute for cash. If real estate income does not enter the locational choice of the individual, $g(eA) = 0$. The price of real estate services is kV, adjusting for the cap rate k and V, the hedonic price index of a house.

The balance sheet condition that assets be equal to the sum of liabilities and equity is

$$V = B + A \tag{3}$$

where B is mortgage debt. The balance sheet condition is converted to an income statement by multiplying the property by its total return, debt by its interest cost, and equity by its rate of return. The returns, and income statement, depend on tax characteristics of the owner.

While the balance sheets of an owner-occupier and absentee investor are identical for the same property, their income statements depend on the occupancy status of the owner. If the property is owned by a landlord, the income statement is

$$\begin{aligned} eA + (1 - \tau)\alpha B &= rV + \tau\bar{\delta}bV \\ &= [(1 - \tau)(k - \lambda) + (1 - \theta\tau)p]V + \delta bV. \end{aligned}$$

The return on equity plus debt service cost is equal to revenue. Mortgage debt is at interest rate α, and deductible as a business expense. The after tax cost per dollar of debt is $(1 - \tau)\alpha$. The effective depreciation rate δ is a transform of $\bar{\delta}$, the inverse of the permitted useful life, measured net of expected costs of recapture on disposition.[3]

The landlord return on equity r is

$$r = (1 - \tau)(k - \lambda) + (1 - \theta\tau)p$$

where $\theta \epsilon [0,1]$ is an adjustment if capital gains are taxed at a preferred rate. If capital gains are taxed on accrual as ordinary income, $\theta = 1$. If capital gains taxation is deferrable indefinitely, or gains can be rolled out, $\theta = 0$.[4] The investor return to real estate is the sum of the rate of accrued capital gains p and the rental dividend or income capitalization rate. This capitalization rate is k, net of operating expenses except for property taxes at rate λ. The pretax total return on the real estate asset is $p + k - \lambda$.

The return on assets for a landlord is

$$\begin{aligned} e &= \frac{(1 - \tau)(k - \lambda - \alpha v) + (1 - \theta\tau)p + \tau\delta b}{1 - v} \\ &= \frac{k - u}{1 - v} \end{aligned}$$

where $v \equiv B/V$ is the leverage, or loan to value ratio. The rate of return is the leveraged difference between the income capitalization rate k and the user cost of real estate services. This user cost is

$$u = (1 - \tau)(\lambda + \alpha v) + \tau(k - \delta b) - (1 - \theta\tau)p \tag{4}$$

the net expense per dollar of property value. The net expense is the cost of property taxes and interest $(1 - \tau)(\lambda + \alpha v)$, plus income tax $\tau(k - \delta b)$, less net capital gains $(1 - \theta\tau)p$.[5] This rate of return e, producing real estate income $e\mathrm{A} = (k - u)V$, is comparable with those on other assets and investments. The investor is not required to reside in any location to receive this return. Real estate provides additional returns that are specific to a location, through the subsidies provided for owner-occupancy.

If the property is owned by an owner-occupant, the balance sheet remains $V = A + B$. By comparison with a landlord, the income statement differs, depending on preferential fiscal treatment. The income statement is

$$e_O A + (1 - \tau)\alpha B = r_O V = [p + K - (1 - \tau)\lambda]V$$

where O subscripts apply to the owner-occupier. The return on equity is

$$e_o = \frac{k + p - (1 - \tau)(\lambda + \alpha v)}{1 - v} = \frac{k - u_o}{1 - v} \tag{5}$$

The rate of return is the leveraged difference between the rent and expenses.

The return on assets is the sum of the income capitalization rate and capital gains, less property taxes, or

$$r_O = k + p - (1 - \tau)\lambda \tag{6}$$

since imputed rent in the income capitalization rate k is not taxed. For owner-occupiers, θ is virtually zero. Property taxes are deductible against any income, and no tax depreciation is permitted.[6] Accrued capital gains can be rolled over and rolled out, to a limit, provided the owner is of a certain age.

The tax preferences on capital gains and the interest deduction entail a designation of a principal residence. The owner must reside in this principal residence to claim preferred status for capital gains, as George Bush discovered.[7]

The user cost of real estate services for an owner-occupier is

$$u_O = (1 - \tau)(\lambda + \alpha v) - p. \tag{7}$$

The difference between the user costs for a landlord and an owner-occupier is a premium

$$c = u - u_O = \tau(k + \theta - \delta b). \tag{8}$$

This premium is the sum of the tax free treatment of imputed income plus preferential taxation of capital gains, less the inability to claim tax depreciation expense.

In locations where rents are high relative to house prices, the premium earned by owner-occupiers increases, holding expected appreciation p constant. The premium is increasing in the expected appreciation rate, and in the capital gains tax on investment real estate θ. The premium is decreasing in depreciation δ, since owner-occupiers are not eligible to claim this expense.

For an owner-occupier, real estate income is

$$e_O A = (k - u + c)V.$$

For a landlord, the corresponding income is $(k - u)V$.

2.2. *Real Estate Asset Purchases*

The above section determines the return on equity, which differs by type of owner. Another feature of real estate markets is that equity is effectively constrained by institutional limits on leverage and debt service ratios, and that expected real estate income is largely excluded in income used to qualify for financing.

Secondary mortgage market institutions set a limit κ as a fraction of cash income Y that a borrower can spend on debt service and property taxes. Debt service is ωB, where for contract rate α and term γ, $\omega = \alpha/[1 - (1 + \alpha)^{-\gamma}]$ is the mortgage payment per dollar of loan. Property taxes are λV, so the underwriting constraint is

$$\begin{aligned} \kappa Y &= \omega B + \lambda V \\ &= \omega(V - \bar{A}) + \lambda V \end{aligned}$$

where $\bar{A}$ is the down payment equity at purchase. The solution of this constraint is the maximum house that the individual can purchase, given a job offer paying Y, or

$$\bar{V} = \frac{\kappa y + \omega \bar{A}}{\omega + \lambda}. \tag{9}$$

This condition applies to new entrants to the local real estate market. For existing owners in high return markets, $V > \bar{V}$, and they could not repurchase

TABLE 1.
Variables and Parameters

Parameters	*Description*
τ	Marginal tax rate
λ	Property tax rate
α	Mortgage contract rate
γ	Number of payments
ω	Mortgage payment
δ	Effective rate of depreciation
θ	Capital gains tax for investor
κ	Debt service ratio
Variables	*Description*
Z	Total income
Y	Labor income, pretax
q	Prices, non-real estate goods and services
A	Real estate equity
V	Hedonic price standardized house
B	Mortgage debt outstanding
p	Capital gains rate
k	Income capitalization rate
v	Loan to value ratio
b	Basis ratio
r, r_O	Rate of return on assets
e, e_O	Rate of return on equity
u, u_O	User cost

their own property. In depressed markets, potentially $V > \bar{V}$. For a marginal buyer satisfying qualifying standards at the constraint, real estate income is

$$e_O A = (k - u)\bar{V} + c\bar{V}. \tag{10}$$

The open market real estate income, that would be available to any investor, is

$$(k - u)\bar{V} = [(1 - \tau)(k - \lambda - \alpha v) + \tau\delta b + (1 - \theta\tau)p]\frac{\kappa y + \omega\bar{A}}{\omega + \lambda}. \tag{11}$$

The premium income to owner-occupancy is

$$c\bar{V} = \tau(k + \theta p - \delta b)\frac{\kappa y + \omega\bar{A}}{\omega + \lambda}. \tag{12}$$

The variables and parameters of the model are summarized in Table 1.

3. Decisions on Job and Housing Choice

The individual m has offers $j = 1,...,J(m)$, drawn from the underlying distribution of jobs. The choice set over jobs need not be common to all individuals. A job package j includes working conditions of salaries, benefits and hours, the quality of the employer, and a location. At the location, the rental price of the standardized house is $k_j V_j$. The price of other goods and services is q_j, an index of prices q other than real estate rents. Direct compensation offered by the employer is Y_j, and the combined tax rate in the location is τ_j. After tax cash income is $(1 - \tau_j Y_j)$.

Total income in the location is $Z_j = (1 - \tau_j) Y_j + g(e_O A)$. If salary income alone is sufficient to determine the locational choice, then $g = 0$ and real estate income is excluded. If salary income is insufficient, then $Z_j > Y_j$. Otherwise, estate income and wealth are unanticipated windfalls not affecting allocative and mobility decisions.

Over the $J(m)$ job offers, the indirect utility level is $f(k_j V_j, q_j, Z_j)$. The location selected is that which maximizes utility. This is a qualitative choice, and differentiability conditions do not hold.[8] If the first job is numbered as that selected

$$I = \begin{cases} 1 & \text{if } \bigcap_{j=2}^{J(m)} u_1(k_1 V_1, q_1, Y_1) - u_j(k_j V_j, q_j, Y_j) \geq 0 \\ 0 & \text{otherwise.} \end{cases} \tag{13}$$

This is a conventional job decision, with real estate income excluded. The implied definition of income is

$$Z_j = Y_j \qquad g(e_O A) = 0.$$

A more general form has income including real estate return, though possibly with a discount. Real estate income cannot easily be collateralized, and involves transactions costs of realization. Institutions on mortgages, property taxes and depreciation act to discourage sale, and to lock in existing owners. Capital markets for borrowing against real estate equity are incomplete, though they are also imperfect for borrowing against human capital. The multinomial decision, with location 1 being that selected, is

$$I = \begin{cases} 1 & \text{if } \bigcap_{j=2}^{J(m)} f_1(k_1 V_1, q_1, Z_1) - f_j(k_j V_j, q_j, Z_j) \geq 0 \\ 0 & \text{otherwise} \end{cases} \tag{14}$$

with $Z_j = Y_j + g(eA)$. Restrictions on the structure are indicated in Table 2.

TABLE 2.
Hypothesis Testing
(with required restrictions)

Form	*Restrictions*
	$\ln Z = \ln Y + \beta_k \ln (k-u)\bar{V} + \beta_c \ln c\bar{V}$ $\beta_k \neq 0, \beta_c \neq 0$
	$\ln Z = \ln Y + \beta_k[\ln (k-u+c)\bar{V}]$ $\beta_k = \beta_c$
	$\ln Z = \ln Y + \ln (k-u+c)\bar{V}$ $\beta_k = \beta_c = 1$
	$\ln Z = \ln Y$ $\beta_k = \beta_c = 0$

The unrestricted form introduces parameters β_c and β_k for the two types of real estate income. If $\beta_c = \beta_k$, then both incomes are viewed as being identical. If the parameters are both equal to one, all income is measured homogeneously. If $\beta_c = \beta_k = 0$, then real estate has no role in relocation decisions.

4. Data

Real estate returns e and e_O are constructed for locations across the United States. A comparable quality house is priced in 161 metropolitan areas across the country, from data compiled by Coldwell Banker offices. Where Coldwell Banker has several offices in a metropolitan area, prices in the least expensive sublocation are used. Data on cap rates k, property tax rates λ, and house prices V are obtained from the survey.

Financing is with a fixed rate mortgage for 30 years, payable monthly, as the payment ω, and interest rate α. The loan to value ratio v is 0.8 and debt-service ratio κ is 0.38. The marginal tax rate for an individual is τ_f federally, and τ_s at the state and city level. The tax rates are specified for a single person with no dependents, with income only from the job, and claiming no deductions other than for real estate. The tax schedules for each state and city are obtained from Central Clearing House (CCH), *State Tax Handbook*. The combined marginal tax rate is

$$\tau = \tau_f + (1 - \tau_f)\tau_s - K\tau_f\tau_s$$

where $K = 1$ if federal taxes are deductible in calculating state tax liability, and zero otherwise. The term $(1 - \tau_f)\tau_s$ accounts for the deductibilty of state

taxes in calculating federal liability. The depreciation rate $\bar{\delta}$ is 1/27.5 to correspond to the rate on residential property under the 1986 Tax Reform Act, and the purchase price set at two-thirds depreciable. The holding period is five years and the rate α is used for discounting, yielding an effective depreciation rate δ. A real estate commission of 6% is payable on sale.

The returns e and e_O are constructed for a job seeker choosing between locations in 1989 and planning to purchase and hold a house for 1989-1994. The data on all variables except the cap rate k and expected appreciation p are for 1989. The average cap rate over 1986-1989 is used for k. Two specifications on expected appreciation p are used. The first is that the sample mean rate for 1986-1989 will obtain for the holding period 1989-1994. The second is a truncation. For locations with above average rates of appreciation, the lowest observed increase during 1986-1989 is used to project the returns for 1989-1994. For locations with below average increases, the highest observed increase is used. The smaller of the two expected appreciation rates is used for p.

The sufficient statistic tests are applied to a sample of new labor market entrants with professional degrees. The survey was administered for jobs commencing in 1989. Respondents were asked to report details on all job offers, including compensation. Fringe benefits such as pension plans, health coverage and moving allowances were surveyed. The location of each employer was asked. The respondents coded the jobs in the order in which offers were recieved, and indicated which offer was selected. The number of respondents was 189, and only those reporting at least two job offers in different locations were included in the sample. This reduced the sample size to 136, with 395 total offers. The largest number of job offers recieved by one individual was 12.

The jobs represent the set of offers that an individual received, rather than comparing an observed wage with a hypothetical alternative. Problems of self-selection by employees in choosing employers, and of employers in making offers, are largely eliminated.

By matching the job offer, salary and employer data with the 161 metropolitan area file, a tax rate is obtained, determining y. The locational file provides data on the real estate market, including cap rate k and returns to real estate. The remaining variable is the price of other goods and services q. For cities covered by a Consumer Price Index, this level in July 1989 is used. For cities not covered, the CPI for the United States is used.

The salary offer y determines the maximum level of house purchasable $\bar{V}$, given the qualification algorithm. This determines the two types of real estate income $(k - u)\bar{V}$ for the owner as investor, and the premium $c\bar{V}$. The rate of return $k - u$ and ownership premium c are the same for all job offers within a location. The potential house size $\bar{V}$ differs, depending on the salary offer.

5. Specification and Empirical Results

The indirect utility function is $f[kV,q,(1-\tau)Y,(k-u)\bar{V}, c\bar{V} : w]$, in real estate rents, prices of other goods, cash income, investor and owner premium real estate income, and other characteristics w. The natural logarithms of the first five arguments are X_n, $n = 1,...,5$. The remaining X_n, $n = 6,...,N$ are characteristics of w. If the indirect utility function has a logarithmic form

$$\ln f = \sum_{n=0}^{N} \beta_n X_n + \epsilon \tag{15}$$

where X_0 denotes an intercept, β_n, $n = 0,...,N$ are parameters and ϵ is an additive error. The coefficients of cash income y, investor real estate income $(k-u)\bar{V}$ and premium income $c\bar{V}$ are, respectively, β_3, β_4, and β_5. The parameters are identified by

$$\beta_4 = \beta_k\beta_3 \qquad \beta_5 = \beta_c\beta_3 \tag{16}$$

The indicator variable $I_j = 1$ if location j is selected, and zero otherwise, with $B_j \equiv Pr[y_j = 1], j = 1,...,J(m)$. With a sample of M individuals, the logarithm of the likelihood function is

$$\ln\ l = \sum_{m=1}^{M} \sum_{j=1}^{J(m)} \mathrm{I}_{mj} \ln B_{mj}. \tag{17}$$

A multinomial logit specification is used for estimation.

The probability that an individual with set $J(m)$ selects the first alternative is

$$B_1 = Pr\left[\bigcap_{j=2}^{J(m)} (\ln f_1 > \ln f_j)\right]$$

$$= Pr\left[\bigcap_{j=2} (\epsilon_j - \epsilon_1) < [X_1 - X_j] \cdot \beta\right]$$

where $X_j \equiv (X_{1j},...,X_{5j})$, and β is a parameter vector of dimension N. The characteristics disappear, since they are specific to the individual, and are the same across jobs. The X variables are the changes in rents, prices of other goods, after tax salaries, and the two forms of real estate income.

The sample has an advantage over other applications of quantal choice models, in that the data for all alternatives are known. In typical cases, data vary across individuals but not over alternatives. Characteristics such as age and sex are known, but not the costs and returns for an individual in each alternative. This lack of data in other applications increases the difficulty of identifying parameters.

The odds of selecting location 1 versus location 2 are

$$B_1/B_2 = \exp(X_1 - X_2) \cdot \beta$$

The X differentials are zero for household characteristics, so all parameters are unidentified if prices and incomes in alternative locations are unknown.[9] This identification problem occurs when the conditions in not accepted offers are unknown. By comparison, in this sample, all variables differ across alternatives, the jobs and locations.

6. Empirical Results

The mean expected real estate preimium income in the largest 25 Metropolitan Statistical Areas (MSAs) is $12,528, as compared with $4,617 outside this group. This is only a part of real estate income. The market component averages $8,942 in the largest MSAs and $4,621 otherwise. The mean total compensation is $37,612 in the largest MSAs, including cash benefits, but before taxes, and $32,815 outside. The differential in expected real estate income is relatively larger than in labor income.

Parameter estimates of the locational choice equation are reported in Table 3. The first column indicates the unrestricted estimates, with all three income components. Two control variables are for whether the job is in the 25 largest MSAs, and a financial ranking of the employer in QUAL. In columns 1-3 are estimates with various forms of real estate income. The two real estate incomes are unrestricted in column 1. In column 2 are the estimates when the two forms of income are homogeneous, but still potentially discounted relative to cash. In column 3 are estimates when both incomes are identical with cash. In column 4 are estimates when neither form of real estate income is included in relocation decisions.

The table reports the results as $\beta_k \equiv \beta_4/\beta_3$ and $\beta_c \equiv \beta_5/\beta_3$, where β_4 and β_5 are the coefficients of investor and owner income in the logit specification, and β_3 is the labor income coefficient. The estimates of the logit have maximum likelihood properties, including invariance under single valued transforms. Then the estimates of β_k and β_c have maximum likelihood properties.

In all specifications, dollar rent differentials $\Delta \ln k$ have a negative effect on job choices and relocation. Prices of other goods and services $\Delta \ln q$ have

TABLE 3.
Estimates, Locational Choice
(asymptotic standard errors in parentheses)

		(1)	(2) $\beta_k = \beta_c$	(3) $\beta_k = \beta_c = 1$	(4) $\beta_k = \beta_c = 0$
Rent $\Delta \ln kV$	β_1	-0.185	-0.199	-0.224	-0.141
		(0.122)	(0.108)	(0.146)	(0.098)
Other prices $\Delta \ln q$	β_2	-0.035	-0.248	-0.213	-0.308
		(0.029)	(0.165)	(0.144)	(0.174)
Labor income $\Delta \ln y$	β_3	0.070	0.075	0.061	0.090
		(0.041)	(0.034)	(0.029)	(0.044)
RE investor income[a]	β_k	0.485	0.529	1	—
$\Delta \ln (k-u)V$		(0.452)	(0.239)	—	
RE owner income[a]	β_c	0.726	0.529	1	—
$\Delta \ln cV$		(0.289)	(0.239)	—	
Controls					
Ranking Δ *QUAL*	β_6	0.065	0.077	0.061	0.083
		(0.041)	(0.041)	(0.029)	(0.045)
Largest 25 MSAs	β_7	0.009	0.027	0.029	0.028
		(0.007)	(0.013)	(0.014)	(0.011)
χ^2/DF			8.2	12.2	14.2
DF			1	2	2

Note: [a] β_k and β_c are obtained from the conditions $\beta_4 = \beta_3\beta_k$ and $\beta_5 = \beta_3\beta_c$, where β_4 and β_5 are the parameters of real estate investor and owner income in the logit estimation. The equation is forced through the origin, so there is no intercept. First differences are denoted by Δ.

the same effect. Differentials in labor income $\Delta \ln y$ are always positive and significant. In all variants where real estate income is included ex ante, labor income is significant in affecting the locational choice.

While labor income is significant, real estate income is also important in locational choice. The coefficients β_k and β_c are the weights assigned to the two forms of income by individuals in computing total income. If the weights are zero, all real estate income is excluded. When the weights are unity, both incomes are included, and homogeneous with labor income. In the unrestricted case, real estate investor income, while positive, is not significant, but the owner premium is significant.

The hypothesis that the two types of income are identical fails. The critical value of χ^2 with one degree of freedom is 8.2, but the test statistic is 8.8. Column 3 tests whether all three types of income are homogeneous. This test restricts the two discount factors at unity. The test fails, with a $\chi^2/2$ test statistic of 12.2, against a critical value of 10.6. In column 4, all real estate income is excluded. Real estate income cannot be removed from a definition of income, with $\chi^2/2$ being 14.2, against a critical value of 10.6. Location decisions are not made solely on the

basis of labor income. Individuals use a more broadly based definition of income, including the return to real estate.

7. Concluding Remarks

The individual investor holds a restricted portfolio of assets, principally skills to earn salaries and real estate. This restricted portfolio is nondiversified and subject to risk in the area. A decline in the local economy increases the risk of unemployment, and depresses the real estate market. Most large employers pay similar compensation, regardless of location. Returns to human capital are standardized, while large location-specific differentials remain in real estate returns. The individual investor, dominated by indivisible investments, must make choices under capital market and other restrictions. The results indicate that a structure can be developed to accommodate these choices.

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Notes

1. The source is the United States Bureau of the Census, Current Population Survey, P-70-7. On the expenditure side, housing costs have a 34% weight in the Consumer Price Index.
2. Deaton (1989) notes that both from the Survey of Consumer Finances and the Consumer Expenditure Survey, the median financial wealth of a U.S. househod in 1987 was less than $1,000. This estimate excludes pension rights.
3. For holding length T and interest rate α, the asset value of one dollar of depreciation is

$$d = \frac{1-(1+\alpha)^{-T}}{\alpha} - \frac{T}{(1+\alpha)^{T}}.$$

Multiplying by $\alpha/[1-(1+\alpha)^{-T}]$ converts the asset to an annuitized service flow, or

$$\delta = \bar{\delta}\left[1 - \frac{\alpha T}{(1+\alpha)^{T}-1}\right]$$

the effective depreciation rate. The depreciable basis is bV, where b is the ratio of the purchase price of structural improvements to the market value of the property.
4. Examples of deferred capital gains on investment real estate are rollovers, exchanges within a given time limit for another designated property, under Section 1031 of the tax code, and certain installment sales provisions.
5. The term structure, as in Cox, Ingersoll, and Ross (1985), and default risk are other modifications.
6. These are for U.S. institutions. In Canada, $r_O = k + p - \lambda$, as property taxes are not deductible, but capital gains can be rolled out with no restriction. In the U.K., Japan, and

West Germany, there is no capital gains taxation. In Switzerland, imputed rent k is taxes, but assessments lag market values.

7. On becoming Vice President in 1981, he sold his Houston house for $853,000 and purchased his Kennebunkport, Maine, property for $950,000, claiming the latter as his principal residence. The Internal Revenue Service successfully denied his claim, arguing that his principal residence was the Vice President's house. He was assessed over $200,000 in back capital gains taxes and penalties.
8. The continuous demand for real estate services is $-(\partial u/\partial k)/(\partial u/\partial y)$. The relevant decision is the purchase of real estate properties.
9. See McFadden (1984) and Judge, Griffiths, Hill, Lütkepohl, and Lee (1985, pp. 770-771).

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