The Misuse of Alpha in Private Equity Real Estate Investments

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Abstract

Much of the debate over whether fund managers attempt to subvert the evaluation procedure to their advantage has focused on private equity buyout funds. This study provides new evidence that bears directly on this ongoing debate by investigating private equity funds that invest in commercial real estate. Three key questions motivate the exercise in what follows. First, given the subjective nature of the evaluation process, can the decisions made by private equity real estate fund managers shape the outcome of property performance into something that affects the fund manager's fee? Specifically, are unlevered deal level alphas "known" at acquisition with enough certainty that the manager can utilize positive financial leverage to enhance Jensen's alphas? Second, do discrepancies in reported versus true deal-level performance exist in booming versus declining markets? Third, it is not entirely clear as to which type of private equity real estate fund, core, value-added, or opportunistic, poses relatively more moral hazard than others. The theory would say that value-added and opportunistic funds pose the biggest threats, but there is a growing concern of style creep and style gaming among core funds. We find that for a vast majority of property deals over the sample period of 1978 through 2009, particularly for properties that were acquired prior to 2001, Jensen's alphas exceed the unlevered deal-level alphas by a wide margin, with a range of approximately 1.03 to 8.90% across core, value-added, and opportunistic properties. Our results also suggest that years of high Jensen's alphas are followed by years of low Jensen's alphas that are well below true deal-level alphas. The latter is understandable in light of the fact that fund managers use leverage to increase their potential returns but at the cost of more risk.

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1 Introduction

The vast majority of private equity funds specializing in commercial real estate are evaluated in some fashion or another on the basis of alpha. Yet alphas associated with most private equity (buyout) funds have been under attack practically for quite some time now, most notably by Brown and Goetzmann (2003), Goetzman, Ingersoll, and Ross (2003), Hodder and Jackwerth (2007), Panageas and Westerfield (2009), Dai and Sundaresan (2010), and Lan, Wang, and Yang (2011) among others. The main criticism has been that alphas can be distorted by the fund manager's discretion under the fund contract between the investors on the one hand and the fund management company on the other hand through the judicious use of financial leverage.

We bring new evidence to bear on this debate with an analysis of U.S. private equity real estate funds. We shall put to use a "straw man" design, which can easily be knocked down or propped up. Our "straw man" is a private equity real estate fund manager who is committed to "adding value" through leverage and financial engineering. Our private equity real estate fund manager receives 2% of funds under management each year as a management fee and earns 20% of returns if a certain return "hurdle" is met.[1] The compensation of the fund manager is also subject to a "high water" mark – if the fund suffers a loss on one property, the fund manager can get the performance fee only after this loss has been recovered. However, with non-recourse financing at the property-level, where the lending bank is only entitled to repayment from the profits of the property the loan is funding, the maximum potential loss is limited to the amount of the investment. Also, potential losses are limited through diversification, because certain properties (in, say, other sectors) can gain back the losses. We assume that our "straw man" fund manager has the ability to select properties sufficient to generate a positive "true" deal-level alpha (as defined by Acharya, Gottschal, Hahn, and Kehoe (2013), hereafter AGHK). Our "straw man" fund manager then leverages the property

[1] Loosely speaking, only value-add and opportunistic real estate fund strategies utilize such a "2% and 20%" rule for compensation. So, by definition, our private equity real estate fund manager is a value-added or opportunistic real estate fund manager.

to achieve a large positive Jensen's alpha with positive leverage, but also creates or facilitates a risk of loss. The latter results when financial leverage becomes negative. Importantly, we may expect years in which such a strategy will earn high Jensen's alphas that are well in excess of the true deal-level alpha, followed by years in which such a strategy will earn low Jensen's alphas that are well below true deal-level alphas, in a classic boom-and-bust cycle. Along the way, investors will pay large fees to the fund manager (over and above that based on the true deal-level alphas).

The details of our test of these predictions follow. We pick properties from the National Council of Real Estate Investment Fiduciaries (NCREIF) database (which is an extensive database providing information on about 10,000 property investments made by US-based private equity real estate funds). The period covers from 1978 Q1 to 2012 Q2. Only properties that were bought and sold during this period are included in the sample. The technique employed is a paired comparison test. We construct two measures of investment performance for private equity real estate funds, each at the property level. The broad measure is Jensen's alpha and the narrow measure is the "true" deal-level alpha for each property. The latter, as defined by AGHK, is the difference between the un-levered return on the property and the un-levered return for the peers of the deal. Paired comparisons are used on these two performance measures, as a way of testing various hypotheses: is Jensen's alpha (adjusted for leverage) significantly larger, on average, than the true deal-level alpha in booming markets when positive financial leverage occurs, are the two performance measures (adjusted for leverage) equal, is Jensen's alpha (adjusted for leverage) significantly below the true deal-level alpha, on average, in declining markets when negative financial leverage occurs?

Our work has two main findings. First, in booming markets, Jensen's alpha (adjusted for leverage) overstates the property's true deal-level alpha in most cases by a wide margin, with a range of approximately 1.03 to 8.90% across core, value-added, and opportunistic properties. Second, we find that the degree of overstatement increases when the level of financing is itself sufficiently large and the return from risk-taking is low. Our paired comparisons suggest that

the degree of overstatement is in the range of 2.58 to 8.90% across value-added and opportunistic properties (when investments made via private equity real estate funds are highly levered). The paired differences between Jensen's alphas (adjusted for leverage) and true deal-level alphas are statistically significant at standard levels.

We perform a variety of tests to check the robustness of our estimates. With few exceptions, the degree of overstatement changes little when we screen our sample in various ways. The differences between Jensen's alphas and true deal-level alphas are large in absolute terms, are statistically significant, and their statistical significance is robust to our battery of sensitivity tests.

All these results are in line with what the theory postulates as really existing. At the level of theory, by leveraging, the private equity real estate fund manager (who is able, or simply lucky, to generate a positive deal-level alpha) is positioned to deliver for shareholders a large Jensen's alpha, which means high compensation for the fund manager. However, high leverage also implies high volatile and hence potentially very large negative Jensen's alphas (well below the true deal-level alpha) in periods of declining markets. But the latter may have absolutely no bearing on the fund manager's compensation. Obviously, to some extent, the latter result must be the case because otherwise we should not see that which we actually do see unfold in the data.

The remainder of the paper is organized into the following sections. Section 2 describes the data and sample selection and how our property-level IRRs and Jensen's alphas are calculated. Section 3 describes the methodology for calculating the property's true deal-level alpha and how to decompose Jensen's alpha into the property's deal-level alpha plus a return from excess risk taking and a return from sector leverage and incremental leverage. Empirical results are contained in section 4 and the final section presents our conclusions.

2 What the Theory Tells Us

If we had the largest and most comprehensive database on property investments made by U.S. private equity real estate funds (which we actually do have), what would we expect to find? Would we expect to find private equity real estate fund managers trying to subvert the evaluation procedure to their advantage? Would we see the largest discrepancies in reported versus true deal-level performance in booming versus declining markets? Would we expect different behavior from private equity real estate fund managers specializing in core funds versus value-added and opportunistic funds? These are hardly new questions; still, they are fundamental and lying at the heart of much inquiry.

What follows is an attempt to explore these questions. Below we assume that private equity real estate fund managers have superior knowledge about commercial real estate investments and are able to select properties sufficient to generate a positive "true" deal-level alpha. Here we use AGHK's notion of a deal-level alpha to disentangle the effect of leverage from that of operational improvements and to measure the excess return of the property relative to the sector, free of the effects of leverage. More specifically, we assume that private equity real estate fund managers are able to invest in commercial real estate assets with a positive deal-level abnormal performance, α_i^*, defined as:

$$\alpha_i^* = R_i - R_{NPI} \quad (1)$$

where R_i is the unlevered (internal rate of return) return on property i and R_{NPI} is an appropriate benchmark return (in this case the NCREIF property return index, hereafter NPI).

This next point is important. We assume that the private equity real estate fund manager is evaluated in some fashion or another on the basis of Jensen's alpha, and that the fund manager used leverage, both to diversify across different investment opportunities and to increase the Jensen's alpha on the funds invested. We define property leverage effects as:

$$R_i^L - R_i = (R_i - R_{Di})(D/E)_i \quad (2)$$

where R_i^L is the levered property return for property i and R_{Di} is the cost of debt capital for property i. Here, following the derivations in Hamada (1972), it follows that $R_i^L = [\alpha_i^L -$

$R_{Di}(\beta_i(1 + D/E_i) - 1)] + \beta_i^L(R_{NPI})$, where α_i^L is the levered Jensen's alpha on the property measured in relation to the benchmark and $\beta_i^L = \beta_i(1 + D/E_i)$.

Next, from (1) above, it follows that

$$\alpha_i^* = (R_i^L - R_{NPI}) - (R_i^L - R_i) \quad (3)$$

Or, alternatively, using (2) it follows that

$$\alpha_i^* = (R_i^L - R_{NPI}) - (R_i - R_{Di})(D/E)_i \quad (4)$$

Next, substitute for D/E_i in terms of incremental leverage:

$$D/E_i = D/E_{Si} + (D/E_i - D/E_{Si}) \quad (5)$$

where D/E_{Si} captures leverage inherent in the sector and $(D/E_i - D/E_{Si})$ measures the incremental leverage beyond the sector.

Then (4) becomes

$$\alpha_i^* = (R_i^L - R_{NPI}) - (R_i - R_{Di})(D/E)_{Si} - (R_i - R_{Di})(D/E_i - D/E_{Si}) \quad (6)$$

Finally, substituting the definition of R_i^L from above into (6), we have

$$[\alpha_i^L - R_{Di}(\beta_i(1 + D/E_i) - 1)] = \alpha_i^* + (R_i - R_{Di})(D/E)_{Si} + (R_i - R_{Di})(D/E_i - D/E_{Si}) - R_{NPI}[\beta_i(1 + D/E_i) - 1] \quad (7)$$

Here $[\alpha_i^L - R_{Di}(\beta_i(1 + D/E_i) - 1)]$, which is Jensen's alpha adjusted for leverage, is decomposed into the following four components: α_i^*, which is the true deal-level alpha, $(R_i - R_{Di})(D/E)_{Si}$, which is the return from sector leverage, and $(R_i - R_{Di})(D/E_i - D/E_{Si})$, which is the return from incremental leverage, and $R_{NPI}[\beta_i(1 + D/E_i) - 1]$, which is the return from excess risk taking.

Remark 1. The above derivation suggests that it may be possible for $[\alpha_i^L - R_{Di}(\beta_i(1 + D/E_i) - 1)]$ to exceed α_i^*, if $(R_i - R_{Di})(D/E)_{Si} + (R_i - R_{Di})(D/E_i - D/E_{Si}) - R_{NPI}[\beta_i(1 + D/E_i) - 1] > 0$. This latter requirement is satisfied when a private equity real estate fund 1) starts with a basic real estate investment with not much risk exposure (i.e., $R_{NPI}[\beta_i(1 + D/E_i) - 1]$ is low) but with a positive deal-level alpha (i.e., $\alpha_i^* > 0$), and then 2) levers it a great deal (i.e., so that $(R_i - R_{Di})(D/E)_{Si} + (R_i - R_{Di})(D/E_i - D/E_{Si}) >$

$R_{NPI}[\beta_i(1 + D/E_i) - 1])$. Under such circumstances, one should expect to see in the data a large Jensen's alpha, where $[\alpha_i^L - R_{Di}(\beta_i(1 + D/E_i) - 1)]$ exceeds α_i^* simply because of the heavily use of leverage. Such a finding would be consistent with the view that private equity funds take advantage of the use of leverage (without restrictions) to increase the returns on funds invested just enough alpha to pay their fees.

Remark 2. The use of leverage implies high volatile and hence potentially very large negative Jensen's alphas (well below the true deal-level alpha) in periods of declining markets. To illustrate, suppose that property i is modestly levered (with D/E_i exactly equal to D/E_{Si}) and that the commercial real estate market falls into a down cycle, causing R_i^L and, in turn, $[\alpha_i^L - R_{Di}(\beta_i(1 + D/E_i) - 1)]$ to fall far below what private equity real estate investors expected. Suppose further that R_i is such that $0 < R_i \leq R_{Di}$, while $R_{NPI} > 0$. In this case, financial leverage on the property is negative and all investment losses on the property will be magnified as R_i falls. More specifically, with $R_{NPI} > 0$ and a β_i close to one, the term the $R_{NPI}[\beta_i(1 + D/E_i) - 1]$ is positive. Furthermore, with $0 < R_i \leq R_{Di}$ and $D/E_i = D/E_{Si}$, we get $(R_i - R_{Di})(D/E)_{Si} < 0$ while $(R_i - R_{Di})(D/E_i - D/E_{Si}) = 0$. From (7), it follows that $R_{NPI}[\beta_i(1 + D/E_i) - 1] - (R_i - R_{Di})(D/E)_{Si} + (R_i - R_{Di})(D/E_i - D/E_{Si}) > 0$, which implies that $[\alpha_i^L - R_{Di}(\beta_i(1 + D/E_i) - 1)] - \alpha_i^* < 0$. It is clear from this derivation that $[\alpha_i^L - R_{Di}(\beta_i(1 + D/E_i) - 1)]$ will fall significantly below α_i^* on the downside, just as $[\alpha_i^L - R_{Di}(\beta_i(1 + D/E_i) - 1)]$ will exceed α_i^* when the going is good (which is what the data will show, see below). What follows is an attempt to examine the data to see if these predictions hold.

3 The Data

Central to our analysis is the property-level NCREIF database. The NCREIF database started in Q4 of 1977 ultimately collecting information on a sample of roughly 30,000 properties historically and roughly 10,000 current properties by Q2 of 2013. Thereafter, both the original investment managers and new managers (including split-offs and mergers of the

original property managers group) have contributed to property-level data to NCREIF. For the analysis we exclude industrial buildings, hotels, land, entertainment, healthcare, manufactured, parking, self-storage, senior living, and other real estate. However, we do consider the robustness of our results by calculating deal-level alphas for apartments, office and retail.

The NCREIF database includes a wide variety of information summarizing income and expenses, including property level tangible improvement expenditures (for example, roofs, parking lots, elevators, lobbies, HVAC systems, and security systems), improvements to the property that result in an expansion of the property's leasable area, and expenditures related to acquisition or development of the property. The NCREIF database includes all revenue and reimbursable and non-reimbursable operating expenses reported in the current quarter for the property.[2] Net operating income does not include a deduction for debt service, capital expenditures, or tenant improvements, leasing commissions, or development costs. Fund-level asset management fees charged by investment managers are also excluded from the calculation of net operating income. However, operating expenses do include property management fees. Properties owned as joint ventures are reported as if owned at a 100% basis.

Reporting investment managers include the appraised market value of their properties, excluding the impact of any mortgage financing at the beginning of the quarter. The appraised market value of the property is determined either by an internal or external independent third party appraisal without considering any existing financing.[3] However, when a property is sold, the market value of the property reported is the gross sales price. The net (of selling expenses) sales price of the property is also reported. If the property is transferred or sold to another NCREIF data contributing member, the successor manager reports future activity and the property does not leave the data base. If the property is exchanged for another property,

[2]Typically, the NCREIF database collects results at the property level each quarter. The data deadline is the 20th of the month following quarter end.

[3] One distinctive feature of private equity real estate funds is that they operate in a market characterized by the private trading of whole assets. This distinctive feature of private equity real estate funds allows us to compute both the IRR using actual cash inflows and outflows for each deal (property investment) as well as the property's quarterly holding period return.

the property falls out of the sample, since there are too many variables (property type, location, "boot," etc.) to adjust for properties that are exchanged into another investment.[4]

The NCREIF database provides a continuous and comprehensive flow of data on any debt on the property from 1978 to 2012 (the first seven years from 1978 to 1987 only unlevered information on the property is reported). Post 1987 the sum of the principal balances of all loans against the property at the beginning of the quarter less all principal payments, plus any new debt is also reported. The NCREIF database provides information on regular (scheduled) loan principal amortization payments as paid in accordance with the loan documents, as well as balloon payments, whether scheduled or not. The accrual basis interest expense for the quarter is reported in the NCREIF database rather than actual interest paid. The amount reported is the total accrued interest expense for all outstanding debt on the property. Early principal payments and any other principal payments that are not included in the scheduled principal payment are also reported in the database.

For our analysis we limit the sample to those properties that were sold over the period 1978 to 2009. We thus focus on a sample of 7895 institutional real estate properties. Observations with incomplete information regarding either beginning investment amount, actual cash flows each quarter, or the value at the end of the holding period were deleted. Additionally, the data were winsorized to reduce the effect of outliers on the analysis. In winsorizing the data, we eliminated those observations where the loan-to-value ratio rose above one between entry and exit date and where the realized quarterly IRR fell below -10% or above 10%. These final restrictions eliminate 4,379 properties. The final sample is composed of 3,516 properties, of which 1,102 are apartments, 1,457 are office, and 957 are retail.

[4] There also are partial sales reported in the NCREIF database. Partial sales may include items such as the sale of an easement, a parcel of land, or a single building in an industrial park. A partial sale of a property affects the remaining market value of the real estate. In addition, a partial sale affects the property's size and the value in the leasable area. For example, if a large warehouse property with a reported market value of $9 million is subdivided into three contiguous bays, and one is sold for $3 million, a partial sale price of $3 million is reported and the new market value of the property becomes $6 million unless and until an external valuation derives a different value for the property. To avoid dealing with the problems associated with partial sales, we specifically exclude both industrial properties and land investments from our sample (see above).

Panel A1 and A2 of Table 1 shows the distribution of the 3,516 properties by property type and vintage year. We seek to understand differences by type and vintages. The data are grouped by property type to control for lease terms. When rents are flat, the longer the lease term the higher the equivalent rent. Other things equal, a higher equivalent rent implies a higher Jensen's alpha. We group the data by vintage year to understand if properties acquired in certain years display different performance from those that acquired in other years. Periods where prices are low and income yields are high imply investors expect either returns to be high in the future or prices to increase and yields to return to their historical average. Higher future returns and rising prices imply a higher Jensen's alpha. The first vintage group is before 1982. The next vintage group is the three-year period between 1983 and 1985. We then separate the property acquisitions by each successive three-year periods thereafter. There is a nice break in the data in 2004-2006, which indicates the beginning of the post-great financial crisis.[5]

Table 2 shows the distribution of the 3,516 properties by metropolitan-area clusters. Holding all else constant, markets that are characterized either by strong demand from tenants, owners and consumers, or are supply-constrained due to high land costs or planning regimes are more likely to have higher Jensen's alphas than markets in which neither of these conditions, either alone or together, hold. We have divided the US market into eight metropolitan-area clusters. The Capital Metro has only one city, the Washington, DC Combined Statistical Area. The commanding economic presence of the federal government makes the Washington, DC Combined Statistical Area unique. The Heartland Markets are located primarily in the Midwest. These metros (including Chicago, Cincinnati, Cleveland, Columbus, etc.) play host to high concentrations of manufacturing and offer national and regional distribution capabilities. The Lifestyle Centers (including Miami, Las Vegas, Orlando, Phoenix, etc.) are characterized by rapid economic and demographic growth and a

[5] Our sample period also includes a double-dip recession in 1980 and 1981, the Tax Reform Act of 1986 which made significant changes in the taxation of commercial real estate assets, and a recession in 2000/2001 which was driven by a collapse in business investment in equipment and software.

high concentration of the elderly. The New York Corridor is a mature, geographically linked market that includes New York and Philadelphia. The Southern Growth consists of high growth markets (including Atlanta, Dallas, Charlotte, Denver, and Houston) that operate as major regional centers of trade and finance. Southern California includes markets like Los Angeles and San Diego that are located along the West Coast and enjoy high growth and broad economic diversity. Northern California includes The Tech Centers (including Boston, SF Bay Area, Austin, Portland, Raleigh, and Seattle) are centers of advanced technology and higher education. These markets are not linked geographically. The Opportunistic Markets category is composed of all markets outside the seven clusters. These eight metropolitan-area clusters are based on performance benchmarking work performed at Prudential Real Estate Investors (see Smith, Hess, and Liang (2004) for more details).

Table 3 shows the distribution of the 3,516 properties by investment style and vintage year. The 3,516 properties are divided into three investment styles: core, value-added, and opportunistic. There is no easy way to define core, value-added, and opportunistic investments (which results in difficulty evaluating the performance of each). Conventional wisdom has generally come to accept core as a conservative-risk/conservative-return strategy. To be classified as a core investment, we require that the property must be fully operational and fully let, or close to fully let, generally involving little capital expenditure after purchase. In addition, the property must have a loan-to-value ratio between zero and 50%. Value-added is a medium-to-high-risk/medium-to-high-return strategy. To be classified as a value-added investment, we require that the property must have undergone substantial value-added expansion or conversion (in excess of 10% of market value) or a change in use, from a lower use to a higher and better use (e.g., the conversion of industrial properties into office, or the conversion of rental apartments into condominiums, etc.). In addition, the property must have a loan-to-value ratio between 50 and 65%. Opportunistic is a high-risk/high-return strategy. To be classified as an opportunistic investment, the property had to be a new development opportunity or a pre-development property, or a more speculative investment requiring an

initial leasing program to attract new tenants. In addition, the property must have a loan-to-value ratio in excess of 65%.

Before turning to how we measured deal-level alphas and our empirical results, we briefly discuss how we used the NCREIF data to calculate Jensen's alpha and to measure property-level IRRs for each sold property in the sample.

4 How IRRs and Alpha are Measured

The unlevered internal rate of return, R_i, is defined for an arbitrary property investment i by expression (8).

$$V_{it} - \left[\frac{CF_{it+1}}{(1+R_i)} + \frac{CF_{it+2}}{(1+R_i)^2} + \cdots + \frac{CF_{it+n_i} + V_{it+n_i}}{(1+R_i)^{n_i}}\right] = 0 \qquad (8)$$

where CF_{it+k} represents the before-tax cash flows to property i in period $t+k$, V_{it+k} represents the market price of the property in period $t+k$, and n_i is the length of the holding period, and t is the date at which the holding period starts. Following Driessen, Lin, and Phalippou (2012), we specify a discount rate that is different in each period. More specifically, we assume that the discount rate in period $t+k$ is equal to $\alpha_i + \beta_i R_{NPIt+k}$, α_i is Jensen's (unlevered) alpha, and β_i is the property's (unlevered).

If R_i in period $t+k$ is replaced in equation (1) by $\alpha_i + \beta_i R_{NPIt+k}$, the resulting modification of equation (8) is

$$V_{it} - \left[\frac{CF_{it+1}}{(1+\alpha_i+\beta_i R_{NPIt+1})} + \frac{CF_{it+2}}{(1+\alpha_i+\beta_i R_{NPIt+1})(1+\alpha_i+\beta_i R_{NPIt+2})} + \cdots + \frac{CF_{it+n_i} + V_{it+n_i}}{\prod_{k=1}^{n_i}(1+\alpha_i+\beta_i R_{NPIt+k})}\right] \qquad (9)$$

This equation rests on the assumption that value-added skills (i.e., a large positive α_i) will result in a high return on investment. Private equity real estate funds generally try to add value by improving the physical, financial, and/or operational characteristics (through operational expertise) of a property. These value-increasing actions are not necessarily mutually exclusive, but, if successful, they tend to result in improved cash flow and profitability (i.e., larger values ofCF_{it+k}). Holding V_{it} and β_i constant, improved cash flows and profitability imply an increase in R_i in terms of equation (8) and a large positive α_i in terms of equation (9). The empirical problem is how to estimate α_i and β_i from the available data, given values of V_{it}, $CF_{it+1}, CF_{it+2}, \ldots, CF_{it+n_i}$, and V_{it+n_i}. Since equation (9) is a single equation with two unknowns, α_i and β_i, the problem resists solution.

Driessen, Lin, and Phalippou (2012) ingeniously suggested considering least squares optimization applied to NPVs, bringing all the NPVs as close as possible to zero for a cross section of N portfolios of funds. However, to estimate their model Driessen, Lin, and Phalippou (2012) were forced to assume that there is a common parametric structure for α_i and β_i across portfolios. We propose a similar but different least squares optimization technique, one which does not constrain α_i and β_i to have a common parametric structure across investments. More specifically, we solve the least squares optimization

$$\min_{\alpha_i,\beta_i} \sum_{j=1}^{n_i} \left[NPV_{ij}(\alpha_i, \beta_i)\right]^2 \tag{10}$$

where

$$NPV_{ij}(\alpha_i, \beta_i) = V_{it} - \left[\sum_{k=1}^{j} \frac{CF_{it+k}}{\prod_{k=1}^{j}(1 + \alpha_i + \beta_i R_{NPIt+k})} + \frac{V_{it+j}}{\prod_{k=1}^{j}(1 + \alpha_i + \beta_i R_{NPIt+k})}\right] \tag{11}$$

where $NPV_{ij}(\alpha_i, \beta_i)$ is the NPV of the cash flows on property i by year j since investment. We can estimate α_i and β_i for each individual property in our sample in this way since we have (quarterly) data on V_{it+j} for $j = 1,2, \dots, n_i$. We measure CF_{it+k} on a quarterly basis as net operating before debt service, less capital expenditures, plus all cash proceeds from partial sales. We measure V_{it+j} using the quarterly market value reported to NCREIF in period $t + k$ for all $k < n_i$ and the actual sales price (net of selling expenses) in period $t + n_i$ when the property is sold. We convert all quarterly IRRs to annual equivalents.

5 Results of Estimating IRRs and Alpha

Table 4a presents descriptive statistics of IRRs on the 3,516 properties in our sample. The quarterly average IRR in our sample is 4.84% for Apartments, 2.54% for Offices and 3.05% for Retail properties with similar within-type standard deviation of around 19%. However, as evidenced in Table 4b, there is large heterogeneity across property types and cohorts. But for Retail properties in the last cohort, the mean IRR for the later cohorts (cohorts 8, 9 and 10) are negative. Properties acquired during these later vintage years also have larger variation in their IRRs than the earlier cohorts.

Table 5a presents descriptive statistics of the unlevered β_i for the properties in our sample. Unlevered beta varies by property type and vintage year. We find that most of the properties have less risk relative to the benchmark but for apartments that were acquired in 1998-2000 and 2004-2006, whereby both vintage periods coincide with periods prior to economic downturns.

Table 5b looks at the distribution of the quarterly Jensen's alpha by property type and vintage year. They show rather similar patterns to the distribution of the cohort-property type unlevered IRR: but for Retail properties in the cohort 10, the Jensen's alpha for the latter cohorts tend to be largely negative across the property types.

6 Decomposition of Jensen's Measure of Abnormal Performance

6.1 Paired Comparisons of Jensen's Alpha and True Deal-Level Alpha

Table 6 summarizes the results from employing the paired comparisons of Jensen's alpha (adjusted for leverage) and true deal-level alpha. We initially perform the comparison tests by property type. The tests are also performed separately for different time periods. It appears that the Jensen's alpha arising from the above decomposition (adjusted for leverage) overstates the true deal-level abnormal performance for all property types by a wide margin.

We find an average deal-level alpha on apartments, office buildings, and retail shopping centers over the whole sample period of 0.15%, -0.64%, and -0.62%, respectively. If we divide investments in our sample by property type and cohort and then average deal-level alphas across acquisitions in the 1980s to 2000, we find the following deal-level alphas on apartments, office building, and retail shopping centers: 1.39%, 0.50%, and 0.42%. Obviously, the deal-level alphas just summarized are now positive. In contrast, the average deal-level alphas on acquisitions made in the early- to late-2000s across all three property types are substantially negative. That makes sense. By 2007-2009, the great financial crisis (GFC) led to declining rents and lower resale values for most investments and, understandably, negative deal-level alphas.

The Jensen's alphas reported in Table 6 show much more variation over time than the deal-level alphas. We find average Jensen's alphas (adjusted for leverage) on apartments, office buildings, and retail shopping centers over the whole sample period of 0.04%, -0.81%, and -0.19%. However, it is especially clear from these data that in periods of superior performance the average Jensen's alphas (adjusted for leverage) on apartments, office buildings, and retail shopping centers are consistently above the deal-level alphas generated by the properties by a large margin. For instance, on acquisitions made over the period 1983 to1997, Jensen's alpha (adjusted for leverage) on apartments is 4.31%, while the deal level alpha is just 1.64%. Overall, on acquisitions made in the 1980s to the late 1990s, we find average Jensen's alphas (adjusted for leverage) on apartments, office buildings, and retail shopping centers of 4.31%, 2.68%, and 1.83%. These alphas are found to exceed the deal-

level alphas for apartments over the same period by 2.68%, 1.86% for office buildings, and 1.39% for retail shopping centers. In contrast, in periods of inferior performance the average Jensen's alphas (adjusted for leverage) on apartments, office buildings, and retail shopping centers are consistently below the deal-level alphas generated by the properties. For example, on acquisitions made in the 2000s, we find Jensen's alphas (adjusted for leverage) on apartments, office buildings, and retail shopping centers of -6.11%, -5.60%, and -3.53%. These alphas are consistently below the deal-level alphas by -4.05% for apartments, -2.99% for office buildings, and -1.20% for retail shopping centers.

Values of $(R_i - R_{Di})(D/E)_{Si}$ and $(R_i - R_{Di})(D/E_i - D/E_{Si})$ are the biggest factors in explaining the differences between Jensen's alpha (adjusted for leverage) and the true deal-level alpha. Of the acquisitions made over the period 1983 to 1997, the return from sector leverage, $(R_i - R_{Di})(D/E)_{Si}$, on apartments is 2.04%, 0.78% on office buildings, and 0.88% on retail shopping centers. The incremental leverage effect, $(R_i - R_{Di})(D/E_i - D/E_{Si})$, over the same time period on apartments is -0.29%, 0.75% on office buildings, and 0.29% on retail shopping centers, which imply a combined leverage effect on apartments of 2.33%, 1.53% on office buildings, and 1.17% on retail shopping center. In contrast, the evidence points to a return from excess risk-taking, $R_{NPIi}[\beta_i(1 + D/E_i) - 1]$, on acquisitions made over the period 1983 to 1997 on apartments of -0.34%, -0.33% on office buildings, and -0.22% on retail shopping centers, which are all negative compared to that of the combined effects of the return from sector leverage and the incremental leverage effect.

Of the acquisitions made over the period 1998 to 2009, all of these effects are reversed, as is the relationship between Jensen's alphas and the deal-level alphas. As is evident in Table 6, the return from sector leverage on acquisitions made over the period 1998 to 2009 on apartments is -1.4%, -1.51% on office buildings, and -0.98% on retail shopping centers. Here the use of sector leverage essentially magnifies losses. In this sense, when adjusted for leverage, Jensen's alpha will significantly understate the true deal-level alpha by a large margin, which is what we find. Note that the incremental leverage effects for these

acquisitions range from -1.21% on apartments, to -1.05% on office buildings, and 0.61% on retail shopping centers. Combining these two effects together yields a combined effect of leverage ranging from 0.20% on apartments, to -2.56% on office buildings, and -1.59% on retail shopping centers. These results are significant enough to increase the losses suffered and lower Jensen's alpha considerably below the true deal-level alpha.

6.2 Jensen's Alpha and Deal-Level Alpha by Location and Style

Here we present some paired comparison tests to investigate how the Jensen's alpha and the deal-level alpha change when we control for location and investment style. If we think in terms of local spatial monopolies, a perennial question in case of active real estate portfolio management is how much total value added is from property type selection versus market selection. To focus on the relationship between Jensen's alpha and the deal-level alpha performance by geographic location, we decompose our sample into the eight distinct metropolitan-area clusters described above. These markets are distinct from one another in several respects. The New York Corridor, Capital Metro, and Tech Markets are weighted most heavily towards the office sectors and are influenced by factors unique to banking and financial services, politics, and technology. The Lifestyle Center and Southern Growth markets are weighted most heavily towards apartments and the retail sector and hence the factors affecting growth in these markets are influenced by changes in population dynamics and urbanization. The Heartland and Southern California markets are most heavily weighted towards industrial properties and are influenced in part by a strong economic outlook and partly by simple demand and supply. The Opportunistic Markets are smaller markets and certainly influenced by regional concerns.

Table 7 summarizes the results by geographic focus. Overall, the same time trends occur in Table 7 as in Table 6, though less unequivocally. For example, of the acquisitions made over the period 1983 to 1997 we find average Jensen's alphas (adjusted for leverage) that considerably are above the deal-level alphas. The two top-performing markets over the period

1983 to 1997 in terms of deal-level alphas are Capital Metro and the New York Corridor. In both markets, the average Jensen's alpha exceeds the deal-level alpha by over 200 basis points. The two bottom-performing markets over the period 1983 to 1997 in terms of deal-level alphas are the Heartland Markets and Tech Centers. Both markets experienced a negative deal-level alpha. The strongest result in Table 7 is that the deal-level alphas over the period 2000 to 2006 are negative in all markets. In particular, properties acquired over the period 2004-2006, consistently underperform properties acquired over the period 2001-2003. Deal-level alphas over the period 2004-2006 range from a high of -2.31% in Southern Growth to a low of -6.74% in Southern California. Further, over the period 2004-2006, the Jensen's alphas are consistently below the deal-level alphas by large margin. Overall, the deal-level alphas over the period 1983-2009 vary from a high of 0.19% in Capital Metro to a low of -1.28% in Heartland Markets. In comparison, we find average Jensen's alpha of 1.60% in Capital Metro and -1.60% in Heartland Markets.

The final table in the paper, Table 8, reports on the deal-level alphas, Jensen's alphas, the returns from excess risk taking, the returns from sector leverage, and the returns from incremental leverage for core, value-added, and opportunistic properties, by cohort. In principle, as investments in value-added and opportunistic properties involve a significant amount of value creation through redevelopment, releasing, expansion or retrofitting, these investments offer a potential for a much higher return and higher Jensen's alpha than core investments. We further suspect that a much of the high average return on value-added and opportunistic investments comes from financial leverage as opposed to developing or rehabbing existing buildings to higher and better use.

The method used to classify the sample into three groups, core, value-added, and opportunistic investments, is explained in full in Shilling and Wurtzebach (2013). The method is not perfect, but it has the advantage of being simple. Properties that are identified as core investments are assets that are fully operational and fully let, or close to fully let, generally involving little capital expenditure after purchase, and have a loan-to-value ratio between zero

and 50%. We define value-added investments as assets that are actively managed and have undergone substantial value-added expansion or conversion (in excess of 10% of market value), or a change in use of the property from lower use to a higher and better use (e.g., the conversion of industrial properties into office, or the conversion of rental apartments into condominiums, etc.). Value added investments have a loan-to-value ratio between 50 and 65%. We define opportunistic investments as assets that are new development opportunities or pre-development properties, or investments that require an initial leasing program to attract new tenants. Additionally, opportunistic investments have a loan-to-value ratio in excess of 65%.

As can be seen in Table 8, the average deal-level alpha is -0.86% for core properties, 1.04% for value-add properties and 1.21% for opportunistic properties. The same time trends are observed in Table 7. For properties that were acquired in 2001-2009, we find significantly negative deal-level alphas: the average deal-level alphas during that period are -2.75% for core properties, -0.67% for value-add properties and -1.90% for opportunistic properties. Value-add and opportunistic properties have relatively higher values of Jensen's alphas for properties acquired before 2001: the deal-level alphas are 0.40% for core properties, 2.19% for value-add properties and 3.28% for opportunistic properties. Core properties have modest performance during better times but they are the worst performers during a downturn. With regard to Jensen's alpha, the Jensen's alphas are found to exceed the deal-level alphas for core investments on average, over the entire sample period. For core properties acquired before 1998, Jensen's alphas exceed the deal-level alphas by an average of 1.03% and this margin decreased to 0.12 for properties acquired in the period between 1998 and 2009. For value-added properties that were acquired prior to 1998, Jensen's alphas exceeded the deal-level alphas by 2.58% on average and the difference became negative for properties acquired between 1998 and 2009. The same time trend is observed for opportunistic properties. For opportunistic properties acquired before 1998, the Jensen's alphas are found to exceed the

deal-level alphas by 8.90% for opportunistic properties but the Jensen's alphas exceed the deal-level alphas by -5.2% for opportunistic properties acquired in and after 1998.

7 Interpreting the Results

Empirical support for the notion that private equity real estate fund managers attempt to subvert the evaluation procedure to their advantage and that large discrepancies in Jensen's alpha versus true deal-level performance occur in booming versus declining markets appears to be quite favorable. To assess the importance of these findings, we appeal to the results of Chung et al. (2012) that an extra percentage point of internal rate of return beyond the fund's target return objective (or, in our case, an extra percentage point of Jensen's alpha) can be expected to produce an extra $3.32 million, on average, in direct carried interest, assuming a mean current private equity fund size of $500 million and a carried interest of 20%.

Several questions are raised by these results. Two of these are as follows: First, concern for fund survival or forced fund liquidation should, in theory, induce the private equity real estate fund manager to limit the use of leverage (as suggested by Lan, Wang, and Yang (2011) and others). Indeed, at some point, poor performance should trigger money outflow, withdraw/redemption, and forced fund liquidation, thereby causing the private equity real estate fund manager to lose future fees. There are several possible explanations for why this phenomenon may not occur. In general, we know that the average-sized private equity real estate fund is around $500 million in terms of capital committed to the fund (see Chung et al. (2012)). With 50% to 60% leverage per property, total fund capitalization is around $1,000 to $1,250 million. Therefore, with total deal capitalization from $20 to $100 million, the average-sized private equity real estate fund is typically comprised of, at a minimum, 10 to 50 properties, meaning that private equity real estate funds offer some diversification (the latter made possible by the use of leverage).

We also know that most private equity real estate fund managers sponsor multiple funds, with many having two or three funds and a few substantially more. For example, Blackstone and Lone Star are the largest private equity real estate fund managers in the U.S., with total

funds raised during the last 10-years of over $60 billion and $44 billion, and with uncalled capital currently available for investment of $9 billion and $16 billion, respectively. Since 1994 Blackstone has sponsored a series of 19 closed-end funds investing in premier properties in many top locations in the U.S., Europe and Asia, with a diverse mix of apartments, office buildings, industrial, and retail shopping centers. Similarly, Lone Star has sponsored 13 closed-end funds that have invested globally through Lone Star's worldwide network of affiliate offices in Canada, China, France, Germany, Italy, Japan, South Korea, Spain, Taiwan, the United Kingdom, and the U.S. Blackstone and Long Star, as is typical in the industry, characteristically raise a follow-on fund after three years or so of life. Evidence in Chung et al. (2012) suggests that future fund-raising is less sensitive to current performance for private equity real estate funds than for private equity buyout funds. Their explanation for this result is essentially an information asymmetry explanation. There is considerable heterogeneity in the extent to which performance is taken into account in reinvestment decisions in the case of private equity real estate funds because final performance is generally not known with certainty at the time of fund-raising (see Lerner, Schoar, and Wongsunwai (2007)). Another explanation may be related to the fact that very few fund managers have a good track record of returning money across multiple funds.

Yet from an entirely different vantage point, we would like to point out the following observation. Unlike private equity buyout funds or private equity venture funds, where debt financing is mostly fund-level recourse and guarantee obligations, most private equity real estate funds tend to make use of non-recourse debt at the property level. Using non-recourse debt financing to invest in assets limits the loss to the private equity real estate fund to no more than the down payment. So leverage in this case – especially non-recourse leverage – can be a good thing, as it can limit the amount of money the manager may lose over a period and, therefore, limit the amount above the high water mark before receiving a performance

bonus.[6]

The second interesting question that comes to mind, while mulling over the implications of poor performance on forced fund liquidations, is, why should private equity real estate fund managers be evaluated in some fashion or another on the basis of Jensen's alpha in the first place. Shouldn't selection have weeded out compensation contracts based on Jensen's alphas? Shouldn't private equity real estate fund managers be evaluated, instead, on the basis of deal-level alphas? The only explanation we can offer is that private equity real estate funds are still in their early phase and these agency issues, while recognized by some, are still prevalent.

8 Conclusion

Because commercial real estate are tangible assets that are fairly fungible, these assets are amenable to debt-financing and allow private equity real estate fund managers to use leverage to subvert the evaluation procedure to their advantage. Furthermore, given the well-developed real estate mortgage market, virtually all fund managers have access to market levels of mortgage debt. As a result, it is hard to argue that applying mortgage debt to a properties capital structure is a value adding capability unique to any one manager. The evidence presented here generally confirms this supposition.

We measure the extent to which private equity real estate fund managers attempt to subvert the evaluation procedure to their advantage by using two performance measures at the

[6] The acquisition of Stuyvesant Town and Peter Cooper Village, Manhattan's largest apartment complex, by Tishman Speyer Properties LP and BlackRock Realty is a good example of how private equity real estate funds make favorable use of non-recourse debt. Tishman Speyer Properties LP and BlackRock Realty acquired Stuyvesant Town and Peter Cooper Village, consisting of 110 buildings and 11,227 apartments, in 2005 during the real estate boom for $5.4 billion, the largest single real estate transaction known to date in NYC history, according to the New York Times (see http://www.nytimes.com/2010/01/25/nyregion/25stuy.html?hp). Tishman Speyer Properties LP and BlackRock Realty intended to add value to the project by making extensive improvements to the property, like adding air conditioning in each unit and offering doorman and concierge services. To cover their costs, Tishman Speyer Properties LP and BlackRock Realty had tried to raise rents but were thwarted by a real estate downturn and the city's strong rent protections. In 2009, with only a $225 million equity stake in the deal, or 4% of purchase price, Tishman Speyer Properties LP and BlackRock Realty transferred title to the property back to their lenders and their representatives through a deed in lieu of foreclosure. The property was valued at $1.8 billion at that time by Fitch Ratings. However, through the deed in lieu of foreclosure, Tishman Speyer Properties LP and BlackRock Realty were able to limit their total losses on the property to their equity investment. As the loan on Stuyvesant Town and Peter Cooper Village was non-recourse, Tishman Speyer Properties LP and BlackRock Realty's lenders could not do anything (e.g., like pursue other collateral) other than foreclose on the property.

property level. Specifically, we decompose the Jensen's alpha - a measure commonly used to evaluate a private equity fund's manager performance, into four components: a deal-level alpha which measures the true performance of the property, a base-case level return from sector leverage, a property-specific return from incremental leverage and a return from excess risk-taking. We find that, in booming markets, Jensen's alphas exceed the property's true deal-level alpha by a wide margin, with a range of approximately 1.03 to 8.90% for core, value-added, and opportunistic properties. We show that when the unlevered return of the property exceeds the rate of borrowing, this overstatement increases with the level of leverage. The overstatement results remain robust when we control for location and investment style.

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Table 1: Distribution of Sample Properties by Property Type and Vintage year

Table 1 reports the distribution of 3,516 sample properties in the NCREIF database that were sold between 1978 and 2009. Panel A shows the distribution of the 3.516 properties by property type. Panel B shows the distribution of the 3,516 properties by property type and vintage year.

Panel A: Distribution of Sample Properties by Property Type

Property Type	No. of Properties
Apartment	1102
Office	1457
Retail	957
Total	3,516

Panel B: Distribution of Sample properties by Property Type and Vintage Year

Cohort	Properties Acquired in Year	Apartment	Office	Retail
1	Before 1982	6	55	113
2	1983 – 1985	22	40	67
3	1986 - 1988	52	83	55
4	1989 – 1991	52	76	46
5	1992 – 1994	84	40	64
6	1995 – 1997	177	243	96
7	1998 – 2000	321	484	167
8	2001 – 2003	231	229	164
9	2004 – 2006	148	196	170
10	2007 – 2009	9	11	15
	Total	**1102**	**1457**	**957**

Table 2: Distribution of Sample Properties by Metropolitan-Area Clusters and Vintage Year

Table 2 reports the distribution of the 3,516 sample properties by metropolitan-area clusters and vintage year (cohort). D1 represents the Washington DC Combined Statistical Area, D2: Heartland Markets, D3: Lifestyle centers, D4: New York Corridor, D5: Southern Growth, D6: Southern California, D7: Tech Centers, D8: Opportunistic Markets.

Cohort	D1	D2	D3	D4	D5	D6	D7	D8
1	5	6	6	7	12	9	8	121
2	8	2	1	10	10	1	7	90
3	9	12	2	3	12	9	14	129
4	11	3	4	7	11	9	11	118
5	7	17	11	7	6	7	6	127
6	30	32	42	10	9	29	21	343
7	60	50	47	39	28	46	66	636
8	58	40	31	29	30	28	48	360
9	23	22	25	17	22	16	27	362
10	2	3	3	4	0	2	5	16
Total	**213**	**187**	**172**	**133**	**140**	**156**	**213**	**2302**

Table 3: Distribution of Sample Properties by Investment Style and Vintage Year

Table 3 reports the distribution of the 3.516 sample properties by investment style and vintage year. The sample properties are divided into three investment styles. An investment is classified as a core investment if the property is fully operational, and fully let or close to fully let and has a loan-to-value (LTV) ratio of less than 50%. Value-added investments must have undergone substantial expansion or conversion or a change in use to a higher and better use and have a LTV ratio between 50% and 65%. Opportunistic investments are high-risk/high-return investments. These properties have to be new or pre-development properties or are speculative investments with an initial leasing program, and a high LTV ratio in excess of 65%.

Cohort	Investment Style		
	Core	Value-Add	Opportunistic
1	150	23	1
2	99	23	7
3	134	36	20
4	122	34	18
5	157	24	7
6	432	69	15
7	736	172	64
8	405	136	83
9	161	176	177
10	13	6	1
Total	**2409**	**699**	**408**

Table 4a: Average Quarterly Unlevered IRR, in percentage, by Property Type.

Table 4a reports the mean quarterly unlevered IRR for the 3.516 sample properties by property type. The respective standard deviations are in parentheses. Of the 3,516 sample properties, 1,102 are apartments, 1,457 are office and 957 are retail.

	Apartment	Office	Retail
	4.84 (18.57)	2.54 (18.47)	3.05 (19.57)

Table 4b: Mean Annualized Unlevered IRR, in percentage, by Cohort and Property Type.

Table 4b reports the mean annualized unlevered IRR (in percentage) by cohort and property type. The respective standard deviations are in parentheses.

Cohort	**Apartment**	**Office**	**Retail**
1	13.33 (8.87)	5.93 (14.77)	12.99 (11.09)
2	17.45 (13.97)	9.84 (12.53)	8.11 (16.28)
3	18.82 (11.21)	8.88 (14.62)	11.04 (14.73)
4	12.78 (12.14)	9.72 (17.09)	8.71 (16.97)
5	11.50 (15.91)	11.94 (13.49)	7.32 (17.77)
6	10.83 (13.23)	8.14 (13.65)	12.56 (12.94)
7	6.94 (16.29)	4.73 (16.43)	8.49 (18.04)
8	-0.84 (20.44)	-0.34 (19.38)	-4.52 (19.35)
9	-10.43 (19.58)	-15.54 (19.41)	-15.19 (18.03)
10	-4.78 (19.18)	-9.60 (25.63)	7.63 (19.56)

Table 5a: Mean Unlevered Beta by Cohort and Property Type.

Table 5a reports the mean unlevered beta by cohort and property type for the 3,516 sample properties.

Cohort	Apartment	Office	Retail
1	0.60	0.36	0.34
2	0.28	0.48	0.71
3	0.49	0.70	0.48
4	0.67	0.50	0.52
5	0.56	0.39	0.46
6	0.49	0.69	0.66
7	1.09	0.59	0.76
8	0.88	0.79	0.92
9	1.06	0.92	0.78
10	0.85	0.62	0.43

Table 5b: Mean Quarterly Jensen's Alpha by Cohort and Property Type (in percentages)

Cohort	Apartment	Office	Retail
1	3.26	0.86	3.10
2	6.79	2.84	0.69
3	6.28	2.58	2.58
4	3.13	3.64	2.19
5	2.49	3.05	0.79
6	2.85	1.27	2.88
7	-0.32	0.45	1.23
8	-2.86	-1.64	-4.69
9	-12.09	-11.85	-13.34
10	-9.16	-9.34	2.67

Table 6a: Quarterly Jensen's Alpha Decomposition for Apartments

Table 6a reports the quarterly Jensen's alpha decomposition for apartments. All figures are in percentages. Out of the 3,516 sample properties, 1,102 are apartments. Paired comparison tests on the difference between Jensen's alpha and Deal-level alpha are performed across properties within each cohort. The mean difference is reported and its respective p-value is in parentheses. The mean values of Jensen's alpha, Deal-level alpha, the difference between these two measures, the return from excess-risk taking, the return from sector leverage and the return from incremental leverage are reported in the lower panel. These mean values are taken over all the properties (Overall), and across Cohort 1 through Cohort 6, and finally across Cohort 7 through Cohort 10.

Cohort	Jensen's alpha	Deal Alpha	Difference (p-value)	Excess Risk Taking	Return from sector leverage	Return from incremental leverage
1	3.26	1.57	1.69 (0.15)	-0.29	1.34	0.07
2	6.79	2.48	4.31 (0.0008)	-1.03	2.85	0.43
3	6.28	2.49	3.79 (<.0001)	-0.06	2.54	1.20
4	3.13	1.39	1.74 (0.0006)	0.19	1.77	0.15
5	2.49	0.95	1.54 (0.0004)	-0.37	1.55	-0.39
6	2.85	0.87	1.98 (<0.0001)	-0.45	1.47	0.06
7	-0.32	-0.03	-0.29 (0.2941)	1.23	0.63	0.31
8	-2.86	-1.93	-0.94 (0.0075)	0.86	-1.12	1.04
9	-12.09	-4.01	-8.08 (<0.0001)	2.40	-3.32	-2.36
10	-9.16	-2.26	-6.90 (0.0383)	1.28	-1.78	-3.83
Average						
Overall	0.04	0.15	-0.63 (0.0018)	0.38	0.59	-0.33
Cohort 1-6	4.13	1.62	2.22 (<0.0001)	-0.33	1.92	0.26
Cohort 7-10	-6.11	-2.06	-2.21 (<0.0001)	1.44	-1.40	-1.21

Table 6b: Quarterly Jensen's Alpha Decomposition for Office Buildings

Table 6b reports the quarterly Jensen's alpha decomposition for office buildings. All figures are in percentages. Out of the 3,516 sample properties, 1,457 are office buildings. Paired comparison tests on the difference between Jensen's alpha and Deal-level alpha are performed across properties within each cohort. The mean difference is reported and its respective p-value is in parentheses. The mean values of Jensen's alpha, Deal-level alpha, the difference between these two measures, the return from excess-risk taking, the return from sector leverage and the return from incremental leverage are reported in the lower panel. These mean values are taken over all the properties (Overall), and across Cohort 1 through Cohort 6, and finally across Cohort 7 through Cohort 10.

Cohort	Jensen's alpha	Deal Alpha	Difference (p-value)	Excess Risk Taking	Return from sector leverage	Return from incremental leverage
1	0.86	-0.14	1.00 (<0.0001)	-0.80	-0.14	0.33
2	2.84	0.81	2.03 (0.0039)	-0.47	0.67	0.89
3	2.58	0.79	1.80 (0.0002)	0.13	0.53	1.40
4	3.64	0.84	2.80 (<0.0001))	-0.30	0.79	1.70
5	3.05	1.31	1.75 (<0.0001)	-0.84	1.26	-0.35
6	1.27	0.35	0.92 (<0.0001)	-0.19	0.64	0.09
7	0.45	-0.48	0.93 (<0.0001)	-0.28	0.09	0.55
8	-1.65	-1.78	0.14 (0.6507)	0.31	-0.73	1.17
9	-11.85	-5.34	-6.51 (<0.0001)	1.42	-3.26	-1.83
10	-9.34	-2.84	-6.50 (0.1205)	0.27	-2.15	-4.08
Average						
Overall	-0.81	-0.65	-0.05 (0.7097)	-0.08	-0.23	-0.01
Cohort1-6	2.37	0.66	1.47 (<0.0001)	-0.41	0.63	0.68
Cohort 7-10	-5.60	-2.61	-0.94 (<0.0001)	0.43	-1.51	-1.05

Table 6c: Jensen's Alpha Decomposition for Retail

Table 6c reports the quarterly Jensen's alpha decomposition for retail properties. All figures are in percentages. Out of the 3,516 sample properties, 957 are retail. Paired comparison tests on the difference between Jensen's alpha and Deal-level alpha are performed across properties within each cohort. The mean difference is reported and its respective p-value is in parentheses. The mean values of Jensen's alpha, Deal-level alpha, the difference between these two measures, the return from excess-risk taking, the return from sector leverage and the return from incremental leverage are reported in the lower panel. These mean values are taken over all the properties (Overall), and across Cohort 1 through Cohort 6, and finally across Cohort 7 through Cohort 10.

Cohort	Jensen's alpha	Deal Alpha	Difference (p-value)	Excess Risk Taking	Return from sector leverage	Return from incremental leverage
1	3.10	0.94	2.16 (<0.0001)	-1.29	1.46	-0.59
2	0.69	0.08	0.61 (0.2457)	0.25	0.49	0.38
3	2.58	1.10	1.49 (0.0127)	-0.26	1.00	0.23
4	2.19	0.35	1.84 (0.0049)	-0.34	0.71	0.79
5	0.79	-0.19	0.98 (0.1129)	-0.59	0.47	-0.08
6	2.88	0.84	2.04 (<0.0001)	-0.17	1.71	0.16
7	1.23	-0.14	1.37 (0.0014)	0.70	0.91	1.16
8	-4.69	-3.40	-1.29 (<0.0001)	0.85	-1.80	1.36
9	-13.34	-5.49	-7.85 (<0.0001)	1.45	-4.07	-2.33
10	2.67	-0.28	2.96 (0.1581)	0.33	1.02	2.27
Average						
Overall	-0.19	-0.62	-0.59 (0.0041)	0.09	0.19	0.33
Cohort 1-6	2.04	0.52	1.61 (<0.0001)	-0.40	0.97	0.15
Cohort 7-10	-3.53	-2.33	-2.47 (<0.0001)	0.83	-0.98	0.61

Table 7: Quarterly Jensen's Alpha Decomposition by Geography and Cohort

Table 7 reports the quarterly Jensen's alpha decomposition by geographic market and cohort for the 3,516 sample properties. All figures are in percentages. Paired comparison tests on the difference between Jensen's alpha and Deal-level alpha are performed across properties within each cohort. The mean difference is reported and its respective p-value is in parentheses. The mean values of Jensen's alpha, Deal-level alpha, the difference between these two measures, the return from excess-risk taking, the return from sector leverage and the return from incremental leverage are reported in the lower panel. These mean values are taken over all the properties (Overall), and across Cohort 1 through Cohort 6, and finally across Cohort 7 through Cohort 10.

R1: Capital Metro, including Washington, DC						
Cohort	Jensen's alpha	Deal Alpha	Difference (p-value)	Excess Risk Taking	Return from sector leverage	Return from incremental leverage
1	0.27	-1.51	1.78 (0.0854)	-0.90	-0.78	1.67
2	5.62	2.44	3.18 (0.1403)	-0.28	2.03	0.87
3	1.51	1.10	0.41 (0.6247)	-0.03	0.95	-0.56
4	7.35	3.36	4.00 (0.0135)	0.32	2.85	1.46
5	3.63	1.25	2.39 (0.0263)	-0.64	1.64	0.10
6	0.82	0.17	0.67 (0.5608)	0.01	0.64	0.03
7	1.53	0.33	1.19 (0.0016)	0.23	0.74	0.69
8	-3.35	-2.49	-0.85 (0.1147)	0.42	-1.25	0.81
9	-10.04	-4.83	-5.20 (0.0006)	1.24	-3.08	-0.88
10	8.67	2.08	6.59 (0.3414)	0.52	3.60	3.51
Average						
Overall	1.60	0.19	0.16 (0.6302)	0.09	0.73	0.77
Cohort 1-6	3.20	1.13	1.61 (<0.0061)	-0.25	1.22	0.60
Cohort 7-10	-0.80	-1.23	-0.59 (0.1311)	0.60	0.00	1.30

R2: Heartland Markets, including Chicago, Cincinnati, Cleveland, Detroit, Columbus, Indianapolis, Kansas City, Memphis, Minneapolis, Nashville, and St. Louis						
Cohort	Jensen's alpha	Deal Alpha	Difference (p-value)	Excess Risk Taking	Return from sector leverage	Return from incremental leverage
1	5.41	2.63	2.78 (0.0442)	-0.62	1.90	0.26
2	-3.96	-1.08	-2.87 (0.6481)	0.45	-0.64	-1.78
3	6.26	3.23	3.02 (0.0041)	0.06	2.43	0.66
4	-3.03	-2.62	-0.41 (0.8020)	-0.62	-1.47	0.43
5	1.06	-0.49	1.55 (0.0166)	-0.68	0.20	0.66
6	0.85	-0.29	1.14 (0.036)	-0.33	0.26	0.55
7	0.70	-0.07	0.76 (0.0936)	0.55	0.52	0.81
8	-3.35	-2.60	-0.75 (0.1886)	0.62	-1.24	1.11
9	-10.23	-4.26	-5.97 (0.0283)	1.33	-2.97	-1.67
10	-9.69	-7.27	-2.42 (0.6297)	0.00	-4.97	2.56
Average						
Overall	-1.60	-1.28	-0.12 (0.7765)	0.08	-0.60	0.36
Cohort 1-6	1.10	0.23	1.51 (<0.0001)	-0.29	0.45	0.13
Cohort 7-10	-5.64	-3.55	-1.13 (0.0622)	0.63	-2.17	0.70

Table 7-continued: Quarterly Jensen's Alpha Decomposition by Geography and Cohort

R3: Lifestyle Centers, including SE Florida, Sacramento, San Antonio, Las Vegas, Orlando, Phoenix, and Tampa						
Cohort	Jensen's alpha	Deal Alpha	Difference (p-value)	Excess Risk Taking	Return from sector leverage	Return from incremental leverage
1	3.01	1.39	1.61 (0.0002)	-1.10	1.30	-0.79
2	1.16	0.78	-	-0.25	0.55	-0.41
3	11.04	3.70	7.33 (0.4775)	0.87	2.42	5.78
4	-0.60	-1.21	0.62 (0.6975)	0.16	-0.79	1.56
5	0.51	-0.21	0.72 (0.6314)	-0.58	0.33	-0.20
6	2.74	0.86	1.88 (0.0015)	-0.12	1.35	0.41
7	0.34	-0.09	0.42 (0.3491)	0.56	0.56	0.43
8	-2.28	-1.18	-1.11 (0.2926)	0.72	-0.25	-0.14
9	-10.82	-4.93	-5.89 (0.0002)	1.71	-3.36	-0.82
10	5.44	2.11	3.33 (0.2084)	0.01	3.46	-0.12
Average						
Overall	1.05	0.12	-0.22 (0.5817)	0.20	0.56	0.57
Cohort 1-6	2.97	0.89	1.73 (0.0005)	-0.17	0.86	1.06
Cohort 7-10	-1.83	-1.02	-1.43 (0.0095)	0.75	0.10	-0.16

R4: New York Corridor, including New York and Philadelphia						
Cohort	Jensen's alpha	Deal Alpha	Difference (p-value)	Excess Risk Taking	Return from sector leverage	Return from incremental leverage
1	2.01	1.00	1.01 (0.0556)	-0.68	0.71	-0.38
2	3.59	1.34	2.24 (0.28)	-0.09	1.05	1.10
3	4.56	2.77	1.78 (0.1091)	-0.52	2.72	-1.46
4	9.13	2.86	6.26 (0.0758)	-0.15	1.99	4.12
5	2.65	1.28	1.38 (0.0130)	-0.87	1.34	-0.83
6	0.33	-0.20	0.53 (0.0156)	-0.62	0.67	-0.76
7	-5.44	-2.49	-2.97 (0.0062)	1.23	-1.67	-0.04
8	-1.78	-1.79	0.01 (0.9918)	1.14	-0.92	2.07
9	-7.80	-2.85	-4.95 (0.0201)	2.22	-2.01	-0.72
10	-4.40	-1.75	-2.65 (0.7965)	0.50	-0.02	-2.12
Average						
Overall	0.28	0.02	-0.88 (0.1608)	0.22	0.39	0.10
Cohort 1-6	3.71	1.51	2.13 (0.0032)	-0.49	1.41	0.30
Cohort 7-10	-4.85	-2.22	-2.36 (0.0051)	1.27	-1.16	-0.20

Table 7-continued: Quarterly Jensen's Alpha Decomposition by Geography and Cohort

R5: Southern Growth, including Atlanta, Dallas, Charlotte, Denver, and Houston						
Cohort	Jensen's alpha	Deal Alpha	Difference (p-value)	Excess Risk Taking	Return from sector leverage	Return from incremental leverage
1	1.98	0.37	1.61 (0.0028)	-0.81	0.54	0.26
2	5.23	2.54	2.69 (0.031)	0.04	2.06	0.67
3	2.99	0.58	2.41 (0.1361)	-0.22	0.70	1.48
4	-2.99	-2.65	-0.34 (0.7292)	-0.38	-1.98	1.27
5	3.82	0.74	3.10 (0.0788)	0.11	1.00	2.19
6	2.37	0.68	1.70 (0.112)	-0.14	1.05	0.50
7	0.95	0.41	0.53 (0.014)	-0.29	0.96	-0.71
8	-3.41	-2.31	-1.10 (0.1812)	0.34	-1.50	0.74
9	-13.13	-5.84	-7.29 (<0.0001)	1.80	-4.05	-1.44
Average						
Overall	-0.24	-0.61	-0.52 (0.2253)	0.05	-0.14	0.55
Cohort 1-6	2.23	0.38	1.75 (0.0002)	-0.23	0.56	1.06
Cohort 7-9	-5.20	-2.58	-2.23 (0.0004)	0.62	-1.53	-0.47

Table 7-continued: Quarterly Jensen's Alpha Decomposition by Geography and Cohort

R6: Southern California, including Los Angeles and San Diego						
Cohort	Jensen's alpha	Deal Alpha	Difference (p-value)	Excess Risk Taking	Return from sector leverage	Return from incremental leverage
1	2.54	0.98	1.57 (0.1242)	-1.01	1.07	-0.51
2	1.06	-0.09	-	-1.15	0.55	-0.55
3	3.72	1.62	2.09 (0.03)	0.23	1.62	0.71
4	9.34	4.38	4.70 (0.0021)	0.11	3.97	1.11
5	1.97	0.93	1.05 (0.0009)	-0.82	1.50	-1.28
6	0.49	0.31	0.18 (0.9091)	-0.31	1.00	-1.12
7	-0.88	-1.15	0.26 (0.4590)	0.01	-0.28	0.56
8	-2.62	-2.00	-0.61 (0.0946)	0.38	-1.00	0.76
9	-12.07	-6.74	-5.32 (0.006)	1.27	-4.81	0.76
10	-19.12	-4.83	-14.29 (0.4078)	3.24	-3.75	-7.29
Average						
Overall	-1.56	-0.66	-0.18 (0.6833)	0.20	-0.01	-0.69
Cohort 1-6	3.19	1.36	1.43 (0.0635)	-0.49	1.62	-0.27
Cohort 7-10	-8.67	-3.68	-1.29 (0.0090)	1.23	-2.46	-1.30

Table 7-continued: Quarterly Jensen's Alpha Decomposition by Geography and Cohort

R7: Tech Centers, including SF Bay Area, Boston, Austin, Portland, Raleigh, and Seattle						
Cohort	Jensen's alpha	Deal Alpha	Difference (p-value)	Excess Risk Taking	Return from sector leverage	Return from incremental leverage
1	-0.34	-0.65	1.69 (0.1494)	-0.73	-0.40	-0.02
2	-2.36	-3.20	0.84 (<0.0001)	-0.84	-1.89	1.89
3	3.00	1.31	1.69 (0.0028)	-0.16	1.38	0.15
4	4.68	2.25	2.44 (0.0247)	-0.20	2.14	0.09
5	2.22	0.86	1.37 (0.4222)	-0.67	1.40	-0.71
6	2.21	0.96	1.26 (0.0043)	-0.23	1.29	-0.26
7	-0.47	-0.95	0.4733 (0.3058)	0.02	-0.07	0.57
8	-4.00	-2.78	-1.22 (0.1739)	0.80	-1.53	1.11
9	-13.96	-6.55	-7.41 (0.0004)	1.50	-4.69	-1.22
10	6.08	2.82	3.25 (0.4452)	0.49	1.48	2.27
Average						
Overall	-0.29	-0.59	-0.55 (0.1702)	0.00	-0.09	0.39
Cohort 1-6	1.57	0.25	1.40 (<0.0001)	-0.47	0.65	0.19
Cohort 7-10	-3.09	-1.86	-1.45 (0.0105)	0.70	-1.20	0.68

Table 7-continued: Jensen's Alpha Decomposition by Geography and Cohort

R8: Opportunistic Markets, i.e., All Remaining Domestic Markets						
Cohort	Jensen's alpha	Deal Alpha	Difference (p-value)	Excess Risk Taking	Return from sector leverage	Return from incremental leverage
1	2.54	0.63	1.91 (<0.0001)	-1.22	1.09	-0.40
2	2.21	0.64	1.56 (0.0019)	-0.17	0.99	0.40
3	3.47	1.17	2.30 (<0.001)	-0.03	1.07	1.19
4	2.57	0.62	1.96 (<0.001)	-0.20	0.94	0.81
5	2.06	0.76	1.31 (0.001)	-0.50	1.25	-0.44
6	2.43	0.74	1.70 (<0.001)	-0.31	1.24	0.15
7	0.69	-0.12	0.81 (<0.001)	0.40	0.56	0.66
8	-2.75	-2.26	-0.49 (0.0463)	0.68	-1.17	1.36
9	-12.88	-4.93	-7.95 (<0.0001)	1.77	-3.55	-2.63
10	-7.76	-2.62	-5.14 (0.0382)	0.47	-1.69	-2.98
Average						
Overall	-0.74	-0.54	-0.42 (0.0013)	0.09	0.07	-0.19
Cohort 1-6	2.55	0.76	1.78 (<0.0001)	-0.40	1.10	0.28
Cohort 7-10	-5.68	-2.48	-1.91 (<0.0001)	0.83	-1.46	-0.90

Table 8a: Quarterly Jensen's Alpha Decomposition for Core Properties

Table 8a reports the quarterly Jensen's alpha decomposition for core properties by cohort. All figures are in percentages. Out of the 3,516 sample properties, 2,409 are classified as core properties. Paired comparison tests on the difference between Jensen's alpha and Deal-level alpha are performed across properties within each cohort. The mean difference is reported and its respective p-value is in parentheses. The mean values of Jensen's alpha, Deal-level alpha, the difference between these two measures, the return from excess-risk taking, the return from sector leverage and the return from incremental leverage are reported in the lower panel. These mean values are taken over all the properties (Overall), and across Cohort 1 through Cohort 6, and finally across Cohort 7 through Cohort 10.

Cohort	Jensen's alpha	Deal Alpha	Difference (p-value)	Excess Risk Taking	Return from sector leverage	Return from incremental leverage
1	1.93	0.60	1.33 (<0.0001)	-1.07	0.18	0.08
2	1.37	0.34	1.04 (<0.0001)	-0.65	0.15	0.24
3	1.29	0.62	0.67 (<0.0001)	-0.08	0.17	0.41
4	1.03	0.10	0.93 (<0.0001)	-0.39	0.14	0.40
5	1.82	0.56	1.27 (<0.0001)	-0.98	0.25	0.03
6	1.17	0.20	0.97 (<0.0001)	-0.51	0.20	0.26
7	-0.15	-0.81	0.66 (<0.0001)	-0.33	-0.01	0.33
8	-2.90	-2.90	0.00 (0.99)	-0.17	-0.43	0.25
9	-7.41	-5.42	-2.00 (<0.0001)	0.53	-0.99	-0.47
10	-2.58	-1.87	-0.72 (0.45)	-0.40	-0.24	-0.87
Average						
Overall	-0.44	-0.86	0.53 (<0.0001)	-0.41	-0.06	0.07
Cohort 1-6	1.44	0.40	1.03 (<0.0001)	-0.61	0.18	0.24
Cohort 7-10	-3.26	-2.75	0.12 (0.0598)	-0.10	-0.42	-0.19

Table 8b: Quarterly Jensen's Alpha Decomposition for Value-add Properties

Table 8b reports the quarterly Jensen's alpha for value-add properties by cohort. All figures are in percentages. Out of the 3,516 sample properties, 699 are classified as value-add properties. Paired comparison tests on the difference between Jensen's alpha and Deal-level alpha are performed across properties within each cohort. The mean difference is reported and its respective p-value is in parentheses. The mean values of Jensen's alpha, Deal-level alpha, the difference between these two measures, the return from excess-risk taking, the return from sector leverage and the return from incremental leverage are reported in the lower panel. These mean values are taken over all the properties (Overall), and across Cohort 1 through Cohort 6, and finally across Cohort 7 through Cohort 10.

Cohort	Jensen's alpha	Deal Alpha	Difference (p-value)	Excess Risk Taking	Return from sector leverage	Return from incremental leverage
1	4.96	2.76	2.21 (0.0017)	1.06	3.57	-0.31
2	3.54	1.51	2.03 (0.15)	0.59	2.48	0.13
3	4.19	2.32	1.88 (0.0402)	1.06	2.72	0.21
4	4.11	2.21	1.86 (0.0828)	1.18	3.01	0.06
5	3.43	1.55	1.86 (0.1889)	0.64	2.80	-0.29
6	6.67	2.79	3.86 (<0.0001)	0.68	4.82	-0.27
7	4.37	1.70	2.68 (<0.0001)	0.70	3.44	-0.06
8	-1.99	-1.04	-0.9458 (0.0819)	1.09	-0.21	0.36
9	-15.94	-5.84	-10.10 (-0.0001)	1.79	-7.47	-0.84
10	6.13	2.50	3.63 (0.2682)	0.28	4.08	-0.17
Average						
Overall	1.95	1.04	-1.26 (<0.0001)	0.91	1.93	-0.12
Cohort 1-6	4.48	2.19	2.58 (<0.0001)	0.87	3.24	-0.08
Cohort 7-10	-1.86	-0.67	-2.90 (<0.0001)	0.97	-0.04	-0.18

Table 8c: Quarterly Jensen's Alpha Decomposition for Opportunistic Properties

Table 8c reports the quarterly Jensen's alpha for opportunistic properties by cohort. All figures are in percentages. Out of the 3,516 sample properties, 408 are classified as opportunistic properties. Paired comparison tests on the difference between Jensen's alpha and Deal-level alpha are performed across properties within each cohort. The mean difference is reported and its respective p-value is in parentheses. The mean values of Jensen's alpha, Deal-level alpha, the difference between these two measures, the return from excess-risk taking, the return from sector leverage and the return from incremental leverage are reported in the lower panel. These mean values are taken over all the properties (Overall), and across Cohort 1 through Cohort 6, and finally across Cohort 7 through Cohort 10.

Cohort	Jensen's alpha	Deal Alpha	Difference (p-value)	Excess Risk Taking	Return from sector leverage	Return from incremental leverage
1	2.61	1.20	-	1.97	3.49	-0.11
2	18.88	4.65	14.10 (0.0084)	-0.80	10.23	3.19
3	14.04	4.83	9.22 (<0.0001)	2.67	9.51	2.38
4	12.93	4.15	8.73 (0.0001)	1.66	8.51	1.94
5	8.49	1.89	6.59 (0.1553)	1.14	4.18	3.57
6	10.84	2.99	7.84 (0.0843)	-0.05	7.83	-0.03
7	0.81	0.10	0.72 (0.6418)	1.42	1.67	0.47
8	-2.04	-1.12	-0.91 (0.3561)	1.64	-0.95	1.68
9	-12.88	-3.64	-9.25 (<0.0001)	2.32	-6.83	-0.09
10	-9.20	-2.94	-6.27 (0.0768)	1.35	-4.88	-0.04
Average						
Overall	4.45	1.21	-2.85 (<0.0001)	1.33	3.27	1.30
Cohort 1-6	11.30	3.28	8.90 (<0.0001)	1.10	7.29	1.82
Cohort 7-10	-5.83	-1.90	-5.20 (<0.0001)	1.68	-2.75	0.50