The Role of Financial Leverage in the Performance of Private Equity Real Estate Funds

Jamie Alcock, Andrew Baum, Nicholas Colley, and Eva Steiner

Jamie Alcock
is an associate professor at the University of Queensland in Australia and a lecturer at the University of Cambridge in Cambridge, UK.
jta27@cam.ac.uk

Andrew Baum
is an honorary professor of real estate investment at the University of Cambridge in Cambridge, UK.
ab815@cam.ac.uk

Nicholas Colley
is a senior analyst at Property Funds Research in Reading, UK.
nc@propertyfundsresearch.com

Eva Steiner
is a Ph.D. candidate at the University of Cambridge in Cambridge, UK.
es434@cam.ac.uk

The global universe of private equity real estate funds presents investors with the choice of allocating their capital to core, value-add, or opportunistic funds. The efficient allocation of scarce investor capital within this growing universe requires an informed choice between funds on the basis of an adequate assessment of their relative risk and reward profiles. However, in contrast to the well-researched listed real estate sector, the drivers of the return-generating process in the private equity real estate fund spectrum remain insufficiently understood. In particular, the role of leverage as a potential means of contributing to fund performance in the long or the short run remains unclear. For listed real estate, Shilling [1994] argues that REIT value is maximized for equity-only financing, raising the question of the suitability of leverage to enhance firm value in private equity real estate funds. In the private equity real estate sector, the role of leverage in fund performance is less clearly established. In this article, we examine the performance of a large sample of global private equity real estate investment funds, with special attention to the role of leverage as well as managerial skill in making leverage choices.

The results of our study have a number of important practical implications for investors and fund managers, and for transparency in the private equity real estate investment industry as a whole. First, we help assess the contribution of managerial investment skill to fund performance, in particular managers' ability to deploy leverage to good effect. Second, our analysis helps investors to understand the value of managerial skill, and enables a clear distinction between returns achieved through risk-taking via financial leverage and performance generated on the basis of genuine investment skill. Third, our analysis of the drivers of private equity fund performance further contributes to improved transparency in the analysis of fund performance in the private equity real estate industry. Transparency in the drivers of performance is crucial, as regulation and the need for disclosure and managerial accountability become increasingly important.

Specifically, we analyze a unique, original dataset of primary fund information from 169 global private equity real estate investment funds across three style categories over an extended period of time (2001–2011), covering an entire property cycle. We examine the performance of these funds, focusing on the extent to which their excess returns are driven by the underlying market performance as opposed to managerial skill, measured by Jensen's alpha. We then employ this framework to place particular emphasis on two separate but related aspects of the potential contribution that financial leverage can make to fund performance across styles.

Baum et al. [2011, 2012] suggest that leverage may not be viewed as a suitable long-term strategy for delivering returns in excess of core returns. However, this result is based on a relatively small sample of funds observed over a limited period of time.

We re-examine this proposition, using a significantly larger sample observed over an entire property cycle, in order to establish robust evidence for the potential suitability of financial leverage as a long-term strategy to generate value for investors in terms of excess returns. In addition, we raise the complementary question of whether, in the short term, managerial market-timing skills (Baker and Wurgler [2002]) in determining fund leverage may be able positively to contribute to excess returns. For the first time, we explicitly examine the hypothesis that private equity real estate fund managers are able to time the market in their financing choices, and that this skill can contribute to fund performance.

In doing so, we also contribute to the existing literature on the performance of private equity real estate investment funds by unifying prior research and establishing a clear link between studies on the relative performance of funds across the different investment styles, and by examining the role of leverage in determining fund performance in the long run, as well as evidence of market-timing skills when making financing choices.

RELATED LITERATURE

We draw on three streams of literature to form the conceptual background for this study. The first relevant body of work considers whether the relative performance across fund styles is driven by the differential nature of the underlying type of primary investment activity. Kaiser [2005] finds that typical value-add activities, such as refurbishments and other managerial interventions in the operation of direct real estate assets, are significantly related to fund performance. However, the inference rests on the examination of the portfolio held by a single U.S. fund. Fuerst and Marcato [2009] analyze properties across the style spectrum and establish a number of style-related characteristics that appear to be significantly associated with the cross-section of property returns. Yet, the analysis is exclusively at the property level. The original data set of international fund information we employ allows us to contribute to the insights obtained from these earlier studies on the basis of a significantly larger sample of actual fund data collected over an extended period of time (2001–2011).

Funds across the different investment styles are also characterized by differences in their leverage objectives. This distinction within the leverage dimension raises the question of whether the use of financial leverage contributes to fund performance. For listed real estate, Howe and Shilling [1988] assert that in the absence of tax benefits, REITs cannot compete for debt and will favor equity. Shilling [1994] argues that REIT value is maximized for equity-only financing.

For privately held real estate, Anson and Hudson-Wilson [2003] find that leverage is an important determinant of private equity real estate fund performance and that it should be used, albeit in moderation and accountably, in order to contribute to performance. Further, Shilling and Wurtzebach [2010] classify a set of direct real estate funds on the basis of their realized returns into core, value-add, and opportunistic funds, and then conduct a principal component analysis to identify the factors that significantly differentiate the performance of the funds in the three style categories. They find that leverage and market conditions are the two most significant determinants of relative performance. Further, Fairchild et al. [2011] find that leverage plays a key role in determining the market exposure of OECFs.

Baum et al. [2011, 2012] establish that leverage and market beta are highly significant in the explanation of the cross-section of fund returns, but that leverage overall appears to make a negative contribution to fund performance. However, these examples of studies examining the role of leverage implicitly focus on a long-term, average perspective on the impact of financial leverage on fund performance.

In this study, we consider the distinction between the long-term, average impact and short-term, more immediate effects of using leverage in private equity real estate investment funds. We specifically draw on the argument, put forward in the corporate finance literature, that financing decisions are informed by the state of the market, allowing manager to issue debt when the economic environment is most favorable (Baker and Wurgler [2002]).

Prior research finds the market-timing rationale to be a significant determinant of leverage choices in listed U.S. REITs (Boudry et al. [2010]; Li et al.

[2008]). However, to date, managerial timing abilities in financing choices in private equity real estate funds, and their potential implications for fund performance, have not been comprehensively analyzed. We contribute to filling this gap.

HYPOTHESIS DEVELOPMENT

We primarily examine the long- and short-term impact of financial leverage on the performance of private equity real estate investment funds. Some prior research suggests that leverage can make a positive contribution to fund performance and therefore should be used (Anson and Hudson-Wilson [2003]). Other studies suggest that leverage is not a long-term strategy for improving excess returns (Baum et al. [2011, 2012]). Against this background, we re-examine the proposition that leverage positively contributes to fund performance.

Further, we rely on the argument put forward in Goetzmann et al. [2007], who suggest that managers employ leverage to modify the market exposure of their funds in order to enhance performance. Alcock et al. [2012] find evidence consistent with this hypothesis in a sample of U.S. REIT firms. We examine the evidence of (capital structure) market-timing in private equity real estate funds. We hypothesize that managers form a view on the likely strength of the underlying market in the future and optimize their fund's exposure to the market return accordingly, by choosing the appropriate level of leverage. We test the following hypotheses:

> **Hypothesis 1:** The level of leverage held by a fund on average makes a positive contribution to excess fund returns.
>
> **Hypothesis 2:** Timing leverage choices makes a positive contribution to excess fund returns.

DATA AND METHODOLOGY

Dataset

We analyze an initial sample of 169 global private equity real estate funds over the period 2001 to 2011. All fund data is obtained from Property Funds Research (PFR), an independent, management-owned firm that provides research and strategic consulting services on the U.K., European and global institutional real estate markets. The PFR database, established in 2001, is one of a small number that sources information on the private market for unlisted real estate funds. At present, PFR holds information on around 3,800 unlisted, rarely traded institutional real estate funds, which are domiciled all over the world. The funds target single countries, regions (e.g., Europe, Latin America) or the global market, and invest in direct real estate, indirect funds (listed and unlisted), infrastructure, and debt. The data held on the funds is updated on a regular basis utilizing primary sources; these are questionnaires from the fund manager and/or from the investors in the funds as well as fact sheets and annual reports.

The fund profiles contain details on the legal structure, fund life, target sector, geographic focus, investment and investor restrictions, the financial profile including target equity and target gross asset value (GAV), as well as financial data such as current assets, equity committed, and debt levels. Financial performance data is held for a sub-set of funds. This has been provided by fund managers on a strictly confidential basis for use by PFR for research projects.

Data on the underlying direct real estate market return is obtained from IPD. We employ the returns on the main long-term government bond in the fund's primary investment destination as our proxy for the risk-free rate. Data on the risk-free rate is obtained from Bloomberg.

Exhibit 1 presents details on the sample composition. The majority of funds are diversified (72%), followed by retail (13%) and office (6%). Core funds represent 41% of the sample, followed by opportunity (36%) and value-add (23%). The funds in our sample invest primarily in the United Kingdom (44%), followed by Europe (21%) and the United States (18%).

Exhibit 2 presents sample statistics for annual total return and leverage. During the full study period (Panel A), the average annual total return of all funds was 0.8%. Core funds on average delivered 2.24%, outperforming opportunity funds (-4.26%) and broadly on par with value-add funds (2.84%). During the early sub-period, 2001–2007, (Panel B), returns were on average higher for all funds (11.40%), with the style ranking more consistent with a priori expectations (core funds earned 8.86%, value-add 13.91%, and opportunistic 14.23%). An opposite observation holds for the later sub-period (Panel C).

EXHIBIT 1

Characteristics of the Initial Sample of Private Equity Real Estate Investment Funds

The exhibit presents the characteristics of the initial sample of private equity real estate investment funds included in our study over the period 2001–2011. Panel A presents the distribution of funds by underlying property sector, showing the number of funds and the corresponding share of the total sample in percent. Panel B presents the distribution of funds by country. Panel C presents the distribution of funds by investment style.

Panel A: Sector split

Sector	Count	Share
Diversified	121	72%
Industrial	9	5%
Office	10	6%
Other	5	3%
Residential	2	1%
Retail	22	13%
Total	169	100%

Panel B: Country split

Country	Count	Share
Asia	4	2%
Australia	2	1%
Austria	1	1%
CEE	1	1%
Europe	35	21%
Finland	1	1%
France	1	1%
Germany	3	2%
Global	7	4%
Italy	4	2%
Japan	2	1%
Nordic	2	1%
Southern Europe	1	1%
Sweden	1	1%
United Kingdom	74	44%
United States	30	18%
Total	169	100%

Panel C: Style split

Style	Count	Share
Core	70	41%
Opportunity	61	36%
Value-add	38	23%
Total	169	100%

The time series evolution of performance across fund styles appears to be quite homogeneous, with the exception of opportunistic funds that seem to follow the main trends, with performance improving gradually during the strong real estate market periods leading up to the decline in 2008, but in exacerbated cycles (Exhibit 3).

Panel A of Exhibit 2 also shows that the average standard deviation of the total returns across all funds was 25.76%. Consistent with the risk profile of the different fund styles, core fund returns had the lowest variability with a standard deviation of 14.05%, followed by value-add and opportunity funds (19.85% and 42.84%). Given the underperformance of opportunistic funds in terms of average total return, it appears that the risks incurred by investors who chose to deploy their funds in this area of the universe were not rewarded: In our sample period, higher return variability does not necessarily appear to coincide with higher returns. This relationship appears to hold in the earlier sub-period (Panel B) but seems to be reversed in the later sub-period (Panel C). However, the time series evolution of volatility by style appears to match the stated risk profiles (Exhibit 4).

The funds across the style universe are commonly characterized by differences in their primary type of investment activity but also by their target leverage, and thus, risk levels. The average leverage, measured as total debt as a percentage of gross asset value, across all funds was 29.56% for the entire study period. Consistent with their risk profile, the core funds in our sample carry the lowest levels of leverage (12.28%), followed by value-add (34.15%) and opportunistic funds (57.50%).

This relationship between stated risk profiles and relative fund leverage levels appears to remain consistent in the different sub-periods (Exhibit 2, Panels A–C).

Further, it appears that more highly leveraged funds have a wider cross-sectional dispersion of performance (Exhibit 5). This observation may be due to the risk profile of underlying investments of the funds, and suggests that higher leverage coincides with riskier investment projects, consistent with the risk profile of the different fund styles.

METHODOLOGY

In order to examine our two main hypotheses, we estimate the following fixed-effects (FE) panel regression models for the sample funds over the period 2001–2011:

a. Single-factor market model, augmented by style interactions (FE panel):

$$R_{it} = a + b_1 MKT_t + b_2 [MKT^{*}STYLE]_{it} + e_{it}$$

b. Main effect of leverage (FE panel):

$$R_{it} = a + b_1 MKT_t + b_2[MKT*STYLE]_{it} + b_3 LEVER_{it} + b_4[LEVER*STYLE]_{it} + e_{it}$$

c. Timing effect of leverage (FE panel):

$$R_{it} = a + b_1 MKT_t + b_2[MKT*STYLE]_{it} + b_3 LEVER_{it} + b_4[LEVER*STYLE]_{it} + b_5 TIMING_{it} + b_6[TIMING*STYLE]_{it} + e_{it}$$

d. Alternative timing effect of leverage (2SLS estimation):

$$R_{it} = a + b_1 MKT_t + b_2[MKT*STYLE]_{it} + b_3 LEVER_{it} + b_4[LEVER*STYLE]_{it} + b_5 ALT\_TIMING_{it} + e_{it}$$

The dependent variable R_{it} is the total return in the denomination of fund *i* in year t in excess of the risk-free rate. We proxy for the risk-free rate of return using the annual total return denominated in the fund currency on the main long-term government bond in the fund's primary investment destination.

In specification (a), the main predictor is MKT, the excess return denominated in the currency specific to the fund over the risk-free rate on the IPD direct real estate series corresponding to the fund's investment sector and geography.

We augment this model with interactions between MKT and STYLE, representing the value-add and opportunistic fund styles (core being the reference category), in order to account for any potential differential exposure of fund returns to variation in the market return across fund investment styles.

In specification (b) we additionally control for leverage using the variable LEVER, which is measured as the ratio of total debt over gross asset value (denominated in the currency specific to the fund).[1] We place particular emphasis on the LEVER variable, as it captures the overall effect of fund leverage on excess return performance.

Therefore, this variable allows us to examine the empirical evidence consistent with hypothesis 1, that leverage, on average, is able to improve excess returns. Evidence consistent with this hypothesis implies a significantly positive coefficient b_3. We augment the LEVER variable with style interactions in order to capture any differential impact of leverage on excess return performance across investment styles.

We employ specification (c) in order to examine the evidence for hypothesis 2. We create a TIMING variable as the interaction between the lagged change in leverage and the one-step ahead forecast for the return on the market, contemporaneous to the fund excess return observation (dependent variable). We choose this interaction term instead of the simple change in leverage on the right hand side, as the latter would not allow us to investigate why leverage changes, and how changes in

EXHIBIT 2

Sample Statistics of Total Return (% p.a.) and Leverage (Debt/GAV in %) Across Fund Styles

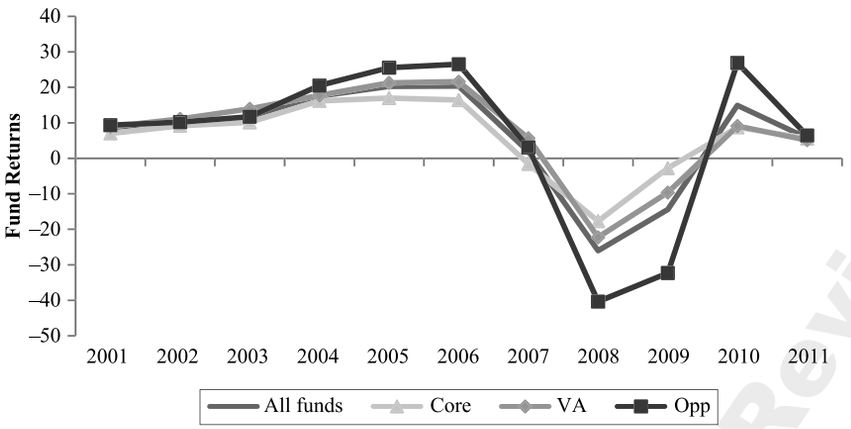
The exhibit presents the sample statistics of fund total return (in percent p.a.) and leverage (measured as the ratio of debt to gross asset value in percent) across the investment styles of the private equity real estate investment funds included in our study over the period 2001–2011. SD is the standard deviation. N is the number of observations. Panel (a) presents the sample statistics for the full study period 2001–2011. Panel (b) presents the sample statistics for the earlier sub-period 2001–2007. Panel (c) presents the sample statistics for the later sub-period 2008–2011.

Funds	Variable	Mean	SD	N
Panel A: Full study period 2001–2011				
Core	Total return	2.24	14.05	391
	Leverage	12.28	17.56	391
Value-add	Total return	2.84	19.85	230
	Leverage	34.15	22.19	230
Opportunity	Total return	–4.26	42.84	204
	Leverage	57.50	21.32	204
All	Total return	0.80	25.76	825
	Leverage	29.56	27.12	825
Panel B: Early sub-period, 2001–2007				
Core	Total return	8.86	10.44	152
	Leverage	8.54	14.15	152
Value-add	Total return	13.91	13.94	94
	Leverage	30.15	20.25	94
Opportunity	Total return	14.23	40.88	53
	Leverage	54.47	17.90	53
All	Total return	11.40	20.35	299
	Leverage	23.47	24.17	299
Panel C: Late sub-period 2008–2011				
Core	Total return	–1.97	14.44	239
	Leverage	14.66	19.07	239
Value-add	Total return	–4.81	19.75	136
	Leverage	36.91	23.10	136
Opportunity	Total return	–10.76	41.72	151
	Leverage	58.57	22.35	151
All	Total return	–5.23	26.57	526
	Leverage	33.02	28.11	526

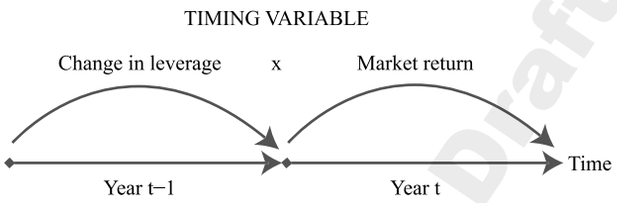
EXHIBIT 3

Time Series of Cross-Sectional Average Fund Returns by Style: 2001–2011

The exhibit shows the time series evolution of the fund total returns overall and by style, utilizing annual total return data on 169 funds over the period 2001–2011. Annual fund-level returns are averaged across funds within each style category to create a time series of cross-sectional average of fund returns by style. Averages are equally weighted. Returns are in the currency denomination of the funds and are shown in percent per annum.



leverage that happen in anticipation of a strong or weak future market environment impact performance. The chart shows the structure of the TIMING variable in year *t* that we relate to the fund excess return in year *t*:



Our rationale is as follows: A skilled manager will form a view on the likely return on the market in the following year *t* and ensure that their fund, in terms of leverage, is positioned optimally at the end of the previous year *t*–1 in order to benefit from the expected variation in the market return. For instance, if the manager expects a strong (weak) market in year *t*, they will ensure that fund leverage is higher (lower) at the beginning of that year *t*, so as to maximize (minimize) exposure to this strong (weak) market and capture higher (lower) beta in this market environment.

In this strategy, we do not aim to distinguish between active and passive modifications of leverage, e.g., active debt repayments versus passive fluctuations in leverage due to changes in the gross asset value of the fund. We focus our analysis on the leverage position that the fund occupies at beginning of the year *t*, as this will determine market exposure and thus have an immediate impact on performance.

If managers possess the skill to time the market in their leverage choices, then the timing variable will be positively and significantly related to fund returns in year *t*. Leverage increases the exposure of equity to variation in the market return. One way in which leverage may contribute to performance is by providing managers with a tool to modify the exposure of equity to the variation in the market return. Managers may increase this exposure in good times and reduce it in bad times.

We can expect a positive effect of market timing on total return performance if increases in leverage coincide with strong future market environments, and equally if reductions in leverage happen when the market is expected to be weak, thereby reducing the exposure of equity to the variation in the market return and thus dampening the effect of the weaker market relative to a situation with higher leverage.

In order to mitigate the look-ahead bias that would be introduced by the use of the actual future market return in the timing variable, which implies perfect managerial foresight, we replace this future market return with a conditional expectation of this return. This conditional expectation is obtained from a simple AR(1) model of the market returns. Thereby, we replace perfect foresight with an assumption that managers forecast the market as a linear function of the performance in the last period, plus a shock element specific to the future period. Our choice does not presume superior forecasting skill for the average manager, consistent with Matysiak et al. [2012].

Evidence consistent with hypothesis 2, that timing leverage choices makes a positive contribution to excess fund returns, results in a positive, significant coefficient b_5. We also create interaction terms between TIMING

EXHIBIT 4

Time Series of Cross-Sectional Fund Return Volatility by Style: 2001–2011

The exhibit shows the time series evolution of the fund return volatility overall and by style, utilizing annual total return data on 169 funds over the period 2001–2011. The annual volatility is calculated as the standard deviation of annual fund-level returns across all funds and across the funds within each style category to create a time series of cross-sectional average fund return volatility for all funds and by style. Returns are in the currency denomination of the funds and are shown in percent per annum. The standard deviation is shown in percent per annum.

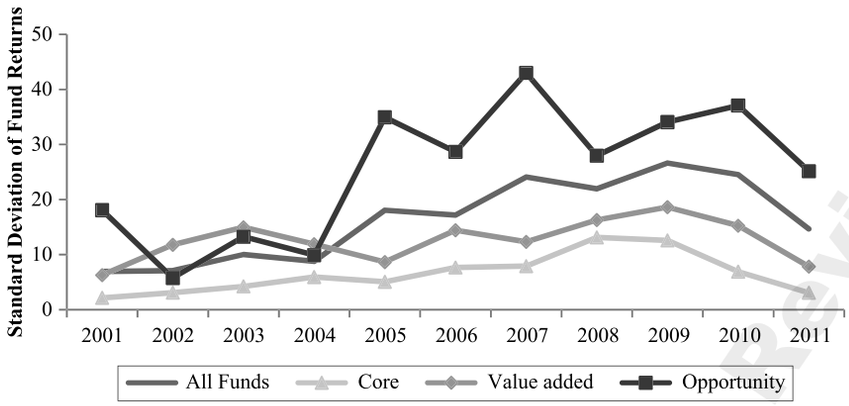
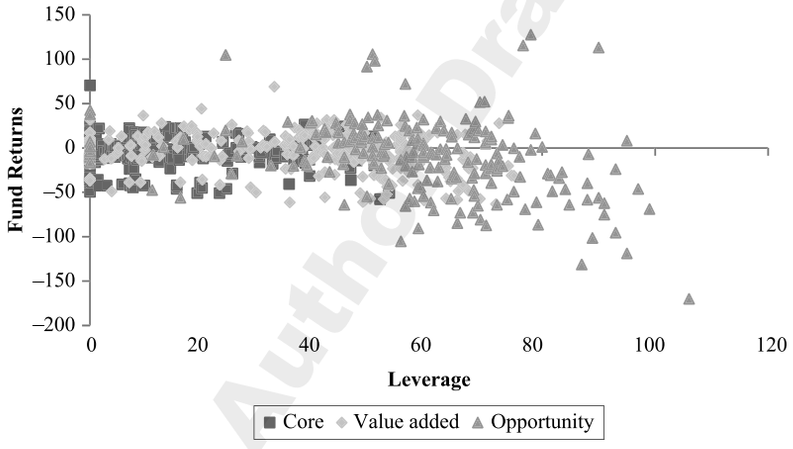


EXHIBIT 5

Fund Returns and Leverage: 2001–2011

The exhibit shows a scatter plot between leverage (measured as the ratio of debt to gross asset value in percent) and annual fund returns (total return in percent per annum), utilizing annual total return and leverage data on 169 funds over the period 2001–2011.



and fund styles in order to distinguish managerial skills in timing leverage choices across fund styles.

In specification (d), we employ an alternative measure of timing and estimate a 2SLS model. First, we estimate the change in fund leverage over year $t-1$ as a function of the forecast return on the market in year t. We interpret the prediction from this first-step regression as the change in leverage incurred to take advantage of next year's market. This prediction is then incorporated into the second-stage regression of excess fund returns. If managers time the market successfully, we expect a positive significant coefficient b_5 on the *ALT_TIMING* variable.

Unless otherwise stated, all regressions employ firm fixed effects in order to capture the latent impact of firm characteristics such as geography, sector, style, and vintage year. Standard errors are robust to heteroskedasticity and autocorrelation using clustering by firm (Hoechle [2007]; Petersen [2009]).[2]

RESULTS

Exhibit 6 presents the regression results for specifications (a) to (d) over the full study period. Column 1 presents the results from the estimation of the single-factor market model, augmented by style interactions, that explains c. 60% of the variation in excess fund returns. The model constant is significantly negative at c. −3%. This finding suggests that funds overall are unable to deliver significant positive outperformance on the basis of managerial skill that is unrelated to the exposure to the variation in the underlying market return. This finding may reflect the impact of transaction costs, fees, and other market frictions that are especially prevalent in the direct real estate investment industry, given the relatively low level of liquidity of the underlying assets. Our results further suggest that excess fund returns were approximately directly proportional to the excess market return, implying that these funds offer their investors effective exposure to the performance of the underlying property markets.

EXHIBIT 6

Main Regression Results, Full Study Period: 2001–2011

The exhibit presents the panel regression results for the full study period 2001–2011. Column 1 presents the fixed effects panel estimation of a single-factor market model augmented by interaction terms between fund style (VA: value-add, Opp: opportunistic, Core: reference category) and the excess return on the market (in percent p.a.). Column 2 presents the fixed effects panel estimation examining the main effect of leverage (measured as the ratio of debt to gross asset value) and its interaction with fund style (VA and Opp, Core being the reference category). Column 3 presents the fixed effects panel estimation examining the timing effect of leverage (measured as the interaction between the lagged change in leverage and the one-step ahead forecast of the market return) and its interaction with fund style (VA and Opp, Core being the reference category). Column 4 presents the 2SLS estimation examining an alternative timing effect. This effect is measured as the first-stage estimation of the lagged change in leverage as a function of the one-step ahead forecast market return. Robust standard errors (in parentheses) are clustered by firm.

VARIABLES	(1) Market Model	(2) Leverage	(3) Timing	(4) L.D. Leverage 2SLS
Excess market return	1.012***	0.974***	0.962***	0.929***
	(0.03)	(0.03)	(0.04)	(0.04)
Excess market return*VA	0.187**	0.178*	0.153	0.222**
	(0.07)	(0.07)	(0.09)	(0.08)
Excess market return*Opp	0.830***	0.600***	0.807**	0.858***
	(0.11)	(0.16)	(0.30)	(0.15)
Leverage (Debt/GAV ratio)		–0.586***		
		(0.13)		
Leverage*VA		0.204		
		(0.17)		
Leverage*Opp		–0.182		
		(0.32)		
Timing (with market forecast)			–0.047**	
			(0.02)	
Timing*VA			0.016	
			(0.02)	
Timing*Opp			0.000	
			(0.03)	
L.D. Leverage				–0.559**
				(0.18)
Constant	–2.495***	13.666***	–4.556***	–3.939***
	(0.04)	(3.88)	(0.35)	(0.84)
Observations	1,018	775	526	526
R-squared	0.609	0.648	0.573	0.499
Number of firms	154	148	138	138
Firm fixed effects	Yes	Yes	Yes	Yes

*** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$.

The interactions with the style dummies are positive and significant, with the coefficient for opportunity exceeding that of value-add funds. This finding suggests that these fund styles carry higher levels of systematic risk than the core funds, offering stronger exposure to the variation in the underlying market returns.

Column 2 presents the results including the control for the main effect of leverage. This model explains c. 65% of the variation in fund excess returns. The results for the influence of the excess return on the market and its interactions with fund style are consistent with the single-factor market model.

Leverage overall appears to make a significantly negative contribution to the total excess returns earned by the funds in our sample. This finding is consistent with the results reported in Baum et al. [2011, 2012]. The main effect of using debt in private equity real estate funds appears to be such that higher leverage significantly reduces fund excess returns over the risk-free rate. Leverage does not appear to represent a reliable long-term strategy to enhance excess return fund performance.

However, the interaction terms with the fund style dummies are insignificant, suggesting that the value-

reducing effect of leverage does not differ across fund styles. Although the funds in the higher risk categories appear to carry significantly more financial leverage, the value-reducing effect of leverage appears to remain the same in terms of relative magnitude.

Column 3 presents the results on the short-term timing effect of leverage. We find evidence that fund managers appear to be unable successfully to time their leverage decisions to the expected future state of the market.

The coefficient on the timing variable we construct is negative and significant at the 1% level. We interpret this finding as evidence that a strategy of tactically timing leverage choices to the expected future market return does not represent a useful means of enhancing performance in the short term.[3] Furthermore, it appears that this finding persists across all of the fund investment styles, as the interaction terms between the timing variable and the investment style dummies are insignificant. Although the funds in the higher-risk categories appear to carry significantly more leverage than the core funds, they do not appear to utilize these higher levels of leverage more effectively in terms of timing the market.

EXHIBIT 7

Robustness Tests for Early Sub-Period (2001–2007)

The exhibit presents the panel regression results for the early sub-period 2001–2007. Column 1 presents the fixed effects panel estimation of a single-factor market model augmented by interaction terms between fund style (VA: value-add, Opp: opportunistic, Core: reference category) and the excess return on the market (in percent p.a.). Column 2 presents the fixed effects panel estimation examining the main effect of leverage (measured as the ratio of debt to gross asset value) and its interaction with fund style (VA and Opp, Core being the reference category). Column 3 presents the fixed effects panel estimation examining the timing effect of leverage (measured as the interaction between the lagged change in leverage and the one-step ahead forecast of the market return) and its interaction with fund style (VA and Opp, Core being the reference category). Column 4 presents the 2SLS estimation examining an alternative timing effect. This effect is measured as the first-stage estimation of the lagged change in leverage as a function of the one-step ahead forecast market return. Robust standard errors (in parentheses) are clustered by firm.

VARIABLES	(1) Market Model	(2) Leverage	(3) Timing	(4) L.D. Leverage 2SLS
Excess market return (% p.a.)	1.059***	1.047***	0.987***	0.994***
	(0.04)	(0.05)	(0.09)	(0.11)
Excess market return*VA	0.199	0.210	0.292*	0.291
	(0.13)	(0.11)	(0.12)	(0.15)
Excess market return*Opp	0.455*	0.524*	0.320**	0.869**
	(0.19)	(0.24)	(0.09)	(0.27)
Leverage (Debt/GAV ratio)		–0.028		
		(0.12)		
Leverage*VA		–0.282		
		(0.26)		
Leverage*Opp		–0.435		
		(0.39)		
Timing (with market forecast)			0.014	
			(0.01)	
Timing*VA			0.027	
			(0.02)	
Timing*Opp			–0.473***	
			(0.01)	
L.D. Leverage				0.254
				(0.21)
Constant	0.123	7.467	–0.536***	1.149
	(0.38)	(4.11)	(0.12)	(0.88)
Observations	490	290	107	107
R-squared	0.508	0.655	0.870	0.784
Number of firms	118	104	67	67
Firm fixed effects	Yes	Yes	Yes	Yes

*** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$.

Column 4 presents the results on the alternative timing measure. The change in leverage from $t-1$ to t is modeled as a function of the expected return on the market for the year in which the fund return is observed. This change in leverage undertaken deliberately to position the fund according to the expected future market environment is then included in the regression of excess fund returns. The impact of this alternative timing variable remains negative, confirming our earlier finding.

Exhibits 7 and 8 replicate the estimation of our regression models for two sub-periods, the earlier period 2001–2007, prior to the onset of the global financial crisis, and the period 2008–2011, including the recent crisis as well as its immediate aftermath.

The results for the earlier sub-period suggest that the long-term main effect of leverage as well as the short-term strategies measured by the two alternative timing variables tend to be unrelated to fund performance, as the coefficients are mostly insignificant. We interpret this finding as evidence that in a stable or strong market environment, neither the long-term nor tactical use of leverage appears to add to or detract from excess fund returns on average.

EXHIBIT 8

Robustness Tests for Late Sub-Period (2008–2011)

The exhibit presents the panel regression results for the late sub-period 2008–2011. Column 1 presents the fixed effects panel estimation of a single-factor market model augmented by interaction terms between fund style (VA: value-add, Opp: opportunistic, Core: reference category) and the excess return on the market (in percent p.a.). Column 2presents the fixed effects panel estimation examining the main effect of leverage (measured as the ratio of debt to gross asset value) and its interaction with fund style (VA and Opp, Core being the reference category). Column 3 presents the fixed effects panel estimation examining the timing effect of leverage (measured as the interaction between the lagged change in leverage and the one-step ahead forecast of the market return) and its interaction with fund style (VA and Opp, Core being the reference category). Column 4 presents the 2SLS estimation examining an alternative timing effect. This effect is measured as the first-stage estimation of the lagged change in leverage as a function of the one-step ahead forecast market return. Robust standard errors (in parentheses) are clustered by firm.

VARIABLES	(1) Market Model	(2) Leverage	(3) Timing	(4) L.D. Leverage 2SLS
Excess market return (% p.a.)	0.969***	0.928***	0.963***	0.894***
	(0.04)	(0.04)	(0.04)	(0.04)
Excess market return*VA	0.091	0.106	0.105	0.222**
	(0.09)	(0.09)	(0.10)	(0.08)
Excess market return*Opp	0.848***	0.424*	0.741*	0.866***
	(0.18)	(0.21)	(0.30)	(0.15)
Leverage (Debt/GAV ratio)		–0.714***		
		(0.13)		
Leverage*VA		0.274		
		(0.21)		
Leverage*Opp		–0.367		
		(0.32)		
Timing (with market forecast)			–0.060***	
			(0.01)	
Timing*VA			0.021	
			(0.02)	
Timing*Opp			0.014	
			(0.03)	
L.D. Leverage				–0.557**
				(0.18)
Constant	–5.112***	19.046***	–5.986***	–5.135***
	(0.40)	(4.69)	(0.40)	(1.02)
Observations	528	485	419	419
R-squared	0.586	0.653	0.563	0.473
Number of firms	151	145	136	136
Firm fixed effects	Yes	Yes	Yes	Yes

*** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$.

On the other hand, the results for the later subperiod 2008–2011 suggest that the risk of long- as well as short-term leverage-related attempts to enhance excess return fund performance lies in the downside. In a weak market environment, potentially also characterized by scarce availability of debt capital, the effect of the long-term as well as short-term use of leverage appears to have a significantly negative impact on excess return fund performance. The coefficients on the main leverage variable and the two timing measures are significantly negatively related to excess fund returns.

Overall, we interpret our findings as evidence that leverage-related strategies, be it adding leverage in general or tactically changing leverage levels in an attempt to time the market, do not appear to represent reliable techniques to enhance excess fund returns. Our evidence is based on the analysis of an entire property cycle, including strong and weak market environments. More specifically, the leverage-related strategies we examine appear to be largely ineffective in stable market environments, but our results suggest that these strategies can have a significantly negative impact on excess return fund performance in weaker markets.

CONCLUSION

The aftermath of the recent global financial crisis has increased the incentive for private equity real estate fund managers to demonstrate that their investment skills are able to contribute to overall fund performance. The demonstration of investment skills and their contribution to the value offered to investors is especially meaningful in contrast to any performance achieved by increasing the levels of risk incurred by the fund through merely modifying leverage levels.

We establish evidence that fund performance is almost directly proportional to the return on the underlying real estate market, meaning that fund managers effectively track the performance of their target markets.

We find evidence for systematic underperformance measured by Jensen's alpha, which may potentially be related to the impact of transaction costs, fees, and other market frictions.

Further, we establish evidence that leverage cannot be viewed as a long-term strategy to enhance performance. In the short term, managers do not seem to add significantly to fund excess returns by timing leverage choices to the expected market environment.

In practical terms, our results promote a more efficient investment decision-making process by contrasting relative fund performance and risk across styles. Our findings shed light on the connection between relative performance and financial leverage. Further, our results help assess the empirical evidence for managers' skill in timing the market and exploiting the opportunities offered by the prevailing broader economic environment when making financing choices.

ENDNOTES

[1]Our results are robust to using the ratio of total debt to NAV as the measure of leverage.

[2]Note that the TIMING variable considers the change in leverage, not the levels of leverage. The series of first differences in leverage is stationary, further alleviating concerns about the impact of autocorrelation on the inference regarding the timing of leverage choices (an Augmented Dickey Fuller test rejects the null hypothesis of a unit root at the 1% level).

[3]This finding may be partly driven by the choice of forecasting model for the return on the market that we employ. However, in unreported results, we find that using the actual future market return (implying perfect foresight), the impact of timing remains significantly negative.

REFERENCES

Anson, M.J.P., and S. Hudson-Wilson: "Should One Use Leverage in a Private Equity Real Estate Portfolio?" *The Journal of Portfolio Management*, Vol. 29, No. 5 (2003), pp. 54-61.

Alcock, J., J.L. Glascock, and E. Steiner: "Manipulation in US REIT Investment Performance Evaluation: Empirical Evidence." *The Journal of Real Estate Finance and Economics*, Forthcoming (2012).

Baker, M., and J. Wurgler: "Market Timing and Capital Structure." *The Journal of Finance*, Vol. 57, No. 1 (2002), pp. 1-32.

Baum, A., J. Fear, and N. Colley. "Have Property Funds Performed?" Urban Land Institute Europe Policy and Practice Committee Report, 2011.

——. "Have Property Funds Performed?" Urban Land Institute Europe Policy and Practice Committee Report, 2012.

Boudry, W., J.G. Kallberg, and C.H. Liu. "An Analysis of REIT Security Issuance Decisions." *Real Estate Economics*, Vol. 38, No. 1 (2010), pp. 91-120.

Fairchild, S., G. MacKinnon, and J. Rodrigues. "Are All Open-End Core Funds Created Equal?" *The Journal of Portfolio Management*, Vol. 37, No. 5 (2011), pp. 51-67.

Fuerst, F., and G. Marcato. "Style Analysis in Real Estate Markets: Beyond the Sector and Region Dichotomy." *The Journal of Portfolio Management*, Vol. 35, No. 5 (2009), pp. 104-117.

Goetzmann, W., J. Ingersoll, M. Spiegel, and I. Welch. "Portfolio Performance Manipulation and Manipulation-proof Performance Measures." *Review of Financial Studies*, Vol. 20, No. 5 (2007), pp. 1503-1546.

Hoechle, D. "Robust Standard Errors for Panel Regressions with Cross-sectional Dependence." *Stata Journal*, Vol. 7, No. 3 (2007), pp. 1-31.

Howe, J., and J. Shilling. "Capital Structure Theory and REIT Security Offerings." *The Journal of Finance*, Vol. 43, No. 4 (1988), pp. 983-993.

Kaiser, R. "Analyzing Real Estate Portfolio Returns." *The Journal of Portfolio Management,* Vol. 31, No. 5 (2005), pp. 134-142.

Li, A., S.E. Ong, and J.T.L. Ooi. "An Analysis of the Financing Decisions of REITs: The Role of Market Timing and Target Leverage." *The Journal of Real Estate Finance and Economics*, Vol. 40, No. 2 (2008), pp. 130-160.

Matysiak, G., D. Papastamos, and S. Stevenson. "Reassessing the Accuracy of UK Commercial Property Forecasts." IPF research report, 2012.

Petersen, M. "Estimating Standard Errors in Finance Panel Data Sets: Comparing Approaches." *Review of Financial Studies*, Vol. 22, No. 1 (2009), pp. 435-480.

Shilling, J.D. "Taxes and the Capital Structure of Partnerships, REITs, and Other Related Entities." Working paper 94-16, University of Wisconsin, 1994.

Shilling, J.D., and C. Wurtzebach. "Is Value-Added and Opportunistic Real Estate Investing Beneficial? If So, Why?" RERI Working Paper No. 171, 2010.