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The Ideal Real Estate Portfolio?

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Abstract

This paper uses perpetual inventory methods to construct the stock of income-producing real estate for each of 295 MSAs within eight major geographic regions of the U.S. We then use this data to construct real estate portfolio weights that would be perfectly diversified with a CAPM beta of 1.0. Next, we compare the actual real estate investments of private institutional investors (NCREIF) and Real Estate Investment Trusts (REITs) to these market-value weights. Our results suggest that neither private institutional investors nor REITs hold balanced market-value real estate portfolios; rather, they tend to hold real estate portfolios that are heavily concentrated in high-quality locations. The bias toward quality is especially pronounced for institutional investors.

Section 1. Introduction

How should a typical pension fund investor diversify its real estate portfolio across independent geographic locations? A logical starting point is to assign market value weights to each region. This interpretation is consistent with one common reading of standard capital market theory, which suggests that each investor should hold (appropriately leveraged) all risky assets in proportion to their outstanding market values. (See, for example, Sharpe (1964), Lintner (1965), and Mossin (1966).) Other approaches to the portfolio selection problem recognize different investor tax situations, constraints, and heterogenous expectations; but in general these also suggest the market portfolio as a logical starting point. (See Black (1972), Mayers (1972), and Lintner (1969).)

In this paper we have expended some effort to determine the relative market weights that should be given to real estate in eight independent geographic areas in the U.S. Perpetual inventory methods are used to construct the stock of income-producing real estate for each of 295 metropolitan statistical areas (MSA) within eight major geographic regions. We then compare the actual real estate investments of private institutional investors (NCREIF) and Real Estate Investment Trusts (REITs) to the market value

portfolio of investible real estate, as represented by these stock estimates. In practice, neither private pension fund investors nor REITs hold balanced market-value real estate portfolios; rather, as we shall show below, they tend to hold real estate portfolios that are heavily concentrated in high-quality locations. The bias towards quality is especially pronounced for institutional investors.

Section 2. Constructing Relative Market Weights

Section 2.1 Overview

The Bureau of Economic Analysis (BEA) constructs estimates of the value of the capital stock over time, including the stock of real estate (see Young and Musgrave (1980)). Unfortunately, the BEA data, and alternative series such as those constructed by Hulten and Wykoff (1980), are not disaggregated geographically. Hartzell, Pittman, and Downs (1994) estimated the real estate capital stock by county (and hence by metropolitan area) in 1989. Unfortunately due to computer problems their results are not readily available at the county or metropolitan area level for reanalysis. For this and other reasons detailed in Malpezzi, Shilling, and Yang (1998), we undertook the construction of real estate capital stock estimates at the metropolitan level. We used 1982 Census of Government data on assessed values, and

market-value-to-assessed-value ratios as a baseline. With permit value data from Census, and depreciation estimates from Young and Musgrave (1980), we then solved forward to the 1994 capital stock, using a variant of the Census' perpetual inventory valuation method.

More specifically, for each of 242 MSAs with usable data we solved forward:

$$K_{it+1} = K_{it} + C_{it+1} - \delta K_{it} \tag{1}$$

where

K_{it} = stock of income-producing real estate for metropolitan area i in time period t;
C_{it+1} = construction in metropolitan area i during period $t+1$; and
δ = the average annual rate of economic depreciation (taken from Young and Musgrave (1980));

and with $K_{i0} = \gamma_{i0} A_{i0}$, where γ_{i0} is the market-value-to-assessed-value ratio from the 1982 Census of Governments for metropolitan area i in the base period, and A_{i0} is the assessed value of all income-producing real estate in metropolitan area i in the base period.

Reliable data were available for 242 MSAs, but there are over 300 MSAs in the United States. In Malpezzi, Shilling and Yang (1998) we then modeled MSA real estate stock per capita as a function of economic fundamentals, including employment growth and structure, as well as supply side con-

straints such as local geography and regulation. Using these results we were able to estimate the real estate capital stock for an additional 53 MSAs. These 295 MSAs for which we have data comprise over 97 percent of the U.S. metropolitan population, and 78 percent of the total population of the nation.

A detailed description of the methodology, including the predictive models, can be found in Malpezzi, Shilling and Yang. In that paper we also undertake a detailed comparison of our capital stock estimates to those from other studies.

This is a good place to note some differences between our work and the previous work by Hartzell, Pittman, and Downs (1994). Hartzell, Pittman, and Downs had data which permitted them to disaggregate their capital stock measures by type of property, i.e., apartment, industrial, office and retail. Unfortunately, our capital stock data do not permit us to disaggregate different commercial property types. We can, however, construct capital stock measures for all private real estate, single family housing, and the difference–the latter comprising multi-family housing as well as office, industrial, retail and other miscellaneous property types. We lump all these latter types together under the rubric "income property."

Another difference between our work and the Hartzell-Pittman-Downs

study is the geographic scope of our primary data. We have primary data for 247 MSAs, and forecasts for another 53. The Hartzell-Pittman-Downs study, by contrast, had actual data on only 26 counties. Consequently, Hartzell, Pittman, and Downs were forced to rely on regression forecasts for the other 3115 counties. Lastly, the Hartzell-Pittman-Downs data are for 1989. Our data are somewhat more recent.

Section 2.2 Details of the Constructed Weights

While the basic procedure that we use to construct relative market weights is conceptually quite simple, there are many specific issues concerning the actual calculations that need to be discussed.

Section 2.2.1 Time Period

The capital stock data are obtained by solving equation (1) forward over the sample period 1982-1994. The sample period for the capital stock is determined based on data availability. After 1982 the Census of Governments stopped collecting benchmark market-value-to-assessed-value ratios, so 1982 is the latest date for which benchmark exist. On the other end, 1994 is the most recent year for which we have the full set of permits data. Of course there has been substantial construction in some real estate markets since then. However, the stock changes slowly in most places in a given

year. According to our data, the average of MSA real increases in income property stock over the 1982-94 period is about 1 percent per annum. In any given year, the flow of net construction has a relatively minor effect on the stock of real estate capital. Since we are interested mainly in ratios, as discussed below, this slight mismatch creates little problem.

Section 2.2.2 Actual Direct Investment in Real Estate

For the capital stock estimation, we use value of permits data as a proxy for actual direct investment. We would prefer construction put-in-place, but that is not available for geographically disaggregated areas. We examined this issue with aggregate (national) data and found, as expected, that permits and construction data are highly correlated. Especially for income property, permitted projects usually get built. Even the lags involved between permitting and construction do not make too much difference when considering annual data (lags are quite visible with monthly data).

Section 2.2.3 Rate of Economic Depreciation

Errors can arise in our estimation procedure during periods where there are a large number of removals from the stock, i.e., when economic depreciation is higher than the Young-Musgrave estimate. Malpezzi, Ozanne and Thibodeau (1987) showed that depreciation rates for residential real estate

vary significantly by MSA. There are no similar MSA-specific estimates for income property that we are aware of. There is a pattern for older MSAs (proxied by the share of the housing stock built pre World War II) to have higher rates of growth of the income capital stock. This is consistent with a greater need for replacement real estate in older MSAs; but since we assume constant depreciation across MSAs, this could bias our 1994 estimates of the real estate capital stock upwards in older MSAs, and downwards in newer MSAs. Thus, as we discuss in detail in Malpezzi, Shilling and Yang, future research on MSA-specific depreciation rates for income property could yield even better estimates of the capital stock.

Section 2.2.4 Selecting Areas that are Economically Non-Covariant

Diversifying across different geographic regions has been a commonly used proxy for selecting areas that are economically non-covariant. Most real estate portfolio diversification studies break real estate investment into different Census regions and examine various portfolio possibilities for diversifying holdings across the Census regions. Hartzell, Shulman and Wurtzebach (1987) make the point that Census regions may not accurately reflect the locational covariance of economic fundamentals and hence returns. Thus Hartzell, Shulman and Wurtzebach divided the U.S. into eight regions that,

according to their analysis, better reflected this locational covariance.[1] We will use Hartzell, Shulman and Wurtzebach's classification in this study. The eight regions are New England, the Mid-Atlantic Corridor (parts of the mid-Atlantic states close to the Eastern seaboard), the Industrial Midwest (including much of western Pennsylvania and New York, the Great Lakes Region, Minneapolis and St. Louis), the Old South (from Virginia, south to Florida, and west to Arkansas), the Farm Belt (roughly the Great Plains region), the Mineral Extraction Area (from Louisiana to Montana, including Alaska), Southern California (including southern Nevada and Hawaii), and Northern California (including northern Nevada, and the Pacific Northwest). The eight regions are displayed in Figure 1.

Generally, analysis of the economic structure of these regions leads to few surprises. The Mid-Atlantic Corridor has the highest concentration of finance and other office employment. The concentration of oil, gas, and mining jobs is preeminent in the Mineral Extraction region. The highest rate of manufacturing jobs is found in the Industrial Midwest. It is initially surprising that the Northern and Southern California regions have higher proportions of their MSA labor force in agriculture than the Farm Belt.

[1]Hartzell, Shulman and Wurtzebach credited the well known study by Garreau (1981), but developed their own classification.

But note that we are limiting our examination to MSAs within these regions. Most of the two California regions are contained within MSAs, as is much of their agriculture. In the Farm Belt, most of the agriculture is outside of MSAs.

Section 3. Market-Value Weights

Table 1 presents our first basic results, the approximate income property capital stock estimates for the top twenty MSAs in the U.S. The top five private markets are Los Angeles, with $218 billion in income properties, followed by New York City, with $190 billion, Chicago, with $155 billion, Houston, with $137 billion, and Dallas, with $88 billion.

In the aggregate, we estimate the private metropolitan income property stock at approximately $3.3 trillion. As stated earlier, this estimate includes the value of multi-family housing as well as office, industrial, retail and other miscellaneous property types. We have excluded the value of all single family housing (by far the largest component of the total real estate capital stock) and all government real estate. We have also excluded the value of all nonmetropolitan real estate and all real estate from about 30 small metropolitan areas. In Malpezzi, Shilling and Yang we undertake a comparison to other estimates, and find that our estimate of the private

metropolitan income property stock is roughly in line with other studies.

We now present market-value weightings by region. These weightings are formed by aggregating market-value weights over all MSAs within each region. The results appear in Table 2. These portfolio weights are the ones considered to be perfectly diversified with a capital asset pricing model (CAPM) beta of 1.0.

Table 2 shows that a market-value weighted real estate portfolio should have 27 percent of its investments in California–11 percent in Northern California and 16 percent in Southern California. Of the remaining assets, 18 percent should be in Mineral Extraction states; 34 percent should be split evenly between the Industrial Midwest and the Old South; and 14 percent should be in the Mid Atlantic region. The Farm Belt and New England should have the smallest investments, 3 percent in the former and 4 percent in the latter.

Note that the market-value distribution of the income property stock is highly correlated with the distribution of population and employment, but not identical. The Industrial Midwest is significantly underweighted, relative to employment and population: it has almost a quarter of the latter, but only 17 percent of the commercial real estate stock. On the other hand, the Mid Atlantic region and the two California regions have more than their

share of income real estate. On all counts, the Farm Belt and New England are small relative to other regions.

Finally, note that a weighted portfolio that puts exactly the same investment into each region is not consistent with a perfectly diversified market-value real estate portfolio.

Section 4. Actual Portfolio Weights

At this point we would like to ask, How close do pension fund investors come to holding a market-value weighted real estate portfolio? To answer this question, we obtained actual portfolio weights for institutional investment in real estate from NCREIF. We also obtained actual portfolio weights for REITs. Our data are from Fidelity Management & Research Company, and are described in detail in Mahoney, McCarron, Miles, and Sirmans (1996). The methodology for arriving at the actual portfolio weightings by region is the same as described above. We note that our actual portfolio weightings for institutional investors and REITs are for 1996, while our market-value weightings, as stated above, are for 1994. Again, because we are using ratios, there is little cause for alarm.

Table 3 compares income property by region to estimates of the aggregate investment by institutional investors and REIT investors.

As Table 3 shows, we have data on $43 billion in institutional investment. Some institutional investors are not NCREIF members, so this data is a lower bound (although most large pension funds and similar investors belong). Note that institutional investors invest less in the Farm Belt and the Mineral Extraction Region than market weights would suggest. The former region has almost 3 percent of the metropolitan income property stock but only attracts 0.6 percent of private investment. The latter region has about 18 percent of the investible stock but only about 12 percent of investment. The most over-invested region is the Mid-Atlantic, although Northern California is also somewhat over-invested, according to these aggregates.

Our 295 metropolitan areas report $81 billion in stock of REIT investment in 1996. This is in line with NAREIT's 1996 estimate of $89 billion in total REIT capitalization for that year. Of course, the meteoric rise of REIT investment over the past two years is well known; our maintained hypothesis (well worth testing as data becomes available in future) is that while the level of REIT investment has risen, locational preferences may be roughly stable.

Table 3 suggests REITs also depart from buying the market portfolio. Farm Belt real estate is still less popular, though the disparity is much less than observed with private investors: 1.9 percent of REIT investment

in this region that contains 2.8 percent of investible capital. The Mineral Extraction region is only slightly under-invested by REITs (compared to the underinvestment by institutional investors), and the Mid-Atlantic region is no longer heavily over-invested. The largest divergences between REIT portfolio weights and market-value portfolio weights appear to be in the under-invested Southern California Region, and the heavily over-invested Old South. A formal analysis of variance test confirms that the differences observed in Table 3 are significant.

Section 5. Additional Evidence on Location Differences

Another way to examine the distribution of institutional and REIT portfolio investment is to calculate relative shares for each metropolitan area, and see if there are any strong regional patterns in these shares.

A previous study by Mahoney, McCarron, Miles, and Sirmans (1996) used population as a proxy for the size of the investible real estate capital stock. Their "population-adjusted concentration ratio" is in effect a location quotient for investment; it is the ratio of two ratios. The numerator is each metropolitan area's share of total real estate investment by that investor type (public or private, in turn). The denominator is each metropolitan area's

corresponding share of metropolitan population. Thus a location which has real estate investment of a given type proportionate to its population would have a population-adjusted concentration ratio of 1.

In this paper we extend the Mahoney, McCarron, Miles, and Sirmans analysis in several ways, most notably by using our real estate capital stock estimates in the denominator of our concentration ratios. Once again, the numerator is each metropolitan area's share of total real estate investment by that investor type. But in our measure, the denominator is each metropolitan area's corresponding share of the income property stock. Of course population and the stock of investable real estate capital are positively correlated. The simple correlation coefficient is 0.4. But just as clearly, while larger MSAs clearly have larger income property stocks, *ceteris paribus*, the size of the stock is not strictly proportional to population. For comparison, some of the tables below will present both population-weighted concentration ratios as well as our preferred property value-weighted ratios.

Table 4 presents summary statistics for these concentration ratios in each of our eight regions. If public and private investors bought the market portfolio, i.e. invested proportionately to the value of the capital stock, each region's concentration ratio would equal one. It follows trivially that the summary statistics presented (mean, median, first and third quartiles)

would also equal one.

We can see by immediate inspection that such is not the case. Consider the summary statistics for all regions. The mean concentration ratio for institutional investors is 0.32; and median, first and third quartiles are all zero, reflecting the fact that most MSAs within a specific region receive no measured private institutional investment. The distribution of concentration ratios for REITs–with a mean of 0.93, a median of 0.76, first quartile of 0.29 and third quartile of 1.31–is a much wider spread of investment, but still far from the idealized market portfolio.

Table 4 confirms both the regional differences discussed above, and the more concentrated geographic investment patterns of private investors compared to public.[2] Private investors particularly favor the Mid-Atlantic region, and are particularly adverse to the Farm Belt. Public investors concentrate their investment in the Industrial Midwest, the Mid Atlantic Region, and the Old South. Some differences do exist between the patterns discerned from Table 3, above, and this Table 4. That is to be expected, since Table 3 in effect weights results by the size of each market, and in Table 4 each MSA, large or small, has the same weight. Thus, when broad patterns

[2]This and all other qualitative statements regarding differences in table cells have been formally tested using ANOVA techniques. All reported differences are statistically significant at conventional levels.

emerge from both tables, such as heavy REIT investment in the South, we can be confident of the robustness of the result.

Notice, also, that the results in Table 4 are qualitatively similar whether concentration ratios are based on the income property stock or on population. Formal t-tests reject the hypothesis that they give numerically identical results, but the general qualitative pattern, by region and by public/private investor, is quite robust. For this reason, we focus on our preferred income property concentration ratios for the rest of the paper.

Table 4 provides a useful breakdown of investor behavior, but it is still aggregated by region. Which specific MSAs attract the greatest proportionate investment by REITs and private institutional investors? Tables 5 and 6 present the top 20 MSAs using our concentration ratios to measure proportionate investment activity.[3] Table 5 shows that there are about 20 MSAs with private institutional investment roughly double or more than expected on the basis of market weights; Jersey City has over six times its expected investment! It is interesting to note that most of the MSAs with the highest concentration ratios are medium sized (1-2 million population). Washington, D.C. is the largest MSA to make the top 20 in Table 5; the

[3]For discussion of the concentration of the dollar amount of activity in specific counties, see Shilton, Stanley, and Tandy (1996).

largest MSAs like Los Angeles, New York, Chicago and Philadelphia are conspicuous by their absence.

For comparison, Table 5 also presents REIT concentration ratios for the top 20 private markets. In general, markets that attract more than proportionate REIT investment also do well in attracting institutional investment. Only Milwaukee and Minneapolis in the private top 20 have institutional concentration ratios less than one.

Table 6 presents the top 20 MSAs for REIT investment. All of the top 20 MSAs have concentration ratios well over 2. Altoona has roughly five times its expected investment. There are many MSAs of modest size that make the top 20 of the REIT market, although Atlanta, Tampa and Washington all make the top 20 as well. Note that, in contradistinction to the pattern in Table 5, many of the top 20 REIT markets have negligible measured private institutional investment. That is, taking Tables 5 and 6 together, MSAs that attract a lot of institutional investment almost always also attract a high level of REIT investment; but the converse is not necessarily true.

Section 6. The Role of Market Quality in Investment Decisions

What explains the remarkable divergence in concentration of investment activity between institutional and REIT investors? We believe an important determinant of the difference is different legal liability for different investors. In making real estate investments, private pension plan investors are guided by the Employee Retirement Income Security Act (ERISA), whereas public investors are not. It has been suggested that private pension plan investors are adverse to holding low-quality stocks and bonds because ERISA holds them personally liable for losses arising from any breach of their fiduciary duty (see Del Guercio (1996)). Elsewhere we have speculated that private investors tilt their real estate investments toward quality, too (see Malpezzi and Shilling (1997)).

The quality of many investments is measured by ratings provided by agencies like Moody's, Standard and Poor's, and Fitch. Stocks, bonds, and countries are commonly rated. City governments are also rated, for the municipal bond market. But the fiscal position of cities is, in fact, different from the economic potential of metropolitan areas.[4] To our knowledge, there

[4]In preliminary work, we examined the role municipal bond ratings could play in measuring the economic potential of the area. In fact, municipal bond ratings added little information to the economic fundamentals we settled on for our index, described

is little prior research on constructing an index of the quality of an area's economic fundamentals.[5]

For the purpose of this study, we measure MSA "quality" using the method of principal components. Each MSA is first categorized into one of two groups: high and low-quality locations. The differentiation is based on a univariate scale of market quality. The overall size of the market, economic growth, and the variance of growth (measured by employment and by real income per capita) are the main elements comprising the index. That is, investors are assumed to prefer larger markets, everything else equal; faster growing markets, everything else equal; and markets with steady growth are assumed preferred to volatile markets.

Malpezzi and Shilling (1997) formally modeled the locational decisions of public and private investors using this quality measure, and other variables reflecting the economic structure of metropolitan areas. Unsurprisingly, they found that the quality of the market was a powerful determinant of location decisions for both classes of investors as was economic structure. Also unsurprisingly, the effect of quality was much stronger for institutional investors, consistent with a stronger tilt to quality, also noted by Mahoney, McCar-

below.

[5]Of course there is a large literature on metropolitan "quality of life" indexes, such as Roback (1982) and Gyourko and Tracy (1991); but these are at best indirectly related to an index of the economic development potential of an area.

ron, Miles, and Sirmans (1996), and also visible in our presentation in this paper. Again, we argue that this is related to the fiduciary responsibilities that private institutional investors have.

To begin to address this issue, we present concentration ratios based on income property stock for those MSAs with the largest property capital stock. See Table 7. The institutional real estate market is more concentrated in the twenty largest MSAs than the REIT market. Major differences include the large concentrations in Los Angeles, San Diego, Miami, Minneapolis, and Seattle for the institutional real estate market, but not for the REIT market. In contrast, wherever there is a large concentration in the REIT market, there also is a fairly sizeable concentration in the institutional real estate market.

Our final exhibit, Table 8, presents data on investment levels and concentration ratios based on income property according to the "quality" of the market and geographic region.

The results indicate that institutional real estate holdings, by and large, are mostly confined to the high-quality locations in each geographic area. This is true whether looking at the aggregate investment in each cell, or the average concentration ratios in the last two columns. REIT real estate holdings, by contrast, are less concentrated in high-quality locations than

private; but they still tilt to quality.

Section 7. Conclusions

We have concluded that an ultimate index fund for real estate should have its largest concentration in California; its second largest concentration should be split evenly across the Industrial Midwest and the Old South; and its next largest concentration should be in the Mineral Extraction and Mid Atlantic regions. After that, it should have modest holdings in the Farm Belt and in New England.

But, as indicated above, no institutional investor or REIT actually holds a market-value weighted real estate portfolio. In part this can be explained by differences in expectations. Conceivably, if institutional investors or REIT investors have different subjective distributions over future returns, then they will combine risky assets in different proportions. Additionally, each institutional or REIT investor has its own tax considerations, information costs, and time horizons. Such differences may cause some investors to hold, for example, a highly stylized real estate portfolio. Other investors, by contrast, may wish to hold more broad-based real estate portfolio.

One might also argue that institutional investment in real estate is influenced by non-risk factors. For example, one issue regarding real estate is

whether or not institutional investors can make forecasts of expected return, of the variation of returns, and of the covariance of real estate returns with the returns from other investments that are sufficiently reliable for making an investment judgment. Others argue that there is a tendency for pension fund trustees to tilt their portfolios toward high-quality assets that are easy to defend in court in order to protect themselves from personal liability.

The evidence presented above clearly would suggest that both institutional investors and REITs appear to hold real estate portfolios that are heavily concentrated in high-quality locations. The tilt toward quality is especially pronounced for institutional investors.

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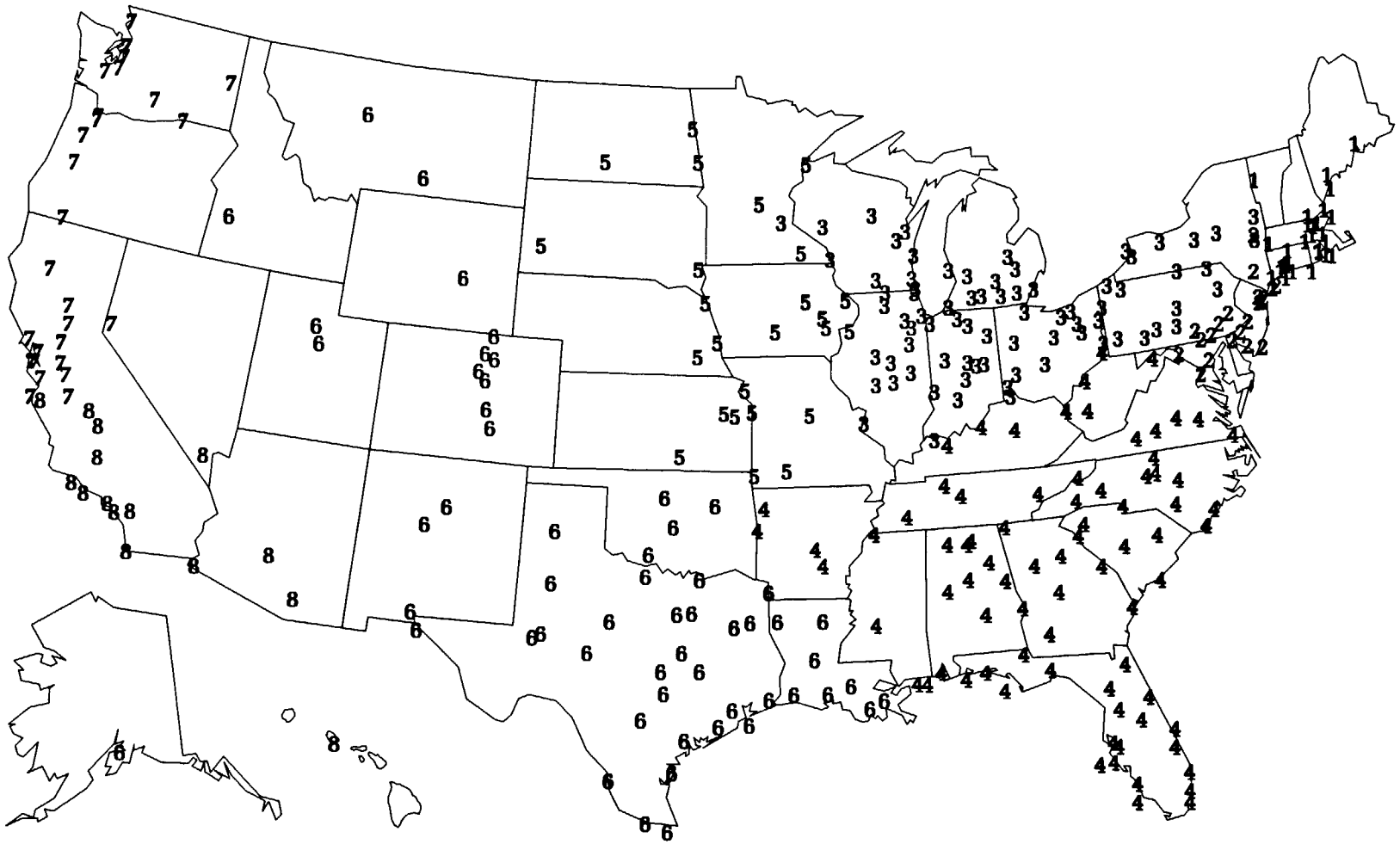
Metropolitan Areas By Hartzell – Shulman – Wurtzebach Region



1 = New England 2 = Mid Atlantic
3 = Industrial Midwest 4 = Old South
5 = Farm Belt 6 = Mineral Extraction
7 = Northern Calif. 8 = Southern Calif.

Table 1: Income Property Capital Stock For the Top 20 MSAs

MSA	Income Property Capital Stock 1994 $Million	MSA's Share of the Capital Stock for 295 MSAs	Population 1994	MSA's Share of Population for 295 MSAs	Employment 1994	MSA's Share of Employment for 295 MSAs	Region
1 Los Angeles	217,658	6.7%	9,149,800	4.5%	4,817,420	4.2%	Southern California
2 New York	190,031	5.8%	8,586,300	4.2%	4,553,251	4.0%	Mid Atlantic
3 Chicago	154,663	4.7%	7,667,800	3.8%	4,508,832	3.9%	Industrial Midwest
4 Houston	136,833	4.2%	3,652,600	1.8%	2,143,222	1.9%	Mineral Extraction
5 Dallas	88,836	2.7%	2,898,200	1.4%	1,950,285	1.7%	Mineral Extraction
6 Boston	79,726	2.4%	5,730,100	2.8%	3,404,615	3.0%	New England
7 Washington	74,523	2.3%	4,466,500	2.2%	3,021,275	2.6%	Mid Atlantic
8 San Diego	73,915	2.3%	2,632,100	1.3%	1,402,471	1.2%	Southern California
9 Oakland	63,817	2.0%	2,182,400	1.1%	1,155,681	1.0%	Northern California
10 Phoenix	63,444	1.9%	2,473,400	1.2%	1,408,444	1.2%	Southern California
11 Riverside	49,507	1.5%	2,906,600	1.4%	1,057,942	0.9%	Southern California
12 Atlanta	48,508	1.5%	3,331,000	1.6%	2,115,622	1.8%	Old South
13 Philadelphia	45,657	1.4%	4,949,200	2.4%	2,634,210	2.3%	Mid Atlantic
14 Miami	43,543	1.3%	2,025,000	1.0%	1,113,469	1.0%	Old South
15 Minneapolis	42,846	1.3%	2,688,400	1.3%	1,830,589	1.6%	Industrial Midwest
16 Seattle	42,473	1.3%	2,179,500	1.1%	1,465,712	1.3%	Northern California
17 San Jose	37,679	1.2%	1,557,200	0.8%	1,005,762	0.9%	Northern California
18 Denver	35,893	1.1%	1,796,300	0.9%	1,195,291	1.0%	Mineral Extraction
19 Detroit	35,518	1.1%	4,307,100	2.1%	2,298,507	2.0%	Industrial Midwest
20 Sacramento	35,380	1.1%	1,441,500	0.7%	770,473	0.7%	Northern California
Total, 295 MSAs	3,259,661	100.0%	202,041,700	100.0%	115,235,060	100.0%	

Table 2: Income Property Capital Stock By Region

Region	Number of MSAs	Income Property Capital Stock 1994 $Million	Percent	Population 1994	Percent	Employment 1994	Percent
Farm Belt	25	90,625	3%	6,430,000	3%	4,173,098	4%
Industrial Midwest	70	561,983	17%	47,557,800	24%	27,450,474	24%
Mid Atlantic	20	465,082	14%	32,841,900	16%	18,335,254	16%
Mineral Extraction	56	579,619	18%	26,989,800	13%	15,616,090	14%
New England	10	132,981	4%	10,865,600	5%	6,353,619	6%
Northern California	26	353,805	11%	16,437,200	8%	9,469,499	8%
Old South	75	539,047	17%	38,428,000	19%	22,331,730	19%
Southern California	13	536,519	16%	22,491,400	11%	11,505,296	10%
Total	295	3,259,661	100%	202,041,700	100%	115,235,060	100%

Table 3: Public and Private Portfolio Investment By Region, Circa 1996

Region	Number of MSAs	Income Property Capital Stock 1994 $Million	Percent	Private (NCREIF) Metropolitan Real Estate Investment 1996	Region's Percent of MSA Private Investment	Private Investment / Income Property Stock	Public (REIT) Metropolitan Real Estate Investment 1996	Region's Percent of MSA Public Investment	Public Investment / Income Property Stock
Farm Belt	25	90,625	2.8%	264	0.6%	0.3%	1,551	1.9%	1.7%
Industrial Midwest	70	561,983	17.2%	7,619	17.8%	1.4%	13,078	16.1%	2.3%
Mid Atlantic	20	465,082	14.3%	9,017	21.1%	1.9%	11,630	14.3%	2.5%
Mineral Extraction	56	579,619	17.8%	4,911	11.5%	0.8%	12,983	16.0%	2.2%
New England	10	132,981	4.1%	1,691	4.0%	1.3%	3,207	3.9%	2.4%
Northern California	26	353,805	10.9%	5,583	13.1%	1.6%	6,915	8.5%	2.0%
Old South	75	539,047	16.5%	7,463	17.5%	1.4%	23,031	28.3%	4.3%
Southern California	13	536,519	16.5%	6,185	14.5%	1.2%	8,859	10.9%	1.7%
Total	295	3,259,661	100.0%	42,733	100.0%	1.3%	81,254	100.0%	2.5%

Table 4: Summary Statistics, MSA Concentration Ratios By Region

Region	Number of MSA Concentration Ratios		Concentration Ratios, Based on Income Property Stock, Private (NCREIF) Investors	Concentration Ratios, Based on Income Property Stock, Public (REIT) Investors	Concentration Ratios, Based on Population Private (NCREIF) Investors	Concentration Ratios, Based on Population Public (REIT) Investors
Farm Belt	25	Mean	0.07	0.50	0.05	0.39
		Median	0.00	0.30	0.00	0.20
		Q3	0.00	0.89	0.00	0.73
		Q1	0.00	0.09	0.00	0.11
Industrial Midwest	70	Mean	0.22	0.98	0.16	0.50
		Median	0.00	0.81	0.00	0.44
		Q3	0.00	1.27	0.00	0.74
		Q1	0.00	0.39	0.00	0.23
Mid Atlantic	20	Mean	1.00	1.25	0.61	0.75
		Median	0.00	1.06	0.00	0.74
		Q3	1.38	1.85	0.76	0.89
		Q1	0.00	0.53	0.00	0.42
Mineral Extraction	56	Mean	0.20	0.82	0.20	0.70
		Median	0.00	0.66	0.00	0.60
		Q3	0.00	1.23	0.00	1.04
		Q1	0.00	0.26	0.00	0.27
New England	10	Mean	0.31	0.59	0.19	0.37
		Median	0.00	0.55	0.00	0.33
		Q3	0.00	1.05	0.00	0.66
		Q1	0.00	0.10	0.00	0.06
Northern California	26	Mean	0.47	0.56	0.54	0.66
		Median	0.00	0.45	0.00	0.54
		Q3	0.82	0.78	1.28	1.04
		Q1	0.00	0.26	0.00	0.21
Old South	75	Mean	0.35	1.23	0.28	0.88
		Median	0.00	1.10	0.00	0.77
		Q3	0.00	1.72	0.00	1.18
		Q1	0.00	0.65	0.00	0.43
Southern California	13	Mean	0.43	0.71	0.53	0.85
		Median	0.06	0.42	0.06	0.57
		Q3	0.89	0.76	1.18	0.95
		Q1	0.00	0.28	0.00	0.32
Total	295	Mean	0.32	0.93	0.27	0.67
		Median	0.00	0.76	0.00	0.54
		Q3	0.00	1.31	0.00	0.91
		Q1	0.00	0.29	0.00	0.22

Table 5: Top 20 MSAs, Income Property Concentration Ratios, Private Investors

Rank	Largest City in MSA	Concentration Ratios, Based on Income Property Stock, Private (NCREIF) Investors	Income Property Capital Stock 1994 $Million	Population 1994	Concentration Ratios, Based on Income Property Stock, Public (REIT) Investors	Region
1	Jersey City	6.76	5,404	552,400	2.47	Mid Atlantic
2	San Francisco	4.33	29,612	1,646,000	1.01	Northern California
3	Washington	4.30	74,523	4,466,500	2.48	Mid Atlantic
4	Norfolk	2.75	13,573	1,529,200	1.22	Old South
5	Charlotte	2.61	16,420	1,260,400	1.95	Old South
6	Memphis	2.39	13,092	1,056,100	1.72	Old South
7	Austin	2.37	17,894	964,000	2.19	Mineral Extraction
8	Cincinnati	2.31	25,288	1,581,200	1.27	Industrial Midwest
9	Baltimore	2.28	25,721	2,458,400	1.52	Mid Atlantic
10	Atlanta	2.27	48,508	3,331,000	4.12	Old South
11	Nashville	2.27	16,787	1,069,600	2.38	Old South
12	Orlando	2.25	25,678	1,361,500	2.04	Old South
13	Chattanooga	2.20	4,639	439,200	2.10	Old South
14	Seattle	2.09	42,473	2,179,500	1.22	Northern California
15	Milwaukee	2.06	13,736	1,455,600	0.46	Industrial Midwest
16	Indianapolis	1.99	18,782	1,461,700	2.36	Industrial Midwest
17	Minneapolis	1.94	42,846	2,688,400	0.60	Industrial Midwest
18	Denver	1.92	35,893	1,796,300	1.30	Mineral Extraction
19	Fort Lauderdale	1.92	27,167	1,383,000	1.66	Old South
20	Saint Louis	1.88	27,926	2,536,100	1.08	Industrial Midwest

Table 6: Top 20 MSAs, Income Property Concentration Ratios, Public Investors

Rank	Largest City in MSA	Concentration Ratios, Based on Income Property Stock, Public (REIT) Investors	Income Property Capital Stock 1994 $Million	Population 1994	Concentration Ratios, Based on Income Property Stock, Private (NCREIF) Investors	Region
1	Altoona	5.34	541	131,800	0.00	Industrial Midwest
2	Atlanta	4.12	48,508	3,331,000	2.27	Old South
3	Richmond	3.39	10,333	916,700	0.00	Old South
4	Saginaw	3.36	1,538	402,300	0.00	Industrial Midwest
5	Raleigh	2.95	13,359	965,100	0.37	Old South
6	Allentown	2.87	5,716	611,800	0.00	Mid Atlantic
7	Santa Fe	2.82	1,316	130,800	0.00	Mineral Extraction
8	Charlottesville	2.74	1,330	140,700	0.00	Old South
9	Jacksonville	2.66	13,195	971,800	1.17	Old South
10	Ann Arbor	2.57	3,218	515,300	0.00	Industrial Midwest
11	Tampa	2.57	30,661	2,156,500	1.35	Old South
12	Sharon	2.56	968	122,200	0.00	Industrial Midwest
13	Trenton	2.53	1,965	329,400	0.00	Mid Atlantic
14	Tallahassee	2.49	2,708	253,400	0.00	Old South
15	Washington	2.48	74,523	4,466,500	4.30	Mid Atlantic
16	Jersey City	2.47	5,404	552,400	6.76	Mid Atlantic
17	Nashville	2.38	16,787	1,069,600	2.27	Old South
18	Muncie	2.37	507	119,200	0.00	Industrial Midwest
19	Indianapolis	2.36	18,782	1,461,700	1.99	Industrial Midwest
20	State College	2.36	1,017	129,800	0.00	Industrial Midwest

Table 7: Concentration Ratios for MSAs with Largest Income Property Capital Stock

MSA	Income Property Capital Stock 1994 $Million	Concentration Ratios, Based on Income Property Stock, Private (NCREIF) Investors	Private Investor Concentration Ratio Rank, Out of 295 MSAs	Concentration Ratios, Based on Income Property Stock, Public (REIT) Investors	Public Investor Concentration Ratio Rank, Out of 295 MSAs	Region
1 Los Angeles	217,658	1.23	35	0.42	200	Southern California
2 New York	190,031	0.77	50	0.11	263	Mid Atlantic
3 Chicago	154,663	1.45	28	0.81	142	Industrial Midwest
4 Houston	136,833	0.60	53	0.64	168	Mineral Extraction
5 Dallas	88,836	1.28	32	1.31	74	Mineral Extraction
6 Boston	79,726	1.40	29	1.09	98	New England
7 Washington	74,523	4.30	3	2.48	15	Mid Atlantic
8 San Diego	73,915	1.01	41	0.59	175	Southern California
9 Oakland	63,817	0.82	47	0.74	152	Northern California
10 Phoenix	63,444	0.86	44	1.46	57	Southern California
11 Riverside	49,507	0.89	43	0.76	148	Southern California
12 Atlanta	48,508	2.27	10	4.12	2	Old South
13 Philadelphia	45,657	1.50	27	1.52	54	Mid Atlantic
14 Miami	43,543	1.75	23	0.52	186	Old South
15 Minneapolis	42,846	1.94	17	0.60	173	Industrial Midwest
16 Seattle	42,473	2.09	14	1.22	85	Northern California
17 San Jose	37,679	1.70	24	1.38	64	Northern California
18 Denver	35,893	1.92	18	1.30	77	Mineral Extraction
19 Detroit	35,518	1.24	34	0.93	127	Industrial Midwest
20 Sacramento	35,380	1.14	39	0.48	189	Northern California
		1.51	30.55	1.12	122.45	
		1.37	36.20	0.97	134.40	
		1.64	24.90	1.28	110.50	

Table 8: Income Property, and Investment, By Region and MSA Quality Category

Region	MSA Quality Category	Number of MSAs	Income Property Capital Stock 1994 $Million	Population 1994	Private (NCREIF Metropolitan Real Estate Investment 1996	Public (REIT) Metropolitan Real Estate Investment 1996	Concentration Ratios, Based on Income Property Stock, rivate (NCREIF Investors	Concentration Ratios, Based on Income Property Stock, Public (REIT) Investors
Farm Belt	High	13	57,478	4,644,100	264	1,409	0.14	0.76
Farm Belt	Low	12	33,146	1,785,900	0	142	0.00	0.22
Industrial Midwest	High	29	418,250	32,019,700	7,044	9,859	0.49	0.93
Industrial Midwest	Low	41	143,733	15,538,100	575	3,219	0.03	1.01
Mid Atlantic	High	19	463,039	32,715,300	9,017	11,618	1.05	1.30
Mid Atlantic	Low	1	2,043	126,600	0	12	0.00	0.24
Mineral Extraction	High	22	271,938	14,515,900	3,805	8,720	0.46	1.19
Mineral Extraction	Low	34	307,681	12,473,900	1,106	4,263	0.02	0.57
New England	High	9	131,782	10,761,700	1,691	3,187	0.34	0.58
New England	Low	1	1,199	103,900	0	20	0.00	0.66
Northern California	High	10	270,124	12,158,900	5,485	5,988	1.14	0.76
Northern California	Low	16	83,681	4,278,300	98	927	0.05	0.43
Old South	High	41	324,622	25,127,100	4,895	17,114	0.44	1.43
Old South	Low	34	214,425	13,300,900	2,568	5,917	0.24	0.98
Southern California	High	4	320,685	13,036,700	4,523	3,467	0.64	0.33
Southern California	Low	9	215,835	9,454,700	1,662	5,392	0.33	0.88
					0	0		
Total	High	147	2,257,918	144,979,400	36,723	61,362	0.55	1.09
Total	Low	148	1,001,743	57,062,300	6,009	19,893	0.09	0.76
Total	All	295	3,259,661	202,041,700	42,733	81,254	0.32	0.93