Public hedge funds

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Abstract

Hedge funds managed by listed firms significantly underperform funds managed by unlisted firms. The underperformance is more severe for funds with low manager deltas, poor governance, and no manager co-investment, or managed by firms whose prices are sensitive to earnings news. Notwithstanding the underperformance, listed firms raise more capital and harvest greater fee revenues than do comparable unlisted firms. The results cannot be explained by endogeneity, backfill bias, serial correlation, or manager manipulation, and are consistent with the view that, for asset management firms, going public weakens the alignment between ownership, control, and investment capital, thereby engendering conflicts of interest.

1. Introduction

"When a fund management company lists on a stock exchange, its clients are not uniformly delighted. They are aware that potential conflicts of interest can arise that some companies fail to manage."

–The Financial Times, July 2012[1]

In the recent years, we have witnessed a slew of public listings by mega asset management firms including Amundi Group, Man Group, Fortress Investment Group, Och-Ziff Capital Management Group, Blackstone Group, and KKR.[2] These publicly listed mega asset managers together managed an impressive US$1.95 trillion in 2016. How does the transition to public equity markets impact investment performance? Fund management companies argue that going public allows them to enhance investment performance by better incentivizing their staff through employee stock options, and by investing the IPO proceeds in superior technology and business support. Moreover, listed firms may be operationally more robust than their unlisted competitors given the higher transparency required of listed companies. However, fund investors contend that public listing allows firm founders to sell off their stakes to outsiders, which exacerbates potential conflicts of interest. Indeed for asset managers, the transition to public markets weakens the alignment between ownership, control, and investment capital, engendering a rich combination of agency problems, hitherto unexplored in the academic literature, which could have significant implications for the fund investor. In this paper, we shed light on these agency issues by investigating the impact on hedge fund performance when asset management firms go public.

The hedge fund industry is an important and interesting laboratory for studying the

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[1]See "Going public brings benefits and pitfalls," The Financial Times, 22 July 2012, and "For private equity clients, worries over public listing," The Wall Street Journal, 25 June 2011.

[2]See for instance "Amundi IPO to create Europe's biggest traded asset manager," Bloomberg, 2 November 2015. By our estimates, at the end of 2013 about 16.68% of hedge fund industry assets were managed by listed firms.

impact of initial public offerings in asset management.[3] First, hedge funds, both public and private, typically report monthly return data to commercial databases, allowing researchers to cleanly measure investment performance and evaluate the performance implications of the private to public transition. Second, it is difficult to run a comparable analysis on private equity funds as performance metrics used in private equity such as IRR or investment multiple are measured over a multi-year horizon, effectively precluding researchers from analyzing the performance implications of the transition in a timely fashion. Third, agency problems are more salient for hedge funds than for mutual funds owing to the complex strategies employed by and the lower level of transparency and disclosure of the former.[4]

Indeed, investors in hedge funds and private equity funds (and to a lesser extent mutual funds) that are managed by publicly listed firms need to contend with a combination of agency issues: the conflicts that surface between management and fund investors (Agarwal, Daniel, and Naik, 2011; Teo, 2011; Aragon and Nanda, 2017) *and* the conflicts that arise between firm shareholders and fund investors. In contrast, a privately held investment firm is typically controlled by its founder-owners, who also invest a substantial portion of their net worth in the funds managed by the firm.[5] This engenders alignment between ownership, control, and investment capital. Post-IPO, the founders of the firm sell-out to new shareholders who typically do not invest alongside the limited partners, thus separating ownership from investment capital. Furthermore, the founders may not re-invest the substantial proceeds from the IPO in the funds managed by the firm, thereby distancing control from investment

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[3]According to BarclayHedge, hedge funds collectively managed over US$3 trillion in assets in 2016. See https://www.barclayhedge.com/research/indices/ghs/mum/HF_Money_Under_Management.html.

[4]Consistent with this view, Ferris and Yan (2009) find economically modest performance differences between mutual funds sorted by firm listing status that are not robust to the risk adjustment methodology. For example, they find that the Fama and French (1993) alpha spread between mutual funds managed by publicly listed firms and those managed by private firms is a modest –2.2 basis points per month and is statistically indistinguishable from zero at the ten percent level. Unlike us, Ferris and Yan (2009) do not establish the link between the underperformance and conflicts of interest. Instead, they assume that the underperformance is itself supportive of the agency view.

[5]According to Luba Nikulina from Towers Watson, "Capital commitment by fund managers is the single most important way to align the interests of managers and investors." See "Skin in the game is crucial, but how much?" Financial Times, 18 November 2012.

capital.[6] Fig. 1 illustrates the separation of ownership, control, and investment capital when an investment firm goes public.

[Insert Fig. 1 here]

We find substantial differences in expected returns on the portfolios of hedge funds sorted by fund management company listing status that are unexplained by the Fung and Hsieh (2004) seven factors. Hedge funds managed by listed firms underperform hedge funds managed by unlisted firms by 2.89% per year (t-statistic = 4.73) after adjusting for co-variation with the Fung and Hsieh (2004) seven factors. The results are not confined to the smallest funds in our sample and cannot be explained by differences in share restrictions and illiquidity (Aragon, 2007; Aragon and Strahan, 2012), incentives (Agarwal, Daniel, and Naik, 2009), fund age (Aggarwal and Jorion, 2010), fund size (Berk and Green, 2004), return smoothing behavior (Getmansky, Lo, and Makarov, 2004), backfill and incubation bias (Liang, 2000; Fung and Hsieh, 2009; Bhardwaj, Gorton, and Rouwenhorst, 2014), and manager manipulation of fund returns (Agarwal, Daniel, and Naik, 2011; Aragon and Nanda, 2017).

Using a differences-in-differences analysis, we find that relative to the five-year pre-IPO period, average fund risk-adjusted performance deteriorates by an annualized 13.68% while average firm alpha wanes by an annualized 8.04% during the five-year post-IPO period.[7] Despite the post-event underperformance, public firms harvest fee revenues that are US$6.36 million or 27.04% greater than do comparable private firms. This is because relative to the control group, public firms are able to grow their assets under management (henceforth AUM) by US$340.95 million or 61.49% during the same period. The surge in firm AUM stems less from organic growth in existing fund AUM and more from the launch of new funds post listing.

In line with an agency story that derives from conflicts between control and investment

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[6]As a result of the windfall from the IPO, the proportion of the founders' net worth that is co-invested in the funds managed by the firm falls, even if the founders do not redeem from the funds post-IPO.

[7]The risk-adjusted underperformance of the hedge funds managed by listed firms in the portfolio sort increases to 11.03% per annum when we confine the fund sample to that used in the event study.

capital, we observe substantial differences in the underperformance for funds sorted on metrics that capture the incentive alignment between management and investors. Specifically, the alpha spread between funds managed by private versus public firms is smaller for funds with high manager total deltas (Agarwal, Daniel, and Naik, 2009), better governance scores (Ozik and Sadka, 2015), and manager personal investment. In keeping with an explanation that relates to conflicts between ownership and investment capital, the short-termist pressures associated with a stock listing (Poterba and Summers, 1995; Graham, Harvey, and Rajgopal, 2005; Asker, Farre-Mensa, and Ljungqvist, 2015) also drive the underperformance of publicly traded asset management firms.[8] We find that firms with high earnings response coefficients or ERCs (Ball and Brown, 1968; Easton and Zmijewski, 1989), whose stock prices are more responsive to earnings, underperform more than do firms with low ERCs. Moreover, consistent with the overall conflicts of interest view, we find that underperformance is more pronounced for firms that exhibit greater separation of ownership, control, and investment capital post-IPO. Specifically, amongst listed firms, those with low insider ownership and whose prospectuses reveal that existing shareholders will cash out post-IPO underperform more.

The aforementioned conflicts of interest translate into fund underperformance via the drive to gather assets post-IPO. Equity markets tend to reward revenue growth, which, for investment firms, generally corresponds to growth in AUM (Pozen and Clay, 2012).[9] Short-termist pressures can also induce excessive asset gathering since asset gathering boosts current fee revenues (or current earnings) at the expense of future returns (or future earnings). Consistent with the asset gathering view, we find that the underperformance is most severe for funds with the lowest liquidity risk exposure (Pástor and Stambaugh, 2003), and there-

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[8]A focus on short-term quarterly earnings at publicly listed investment firms may hamper their ability to attack long horizon mispricings (Stein, 2005), thereby limiting investment opportunity and reducing alpha.

[9]Man Group's strategy is emblematic of this. According to Man Group's Finance Director Kevin Hayes, "the Board's point of view is that at its essence the Man Group's strategy is a growth strategy. We think that's why people invest in us. . . . And when we're looking therefore at each aspect of our business, we have to be able to grow it. We have to be able to scale it." See Pozen and Clay (2012, p. 6).

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fore have the greatest capacity to gather assets.[10] Additionally, we find that high ERC firms raise more capital and launch more funds than do low ERC firms.

Given the greater transparency that is required of a listed firm, hedge funds managed by listed firms may exhibit lower operational risk, thereby attracting investors despite the underperformance. We show that, in line with this view, hedge funds managed by listed firms are less likely to trigger three of the four most common performance flags observed by Bollen and Pool (2012). Specifically, they are less likely to report return distributions with a discontinuity at zero, a low number of negative returns, or a high number of repeated returns.

The endogeneity of firm listing does not explain the underperformance of hedge funds managed by public firms. By analyzing the private to public transition in the event study, we sidestep concerns that time-invariant differences between public and private firms simultaneously explain listing status and fund underperformance. The differences-in-differences methodology ameliorates concerns that observable time-varying differences in firm characteristics drive our findings. To cater for unobserved time-varying differences between public and private firms, we run an instrumental variables analysis with the supply of investment capital at firm founding as the instrument, and find that the impact of listing on fund performance is even stronger after instrumenting for listing status. Our choice of instrument follows Asker, Farre-Mensa, and Ljungqvist (2015) and is robust to alternative specifications.

The results in this paper challenge the view that asset management firms list to enhance investment performance. In doing so, we resonate with three strands of research on hedge funds. The first strand examines agency problems and finds that some hedge funds inflate their December returns (Agarwal, Daniel, and Naik, 2011), take on excessive liquidity risk (Teo, 2011), and strategically delay reporting poor performance (Aragon and Nanda, 2017).[11]

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[10]The advantage of our set up is that it captures ex-ante the intent to raise capital. Actual capital raised ex-post is less useful for our purposes since it is both a function of past fund performance via the flow-performance relationship and a determinant of future fund performance via capacity constraints

[11]Jorion and Schwarz (2014) argue that the discontinuity at zero in the hedge fund net return distribution documented by Bollen and Pool (2009) is not evidence of manager manipulation.

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Our findings indicate that the process of going public heightens conflicts of interest, which in turn hurt performance. A second strand sheds light on the drivers of alpha. We find that, just like motivated (Agarwal, Daniel, and Naik, 2009), emerging (Aggarwal and Jorion, 2010), distinctive (Sun, Wang, and Zheng, 2012), and attentive (Lu, Ray, and Teo, 2016) hedge funds, those managed by private firms also outperform. The third strand uncovers strong direct (Yin, 2016) and indirect (Lim, Sensoy, and Weisbach, 2016) incentives that drive managers to raise capital. Our results suggest that public firms are even more motivated to gather assets.

This paper enriches the literature on initial public offerings. Going public crimps industry competitor performance (Hsu, Reed, and Rocholl, 2010), biases issuers of credit ratings (Kedia, Rajgopal, and Zhou, 2014), hurts firm internal innovation (Bernstein, 2015), and reduces the sensitivity of corporate investment to opportunities (Asker, Farre-Mensa, and Ljungqvist, 2015). Yet little is known about the effect of going public on fund investment performance. Our work addresses this important gap. Our findings are distinct from papers that find that IPO firms suffer from poor long-run post-issue operating performance (Jain and Kini, 1994) and stock returns (Loughran and Ritter, 1995). Unlike those papers, which analyze the conflicts between shareholders and management (Jensen and Meckling, 1976; Jensen, 1989), we focus on the conflicts between fund investors and management / shareholders. We show that while listed asset managers deliver lower returns, which hurt fund investors, they are able to grow fee revenues, which benefits shareholders.

Our work complements a nascent literature on ownership stakes in hedge funds, which reports conflicting results on the performance of hedge funds with external owners. On one hand, Mullally (2017) finds that hedge funds that sell significant ownership stakes to outsiders do not underperform. He contends that external owners in general have strong incentives to monitor their funds. On the other hand, Yan and Zheng (2017) show that conditional on those outside owners being financial firms, hedge funds subsequently underperform, which they attribute to a conflicts of interest story. In our sample, we exclude firms that go public

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simply because they are bought out by listed companies. Therefore, our results are not driven by the external owner or by the financial firm affiliation effect. We argue that an IPO offers a more robust setting for investigating conflicts of interest in hedge fund firms given that the new minority shareholders of a publicly listed firm typically neither invest in the funds under management nor have control rights over the firm. Conversely, in an ownership transfer, the new stakeholder often acquires control rights while simultaneously supplying capital to the funds managed by the firm.[12]

The remainder of this paper is organized as follows. Section 2 describes the data and methodology. Section 3 reports the empirical results while Section 4 presents a battery of robustness tests. Section 5 concludes.

2. Data and methodology

We evaluate hedge funds using monthly net-of-fee returns and assets under management data of live and dead hedge funds reported in the TASS, HFR, and BarclayHedge datasets from January 1994 to December 2013. Because TASS, HFR, and BarclayHedge started distributing their data in 1994, the data sets do not contain information on funds that died before January 1994. This gives rise to survivorship bias. We mitigate this bias by focusing on data from January 1994 onward.

In our fund universe, we have a total of 30,509 hedge funds, of which 12,380 are live funds and 18,129 are dead funds. However, due to concerns that funds with multiple share classes could cloud the analysis, we exclude duplicate share classes from the sample.[13] This leaves a total of 16,592 hedge funds, of which 5,947 are live funds and 10,645 are dead funds at the end of our sample period. The funds are roughly evenly split between TASS, HFR, and BarclayHedge. While 5,547 funds appear in multiple databases, many funds belong to

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[12]See, for example, the seed relationships described in Cohen and Delacey (2005, p. 7).

[13]Inferences do not change when we include multiple share classes of the same fund in the analysis. To merge databases, we follow the procedure outlined in the Appendix of Joenväärä, Kosowski, and Tolonen (2017).

only one database. Specifically, there are 3,597, 3,446, and 4,002 funds unique to the TASS, HFR, and BarclayHedge databases, respectively. This highlights the advantage of obtaining data from more than one source. In addition to monthly return and size information, our sample also captures data on fund characteristics such as management fee, performance fee, redemption period, lock-up period, investment style, leverage indicator, high-water mark indicator, and fund age.[14]

Following Agarwal, Daniel, and Naik (2009), we classify funds into four broad investment styles: Security Selection, Multi-process, Directional Trader, and Relative Value. Security Selection funds take long and short positions in undervalued and overvalued securities, respectively, and reduce systematic risks in the process. Usually, they take positions in equity markets. Multi-process funds employ multiple strategies that take advantage of opportunities created by significant transactional events, such as spin-offs, mergers and acquisitions, bankruptcy reorganizations, recapitalizations, and share buybacks. Directional Trader funds bet on the direction of market prices of currencies, commodities, equities, and bonds in the futures and cash market. Relative Value funds take positions on spread relations between prices of financial assets and aim to minimize market exposure.

We hand collect the fund management companies' public listing status from several sources: S&P Capital IQ, the SEC's Investment Adviser Public Disclosure website, Factiva, and the fund management companies' websites.[15] Specifically, for each fund management company, we perform a search in S&P Capital IQ and SEC's Investment Adviser Public Disclosure, which provide information about the company's current and prior corporate parents. Once we identify a parent and subsidiary relationship, we obtain the effective public listing date for the fund management company by checking the "M&A/Private Placements" section in S&P Capital IQ, conducting a Factiva news search, and perusing the corporate

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[14]To ameliorate the impact of return outliers, we trim the hedge fund returns in our sample at the 99.5^{th} and 0.5^{th} percentiles. The baseline results are virtually unchanged when we use the original returns reported in the databases or when we winsorize the returns at the 99.5^{th} and 0.5^{th} percentiles.

[15]See http://www.adviserinfo.sec.gov/IAPD/Content/Search/iapd_Search.aspx for the SEC's Investment Adviser Public Disclosure website.

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history from the fund management company's website.

Table 1 provides summary statistics on the number of listed firms as well as the number of hedge funds and the assets that they manage. While the number of listed fund management companies is small relative to the number of unlisted fund management companies, listed fund management companies manage a growing number of hedge funds and pool of assets. In 1994, there were only 12 listed firms managing 39 hedge funds and US$2.55 billion or 4.02% of industry assets. In 2013, the number of listed firms has grown to 113. These firms manage 856 hedge funds and US$199.34 billion or 16.68% of industry assets, a significant increase relative to the start of the sample period.

[Insert Table 1 here]

Our firm sample covers a broad spectrum of fund management companies including large asset management houses that also manage private equity funds and mutual funds. This allows us to shed light on the impact of public listing on the asset management industry in general. One concern is that for some of these firms, their hedge fund assets may be a relatively small part of their business. Consequently, the impact of hedge fund performance, fee revenues, and AUM on these firms may be relatively muted. To ameliorate such concerns, as a robustness test, we follow Brunnermeier and Nagel (2004) and discard firms for whom hedge fund assets only make up a small part of their aggregated institutional portfolio. We first check whether a firm is registered as an investment adviser with the SEC. Registration is a prerequisite for conducting non-hedge fund business. If a firm is not registered, we include it in our pure play sample. If a firm is registered, we obtain its registration documents (Form ADV). For a registered firm to be included in our pure play hedge fund firm sample, we require that (a) that it charges performance-based fees, and (b) at least 50% of its clients are "Other pooled investment vehicles (e.g., hedge funds)" or "High net worth individuals". This leaves us with a total of 96 listed and 1,888 unlisted pure play firms at the end of the sample period. In results that are available upon request, we find that our baseline results prevail when we analyze only pure play hedge fund firms.

Hedge fund data are susceptible to many biases (Liang, 2000; Fung and Hsieh, 2009). These biases stem from the fact that inclusion in hedge fund databases is voluntary. As a result, there is a self-selection bias. For instance, funds often undergo an incubation period during which they rely on internal funding before seeking capital from outside investors. Incubated funds with successful track records then go on to list in various hedge fund databases while the unsuccessful funds do not, resulting in an incubation bias. Separate from this, when a fund is listed on a database, it often includes data prior to the listing date. Again, because successful funds have a strong incentive to list and attract capital inflows, these backfilled returns tend to be higher than the non-backfilled returns. In the analysis that follows, we will repeat the tests after dropping the first 24 months of return data from each fund to ensure that the results are robust to backfill and incubation bias. To fully address concerns about backfill bias raised by Bhardwaj, Gorton, and Rouwenhorst (2014) and others, we also redo the tests after removing all return observations that have been backfilled prior to fund listing date.

Throughout this paper, we model the risks of hedge funds using the Fung and Hsieh (2004) seven-factor model. The Fung and Hsieh factors are the excess return on the Standard and Poor's (S&P) 500 index (SNPMRF); a small minus big factor (SCMLC) constructed as the difference between the Russell 2000 and the Standard and Poor's (S&P) 500 indices; the yield spread of the US ten-year Treasury bond over the three-month Treasury bill, adjusted for duration of the ten-year bond (BD10RET); the change in the credit spread of Moody's BAA bond over the ten-year Treasury bond, also appropriately adjusted for duration (BAAMTSY); and the excess returns on portfolios of look back straddle options on currencies (PTFSFX), commodities (PTFSCOM), and bonds (PTFSBD), which are constructed to replicate the maximum possible return from trend following strategies (Fung and Hsieh, 2001) on their respective underlying assets. These seven factors have been shown by Fung and Hsieh (2004) to have considerable explanatory power on hedge fund returns.

3. Empirical results

3.1. Tests of fund performance

To begin, we test for differences in risk-adjusted performance between funds managed by listed and unlisted management companies. Every year, starting in January 1994, two hedge fund portfolios are formed by sorting funds on management company listing status. The post-formation returns on these two portfolios over the next 12 months are linked across years to form a single return series for each portfolio. We then evaluate the performance of the portfolios relative to the Fung and Hsieh (2004) model.

The results, reported in Panel A of Table 2, reveal substantial differences in expected returns, on the portfolios sorted by management company listing status, that are unexplained by the Fung and Hsieh (2004) seven factors. Hedge funds managed by listed companies underperform those managed by unlisted firms by a statistically significant but modest 1.89% per year (t-statistic = 3.13). After adjusting for co-variation with the factors from the Fung and Hsieh (2004) model, the spread increases to an economically significant 2.89% per year (t-statistic = 4.73).[16] As in the rest of the paper, we base statistical inferences on White (1980) heteroskedasticity-consistent standard errors. Since hedge funds with investor capital below US\$20 million may not be relevant to large institutional investors, we also conduct the portfolio sort on the sample of hedge funds with at least US\$20 million of AUM. The results reported in Panel B of Table 2 indicate that our findings are not driven by small funds.[17]

[Insert Table 2 and Fig. 2 here]

Fig. 2 complements the results from Panel A of Table 2. It illustrates the monthly

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[16]The portfolio sort results are robust to value-weighting the funds within each portfolio. The risk-adjusted spread for the value-weighted sort is 2.75% per annum (t-statistic = 4.20).

[17]The portfolio sort results are not driven solely by the underperformance of funds launched post IPO by listed firms. We redo our portfolio sort with only funds that were conceived prior to firm listing and find that these funds post firm IPO underperform funds managed by unlisted firms by 2.54% per year after adjusting for risk (t-statistic = 2.72). We note that funds launched post IPO underperform funds launched pre IPO, but the performance spread is statistically indistinguishable from zero.

cumulative abnormal returns (henceforth CARs) from the portfolio of funds managed by listed firms (portfolio A) and the portfolio of funds managed by unlisted firms (portfolio B). CAR is the cumulative difference between a portfolio's excess return and its factor loadings (estimated over the entire sample period) multiplied by the Fung and Hsieh (2004) risk factors. The CARs in Fig. 2 indicate that portfolio A consistently underperforms portfolio B over the entire sample period and suggest that the underperformance of funds managed by listed firms is not peculiar to a particular year.

There may be concerns that the portfolio sort results are driven by shareholder activists as activists that are managed by listed firms may be less willing to exert strong pressure on portfolio companies to make shareholder-friendly changes given that they themselves are vulnerable to shareholder activism. To address such concerns, we identify shareholder activist funds in our sample based on strategy name, substrategy name, fund name, and fund investment strategy description. In total, we have 95 shareholder activist funds in our sample. After removing shareholder activists, we find that funds managed by listed firms still underperform those managed by unlisted firms by 2.85% per annum (t-statistic = 4.66) after adjusting for risk.

To further test the performance difference between funds managed by listed and unlisted management companies, we estimate the following pooled OLS regression:

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\begin{aligned}
ALPHA_{im} = a &+ bLISTED_{im} + cMGTFEE_i + dPERFFEE_i + eNOTICE_i + fMININV_i \\
&+ g\log(SIZE_{im-1}) + hAGE_{im} + \sum_k p^k STYLEDUM_i^k + \sum_l q^l YEARDUM_{im}^l + \epsilon_{im}, \quad (1)
\end{aligned}
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where $ALPHA$ is fund monthly abnormal return after stripping away co-variation with the Fung and Hsieh (2004) seven factors, $LISTED$ is an indicator variable that takes a value of one when a fund is managed by a listed firm and a value of zero otherwise, $MGTFEE$ is fund management fee in percentage, $PERFFEE$ is fund performance fee in percentage, $NOTICE$ is fund redemption notification period in months, $MININV$ is fund minimum investment

in millions of US\$, *SIZE* is fund AUM in millions of US\$, *AGE* is fund age in decades, *STYLEDUM* is the fund style dummy, and *YEARDUM* is the year dummy. To estimate fund alpha, we use the past 24 months of return data.[18] We also estimate the analogous regression on raw monthly fund returns to ensure that our findings are not artefacts of the risk adjustment methodology.

[Insert Table 3 here]

The results from the cross-sectional regression analysis, reported in columns one to four of Table 3, corroborate the findings from the portfolio sorts. Specifically, the coefficient estimate on *LISTED* in the alpha regression reported in column four of Table 3 indicates that, controlling for other factors that could explain fund performance, funds managed by listed companies underperform funds managed by unlisted companies by 2.44% per annum after adjusting for risk. Inferences do not change when we estimate the regression on raw returns suggesting that our prior findings are not driven by our risk adjustment technology. The coefficient estimates on the control variables accord with the extant literature. Higher-powered incentives or performance fees (Agarwal, Daniel, and Naik, 2009) and longer redemption notice periods (Aragon, 2007) are associated with superior performance, while fund age (Aggarwal and Jorion, 2010) is linked to poorer performance. The impact of fund size on performance is more ambiguous. While size is associated with lower returns (Berk and Green, 2004), it is also linked to higher alphas.[19]

To check for robustness, we estimate Fama and MacBeth (1973) regressions in place of the OLS regressions. Specifically, first we run cross-sectional regressions for each month. Then, we report the time-series averages of the coefficient estimates, and use the time-series standard errors of the average slopes to draw inferences. The Fama and MacBeth regressions control for correlation in residuals across different firms within the same month. We compute

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[18]Inferences do not change when we estimate fund alpha using the past 36 months of returns instead.

[19]Diseconomies of scale at the firm level do not explain our findings. In unreported results that are available upon request, we show that the pooled OLS regression findings are robust to including the log of lagged firm AUM as an additional independent variable.

Newey and West (1987) standard errors with a three-month lag to adjust for dependence across time. The Fama and MacBeth (1973) results reported in columns five to eight of Table 3 echo our previous findings and indicate that they are robust to alternative model specifications.

One concern is that funds managed by listed firms may take on less leverage than do funds managed by unlisted firms. This may explain the underperformance of the former relative to the latter. To address this concern, we re-estimate the Eq. (1) regressions with fund information ratio in place of fund alpha. Information ratio is fund alpha divided by the standard deviation of fund residuals from the Fung and Hsieh (2004) model estimated over the past 24 months. In results that are available upon request, we find that the coefficient estimates on *LISTED* in the OLS regressions on information ratio are negative and statistically significant at the one percent level. After controlling for the other factors that may drive fund information ratio, funds managed by listed firms deliver information ratios that are on average 0.215 lower than do funds managed by unlisted firms. Inferences do not change when we estimate Fama and MacBeth (1973) regressions on fund information ratio.

3.2. Event study

To complement the baseline portfolio sorts, we conduct an event study to investigate fund performance and AUM before and after firm listing. We choose as the event window the period starting 60 months prior to the IPO and ending 60 months after the IPO.[20] To be included in the sample, a fund must have monthly return information during the period that starts 24 months pre IPO and ends 24 months post IPO. This leaves us with 58 funds that belong to 27 firms with sufficient return information. To account for endogeneity concerns driven by observable differences between listed and unlisted firms, we match event hedge funds with non-event hedge funds based on fund performance and AUM in the 24-month pre-IPO period and conduct a differences-in-differences analysis. For example, in the fund

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[20]Our differences-in-differences results are robust to using an event window that starts 48 months prior to the IPO and ends 48 months after the IPO.

alpha analysis, event funds are matched to non-event funds by minimizing the sum of the absolute percentage differences in monthly fund alpha in the 24-month pre-IPO period. Panel A of Table 4 reports differences in fund alpha and AUM before and after the IPO relative to the matched sample. We also match event firms with non-event firms based on firm performance, firm AUM, firm revenue, and number of funds per firm, and report the results from differences-in-differences analyses of these firm attributes in Panel B of Table 4.[21]

[Insert Tables 4 and 5 here]

The results reported in Table 4 indicate that relative to the five-year period before IPO and to a matched sample of funds, fund risk-adjusted performance deteriorates by an annualized 13.68% during the five-year period following the IPO.[22] The reduction in fund performance is economically meaningful and statistically significant at the one percent level. At the same time and relative to comparable firms, listed firm risk-adjusted performance wanes by an annualized 8.04%. These results suggest that the drop in performance may be driven more by the smaller funds managed by listed firms.

Do the lower alphas of listed firms translate into lower fee revenues for these asset management companies? We find that despite the deterioration in performance, relative to their unlisted competitors, listed firms harvest fee revenues that are US$6.36 million or 27.04% greater post listing. This is because compared to the control group, they grow their AUM by US$340.95 million or 61.49% during the same period. The surge in firm AUM stems less from organic growth in existing fund AUM and more from the launch of new funds post listing. After listing, existing fund AUM ratchets up by US$144 million, but the AUM increase is still lower than that for funds in the control group. At the same time, the number

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[21]Inferences do not change when we use a propensity score-matching model to match event funds and firms with non-event funds and firms.

[22]To reconcile the results from the event study (Table 4) with those of the portfolio sort (Table 2), we rerun the portfolio sort with only funds from the event study sample, i.e., funds with at least 24 months of return information pre- and post-firm IPO. The results indicate that for this group of funds, the alpha spread between funds managed by unlisted firms and those managed by listed firms is 11.03% per annum. This is consistent with the magnitude of the alpha spread reported in Table 4.

of funds per firm increases from 3.34 to 6.37, which is 2.77 funds per firm greater than for comparable firms.

Are listed firms more likely to conceive additional hedge funds after controlling for other factors that drive fund launch? To investigate, we estimate probit regressions on the probability of launching a new hedge fund in a given year. We include as independent variables an indicator variable for whether a firm is listed, as well as controls for past firm performance over the previous year, the number of funds already launched by the firm, standard deviation of monthly firm returns over the previous year, aggregate firm flow over the previous year, firm management fee, firm performance fee, firm notice period, firm minimum investments, firm age, and the log of firm size. Firm management fee is simply the value-weighted average management fee of the funds managed by the firm. The other firm attributes are constructed analogously.

The results reported in Table 5 suggest that firms are more likely to raise additional funds post-IPO. The marginal effects from the regression with firm return as a control variable indicate that listing increases the probability that a firm will launch a new fund by 3.27 percentage points. In any given year, the unconditional probability that a firm will launch a new fund is 10.67 percentage points; so listing increases the chance that a firm will raise a new fund by 30.65%. The coefficient estimates on the other independent variables yield interesting insights. They indicate that firms that are larger, are younger, set more investor-friendly redemption notification terms, and conceived many funds before are more likely to launch additional funds.

3.3. Conflicts between investment capital and control

The results in the previous subsection are consistent with the view that principal-agent problems drive fund behavior around firm IPOs. To investigate further, we stratify funds based on metrics that moderate conflicts between fund management and investors at hedge funds, and redo the portfolio sorts. First, we condition on fund manager total delta. Agarwal, Daniel,

and Naik (2009) argue that managers who are operating close to their high watermarks, and hence have higher manager total deltas, are more aligned with their investors. Second, we condition on the Ozik and Sadka (2015) governance measure, which is based on whether a fund is an onshore fund, features a high watermark, is registered with the SEC, was audited in the past, and employs a top auditor or legal counsel.[23] As per Ozik and Sadka (2015), we group funds into high aggregate governance funds, i.e., funds with aggregate governance scores greater than or equal to four (out of five), and low aggregate governance funds, i.e., funds with aggregate governance scores less than or equal to one (out of five). Third, we condition on fund manager personal investment, which aligns manager interests with those of investors and has been used by researchers to study conflicts of interest in hedge funds (see, for example, Brown et al. (2009)). Higher manager total deltas, better fund governance, and manager personal investment, should ameliorate the agency problems faced by listed asset management firms and therefore help narrow the investment performance gap between listed and unlisted firms.

We report in Panels A to C of Table 6 the results from the baseline portfolio sorts after stratifying funds by the above-mentioned metrics. We find that the alpha spreads between funds managed by listed and unlisted firms are smaller for funds with greater incentive alignment, i.e., funds with high manager total deltas, better governance, and manager co-investment. These results lend credence to the view that the underperformance of listed firms is partly driven by the conflicts between control and investment capital.

[Insert Tables 6 and 7 here]

3.4. Conflicts between investment capital and ownership

Is the underperformance of funds managed by listed firms also driven by the conflicts between fund investors and firm shareholders? The short-termist pressures associated with stock

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[23]See http://en.wikipedia.org/wiki/List_of_100_largest_law_firms_by_revenue for the top law firms and http://www.accountingmajors.com/accountingmajors/articles/top100.html for the top accounting firms.

listings could induce the underperformance of public asset management firms. An emphasis on short-term quarterly earnings at public investment firms would hamper their ability to correct long horizon mispricings in the market (Stein, 2005), forcing them to focus instead on short horizon mispricings, thereby limiting investment opportunity and reducing alpha.

To test, we follow Asker, Farre-Mensa, and Ljungqvist (2015) and compute earnings response coefficients or ERCs (Ball and Brown, 1968; Easton and Zmijewski, 1989). ERCs measure the sensitivity of stock returns to firm earnings. We compute ERCs using firm level regressions for all listed firms with at least eight quarters of earnings information from I/B/E/S. To increase the precision of our estimates and conserve the number of observations, firm ERCs are estimated using information that span the full sample period. If short-termism explains fund underperformance, then we should find that the underperformance is concentrated in funds managed by firms with high ERCs.

Table 7 reports the excess returns and alphas of portfolios of hedge funds managed by listed firms with high versus low ERCs. The sample period for the sort extends from January 2000 to December 2013 and corresponds to the period where there are at least ten funds in each of the high ERC and low ERC fund portfolios. We find indeed that high ERC firms drive the underperformance of funds managed by listed firms. Specifically, after adjusting for covariation with the Fung and Hsieh (2004) seven factors, the high ERC portfolio (Portfolio A1) underperforms the unlisted portfolio (Portfolio B) by 2.68% per year (t-statistic = 3.13) while the low ERC portfolio (Portfolio A2) delivers a risk-adjusted return that is statistically indistinguishable from that of the unlisted portfolio.

3.5. Separation of investment capital, ownership, and control post-IPO

If the separation of investment capital, ownership, and control truly drives the underperformance of funds managed by listed firms, we should observe that the results are strongest for funds belonging to public firms where the founders unloaded most of their stakes. In such firms, the level of insider ownership will be low. Therefore, we argue that public firms

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with few insider owners and few closely held shares experience the greatest separation of ownership, control, and investment capital. Next, we sort funds managed by listed firms based on the number of insider owners and the number of closely held shares. We obtain data on insider owners from Form ADV Schedule A and B, and information on closely held shares from Datastream. We define an insider owner as a member of the fund management team who owns, either directly or indirectly, at least five percent of the fund management company.

The sort results reported in Panels D and E of Table 6 indicate that, relative to funds managed by unlisted firms, hedge funds managed by listed firms with no insider owners underperform by 2.58% per annum (t-statistic = 3.16) after adjusting for risk, while those managed by listed firms with at least one insider owner outperform by 0.05% per annum (t-statistic = 0.02) after adjusting for risk. Similarly, relative to funds managed by unlisted firms, funds managed by listed firms with few closely held shares (as a proportion of the total number of shares outstanding) underperform more than do funds managed by listed firms with many closely held shares. The risk-adjusted underperformance of the former is 3.44% per annum (t-statistic = 5.07) while that of the latter is 2.31% per annum (t-statistic = 2.67). These results buttress the conflicts of interest view.

To further investigate the view, we sort funds managed by listed firms based on whether they reveal in their IPO prospectuses that their existing shareholders will cash out. We obtain IPO prospectuses from the Perfect Information filings database. Out of the 41 investment firms for which we have prospectuses, 23 firms reveal either directly or indirectly that existing shareholders will cash out during the IPO. The results reported in Panel F of Table 6 indicate that, in line with the conflicts of interest explanation, the underperformance is driven by listed firms whose existing shareholders cashed out during the IPO. After adjusting for risk, funds managed by listed firms where existing shareholders cashed out underperform funds managed by unlisted firms by 4.58% per year (t-statistic = 2.86), while those managed by listed firms where existing shareholders did not cash out underperform their unlisted

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competitors by a modest 0.27% per year (t-statistic $= 0.35$).

3.6. Asset gathering

How do the conflicts of interest that surface post-IPO engender fund underperformance? Fund management companies that go public may underperform as they are focused on gathering assets and therefore are either less motivated to build on their successful track records (since they are busy exploiting them) or are simply distracted by the demands associated with growing their businesses. Researchers have shown that manager motivation (Agarwal, Daniel, and Naik, 2009; Aggarwal and Jorion, 2010) and inattention (Lu, Ray, and Teo, 2016) impact performance. Recent work has argued that in the absence of personal capital there are strong direct (Yin, 2016) and indirect (Lim, Sensoy, and Weisbach, 2016) incentives that drive hedge fund managers to raise capital. Equity markets tend to reward revenue growth and for investment firms, revenue growth generally corresponds to growth in AUM. Moreover, capital markets value stable and predictable earnings. This may encourage asset management firms to trade volatile performance fee revenues for relatively stable management fee revenues by growing AUM (Pozen and Clay, 2012). Indeed, we find from the results in Table 4 that relative to their unlisted counterparts, listed firms raise more capital and are more likely launch new funds.

We argue that for the asset gathering view to hold, underperformance must be concentrated amongst funds that have the greatest scope or potential for gathering assets. Hedge funds that take on lower liquidity risk, are less susceptible to capacity constraints (Berk and Green, 2004), and therefore have greater potential for gathering assets. Therefore, we sort funds based on their liquidity risk as captured by fund historical Pástor and Stambaugh (2003) liquidity beta and redo the baseline portfolio sorts. Fund historical liquidity beta is estimated in the presence of the factors from the Fung and Hsieh (2004) model, using the past 24 months of data. Five hedge fund groups are formed every January 1, starting in 1996, based on fund historical Pástor and Stambaugh liquidity beta. Next, for each of these

five groups, hedge funds are sorted into two portfolios based on fund management company listing status. The post-formation returns on these ten portfolios during the next 12 months are linked across years to form a single return series for each portfolio.

Table 8 reports the baseline portfolio sorts on five groups of funds stratified by fund historical Pástor and Stambaugh (2003) liquidity beta. Consistent with the asset gathering view, the performance differential between funds managed by listed firms and those managed by unlisted firms is greatest for funds that take on lower liquidity risk and therefore, have fewer constraints on growth. Specifically, after adjusting for covariation with the Fung and Hsieh (2004) seven factors, the underperformance of the funds managed by listed firms (relative to those managed by unlisted firms) is 6.66% per annum (t-statistic $=4.81$) for funds in the lowest liquidity beta quintile but only 2.89% per annum (t-statistic $=1.64$) for funds in the highest liquidity beta quintile.

The advantage of our set up is that it captures ex-ante the intent to raise capital. Actual capital raised ex-post is less useful for our purposes since it is both a function of past fund performance (Agarwal, Green, and Ren, 2017) via the flow-performance relationship and a determinant of future fund performance via capacity constraints. Nonetheless, in untabulated results, we also sort funds managed by listed firms into portfolios based on the firm annualized AUM percentage growth post IPO and find that the underperformance is concentrated in funds managed by firms that have aggressively raised capital post IPO. Funds managed by firms with above median AUM growth post IPO underperform funds managed by unlisted firms by 3.21% per annum (t-statistic $=3.96$) after adjusting for risk. Conversely, funds managed by firms with below median AUM growth post IPO only underperform funds managed by unlisted firms by 0.99% per annum (t-statistic $=0.84$) after accounting for risk.

Short-termist pressures can also induce excessive asset gathering since asset gathering boosts current fee revenues (or current firm earnings) at the expense of future returns (or future earnings). In results that are available upon request, we find using a probit regression on the probability of fund launch post firm listing that, in any given year, high ERC firms

are 37% more likely to launch new funds than are low ERC firms. Furthermore, high ERC firms raise more capital than do low ERC firms. Indeed, in spite of their underperformance, high ERC firms manage on average US$789.47 million more than do low ERC firms.

[Insert Tables 8 and 9 here]

3.7. Operational risk

Why do investors continue to subscribe to hedge funds managed by listed firms in light of the underperformance? One view is that given the transparency that is required of a publicly listed firm, funds managed by listed firms exhibit lower operational risk. Therefore, investors in such funds may be trading investment performance for lower operational risk.

To investigate, we leverage on work by Bollen and Pool (2012) who identify performance flags that are associated with the risk that a hedge fund is a fraud. We focus on the four performance flags with the highest rejection rates for reporting violations in the Bollen and Pool (2012) sample.[24] They are (i) Kink, which is triggered when a fund reports a return distribution with a discontinuity at zero, (ii) Maxrsq, which is triggered when a fund has an adjusted R-squared that is not significantly different from zero, (iii) % Negative, which is activated when a fund reports a low number of negative returns, (iv) % Repeat, which is activated when a fund reports a high number of repeated returns. We report in Table 9, the percentage of hedge funds grouped by firm listing that set off any one of the above-mentioned performance flags at the ten percent significance level, as well as the difference in rejection frequencies between the two groups of funds.

Table 9 indicates that hedge funds managed by listed firms are less likely to set off three of the four performance flags. Specifically, funds managed by listed firms compare favorably to funds managed by unlisted firms based on Kink, % Negative, and % Repeat. They are 3.6% less likely to report distributions with a discontinuity at zero, 3.2% less likely to report a low number of negative returns, and 7.7% less likely to report a high number of repeated

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[24]See Panel B of Table 5 in Bollen and Pool (2012).

returns. Moreover, the differences in rejection rates are statistically significant at the one percent level for these three indicators of fraud risk.

3.8. Endogeneity of firm listing status

Does the endogeneity of firm listing engender the underperformance of hedge funds managed by public firms? Systematic differences may exist between firms that list and those that do not. These differences could impact both the propensity to list and fund investment performance. The event study in Section 3.2., by analyzing within firm variation in listing status, addresses concerns that the spread in investment performance may be driven by time-invariant differences between private and public firms. Furthermore, the differences-in-differences methodology that we employ in the event study allows us to ameliorate concerns that observed time-varying differences between listed and unlisted firms explain our results.

Still, the event study leaves open the possibility that unobserved time-varying differences between public and private firms might simultaneously affect the decision to go public and fund investment performance. To address this concern, we conduct an instrumental variables analysis. The instrument that we use, i.e., firm strategy flow at founding, is motivated by Asker, Farre-Mensa, and Ljungqvist's (2015) choice of venture capital supply at founding to instrument for firm listing status. Firm strategy flow at founding is the strategy flow of the first fund conceived by the firm in the two-year period post firm inception.[25] We argue that the ability to attract capital at inception allows a firm to quickly reach critical mass and sets the stage for a possible public listing several years later. The first-stage results in Column 1 of Table 10 confirm this prediction. The supply of capital around the time of firm founding is a positive and significant predictor of a firm's listing status with an F-statistic of 27.30.

The exclusion restriction is that conditional on covariates, firm strategy flow in the two-

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[25]Specifically, Asker, Farre-Mensa, and Ljungqvist (2015) use as their instrument the total number of firms receiving first-round venture capital funding in a firm's headquarter state two years after a firm was funded. Likewise, we use firm strategy flow in the two-year period after firm inception. We obtain similar inferences when we use firm strategy flow during the one-year period before inception or firm strategy flow during the one-year period after inception as alternative instruments.

year period after inception only affects fund investment performance through its impact on a firm's listing status. One concern is that early firm strategy flow may drive future strategy returns via strategy-level capacity constraints (Naik, Ramadorai, and Strömqvist, 2007). However, the median firm age at listing in our sample of eight years helps alleviate this concern.[26] Capital accumulation between six to eight years earlier should have little impact on a fund's investment performance today. As in Acemoglu, Johnson, and Robinson (2001) and Glaeser, Kerr, and Kerr (2015), we rely on the separation of time to motivate the exclusion requirement. In unreported results, we find that higher strategy flow over the last two years is not a reliable harbinger of lower future strategy returns. Therefore, our use of strategy flow as opposed to AUM allows us to sidestep concerns related to strategy-level capacity constraints.

In Columns 2 and 3 of Table 10, we report the second stage results for the fund return and alpha equations, respectively. After instrumenting for firm listing status, hedge funds managed by publicly listed firms continue to underperform those managed by private firms. A comparison to the equivalent naïve OLS estimates in Columns 4 and 5 of Table 10 indicates that the point estimates are larger in absolute terms after instrumenting for listing status. These findings suggest that endogeneity is unlikely to drive our results.

[Insert Tables 10 and 11 here]

4. Robustness tests

In this section, we conduct a battery of robustness tests to ascertain the strength of our empirical results.

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[26]For the instrumental variables analysis, to accommodate our choice of instrument, we remove all firms that list within two years of firm inception.

4.1. Backfill bias

Funds managed by unlisted firms may backfill their returns more often than do funds managed by listed firms. In response to concerns about backfill bias raised by Bhardwaj, Gorton, and Rouwenhorst (2014) and others, we confine the analysis to TASS and HFR funds for which we have the date that the fund listed on the databases (only TASS and HFR provide this information). Next, we redo the baseline Table 2 portfolio sort for this subset of funds and for those returns at or after the respective fund listing date. As there are not enough funds with returns post-listing in the cross-section during the earlier years, we perform the analysis for the period after 1996. As shown in Panel A of Table 11, our inferences remain unchanged when we control for backfill bias in this fashion. As an alternative, we also remove the first 24 months of returns for all funds to adjust for backfill and incubation bias. The portfolio alpha spread remains economically meaningful and statistically significant at the one percent level.

4.2. Serial correlation

Serial correlation in fund returns could arise from linear interpolation of prices for infrequently traded securities, the use of smoothed broker dealer quotes, or deliberate performance-smoothing behavior. This could inflate some of the test statistics that we use to make inferences. To allay such concerns, we unsmooth fund returns using the algorithm of Getmansky, Lo, and Makarov (2004) and redo the Table 2 portfolio sort. The results reported in Panel B of Table 11 indicate that our findings are not driven by serial correlation.

4.3. Pre-fee returns

Hedge fund returns are reported net of fees. If funds managed by listed firms charge higher fees than do funds managed by unlisted firms, this may explain the underperformance of the former. To check, we follow the algorithm outlined in Appendix A of Agarwal, Daniel,

and Naik (2009) and back out pre-fee fund returns. As shown in Panel C of Table 11, the baseline portfolio sort spreads are even greater when we analyze pre-fee fund returns.

4.4. Dynamic risk exposures

One concern is that the beta loadings of the fund portfolios might not stay constant over time. As a result, the risk-adjustment may not be accurate. To account for dynamic factor loadings, we calculate the factor loadings using a rolling 24-month window and use those factor loadings to calculate abnormal returns one month forward. The results reported in Panel D of Table 11 indicate that inferences remain unchanged after catering for dynamic risk exposures.

4.5. Omitted risk factors

The presence of additional risk factors could cloud inferences from the portfolio sort analysis. Relative to funds managed by listed firms, those managed by unlisted firms could be loading up more on some risk factor (e.g., emerging markets) that did well over the sample period. To ameliorate such concerns, we augment the Fung and Hsieh (2004) model with an emerging markets factor derived from the MSCI Emerging Markets Index return. To cater for exposure to option-based strategies (Mitchell and Pulvino, 2001), we also augment the Fung and Hsieh (2004) model with the out-of-the-money S&P 500 call and put option-based factors from the Agarwal and Naik (2004) model. Finally, to account for exposure to liquidity risk (Teo, 2011; Aragon and Strahan, 2012; Sadka, 2012), we supplement the Fung and Hsieh model with the Pástor and Stambaugh (2003) liquidity factor. The results presented in Panels E, F, and G of Table 11 indicate that our baseline results are not driven by the presence of omitted risk factors.

4.6. Fund termination

There are concerns that because funds that terminated their operations may have stopped reporting returns prematurely, the portfolio alphas are biased upward. To allay such concerns, we assume that, for the month after a fund liquidates, its return is –10%. Thereafter, money is reallocated to the remaining funds in the portfolio. As shown in Panel H of Table 11, with the adjustment for fund termination, the alphas of the portfolios in the baseline sort fall but the spread remains economically and statistically significant. We also experiment with more extreme termination returns of –20% and –30%, and obtain qualitatively similar results.

4.7. Subsample analysis

To understand how the underperformance of funds managed by listed firms varies over time, we split the sample period into two subperiods: January 1994 to December 2003 and January 2004 to December 2013. Next, we redo the Table 2 portfolio sort for each subperiod. The results in Panels I and J of Table 11 indicate that our findings are robust across subperiods.

4.8. Manager manipulation of fund returns

Funds managed by listed firms, due to the higher level of transparency required of them, may be less inclined to inflate their returns than are funds managed by unlisted firms. This may explain the apparent underperformance of the former when we analyze self-reported returns from commercial hedge fund databases. To address this concern, we construct firm returns from firm stock holdings reported in the Thomson Financial 13-F holdings data. We argue that there is less scope for manipulation in the verifiable 13-F filings data that are reported to the SEC. The baseline portfolio sort results from returns derived from stock holdings data are presented in Panel L of Table 11. Since these results are constructed at the firm level, we also present the baseline portfolio sort results from firm returns in Panel K

of Table 11 for comparison. The number of firms at the end of our sample falls by 88% when we analyze the sample of firm returns derived from stock holdings data.[27] Nonetheless, the results reported in Panel L of Table 11 indicate that our findings are robust to adjusting for manager manipulation of hedge fund returns.

Another way to address manager manipulation is to use the manipulation-proof performance measure (henceforth MPPM) proposed by Goetzmann et al. (2007). In that effort, we compute MPPM for the hedge funds in our sample based on rolling 24 months of return information and redo the baseline Eq. (1) regressions with fund MPPM in place of fund alpha. We find that, for all values of $\rho \in \{2, 3, 4\}$ used in the computation of MPPM, the coefficient estimates on *LISTED* in the OLS and Fama and MacBeth (1973) regressions are positive and statistically different from zero at the one percent level.

5. Conclusion

Our empirical results challenge the view that asset management firms go public to enhance investment performance. They indicate that, for an asset management firm, the process of going public separates investment capital from ownership and control, precipitating conflicts of interest that hurt investors.

We show that hedge funds managed by listed asset management firms consistently underperform funds managed by their unlisted competitors after adjusting for risk. The results are partly driven by problems that surface from the separation of control and investment capital in a publicly listed firm. Hedge funds that align management and investment capital, such as funds with high manager total deltas, better governance, and manager co-investment, underperform less when their management companies go public. The results are also driven

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[27]This is because our sample of hedge funds also includes funds that invest exclusively in non-US equities such as European focused funds as well as small equity long/short funds that have less than US$100 million in US equity exposure and are therefore not required to report their quarterly holdings to the SEC. In addition, the sample covers other funds that, given their investment style mandate, do not necessarily have single-stock exposure. Examples of such funds include fixed income, distressed debt, and macro funds, as well as commodity trading advisors.

by problems that spring from the separation of ownership and investment capital. Asset management firms that are especially prone to short-termist pressures from shareholders underperform more than do firms that are insulated from such pressures. Consistent with the overall conflicts of interest view, listed management firms with greater separation of ownership, control, and investment capital exhibit more acute underperformance. Relative to funds managed by unlisted firms, those managed by listed firms with low insider ownership and founders who cashed out underperform more. The conflicts of interest at hedge funds managed by listed firms translate into a tendency to raise capital by growing the AUM of new products. These capital raising activities in turn engender underperformance. We show that funds that have the greatest scope for asset gathering, as a consequence of their low liquidity risk levels, also exhibit the most severe underperformance. By subscribing to funds managed by listed firms, investors trade investment performance for lower operational risk.

The empirical results in this paper enrich our understanding of agency forces at work in the asset management industry. Press coverage on the public listings by asset managers has alluded to the problems that arise from the separation of control, ownership, and investment capital. Therefore, do fund investors appreciate and internalize the conflicts of interest that transpire at publicly-listed asset management firms? We find that some hedge fund investors appear to do so. In results available upon request, we show that fund of hedge funds (henceforth FOFs) with high past Fung and Hsieh (2004) alpha t-statistics subsequently outperform FOFs with low past alpha t-statistics. Moreover, the former tend to load up less on listed hedge funds than do the latter.[28] These results provide prima facie evidence that skilled investors may be cognizant of the conflicts of interest that afflict hedge funds managed by listed firms, and judiciously avoid such funds.

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[28]Specifically, the alpha spread between the top and bottom deciles of FOFs sorted on past two-year alpha t-statistics and held for one year is 3.12% per annum (t-statistic = 3.17). The loading on the listed hedge fund portfolio for the FOF decile spread is –0.38 (t-statistic = –3.53).

References

Acemoglu, D., Johnson, S., Robinson, J., 2001. The colonial origins of comparative development: an empirical investigation. American Economic Review 91, 1369–1401.

Agarwal, V., Daniel, N., Naik, N. Y., 2009. Role of managerial incentives and discretion in hedge fund performance. Journal of Finance 64, 2221–2256.

Agarwal, V., Daniel, N., Naik, N. Y., 2011. Do hedge funds manage their reported returns? Review of Financial Studies 24, 3281–3320.

Agarwal, V., Green, T.C., Ren, H., 2017. Alpha or beta in the eye of the beholder: what drives hedge fund flows? Journal of Financial Economics, forthcoming.

Agarwal, V., Naik, N. Y., 2004. Risk and portfolio decisions involving hedge funds. Review of Financial Studies 17, 63–98.

Aggarwal, R. K., Jorion, P., 2010. The performance of emerging hedge funds and managers. Journal of Financial Economics 96, 238–256.

Aragon, G. 2007. Share restrictions and asset pricing: evidence from the hedge fund industry. Journal of Financial Economics 83, 33–58.

Aragon, G., Nanda, V., 2017. Strategic delays and clustering in hedge fund reported returns. Journal of Financial and Quantitative Analysis 52, 1–35.

Aragon, G., Strahan, P., 2012. Hedge funds as liquidity providers: evidence from the Lehman bankruptcy. Journal of Financial Economics 103, 570–587.

Asker, J., Ferra-Mensa, J., Ljungqvist, A., 2015. Corporate investment and stock market listing: a puzzle? Review of Financial Studies 28, 342–390.

Ball, R., Brown, P., 1968. An empirical evaluation of accounting income numbers. Journal of Accounting Research 6, 159–178.

Berk, J., Green, R., 2004. Mutual fund flows and performance in rational markets. Journal of Political Economy 112, 1269–1295.

Bernstein, S., 2015. Does going public affect innovation? Journal of Finance 70, 1365–1403.

Bhardwaj, G., Gorton, G., Rouwenhorst K.G., 2014. Fooling some of the people all of the time: the inefficient performance and persistence of commodity trading advisors. Review of Financial Studies 27, 3099–3132.

Bollen, N., Pool, V., 2009. Do hedge fund managers misreport returns? Evidence from the

pooled distribution. Journal of Finance 64, 2257–2288.

Bollen, N., Pool, V., 2012. Suspicious patterns in hedge fund returns and the risk of fraud. Review of Financial Studies 25, 2673–2702.

Brown, S., Goetzmann, W., Liang, B., Schwarz, C., 2009. Estimating operational risk for hedge funds: the ω-score. Financial Analysts Journal 65, 43–53.

Brunnermeier, M.K., Nagel, S., 2004. Hedge funds and the technology bubble. Journal of Finance 59, 2013–2040.

Cohen, R., Delacey, B., 2005. Protégé Partners: the capacity challenge. Harvard Business School Case 9-205-100.

Easton, P., Zmijewski, M., 1989. Cross-sectional variation in the stock market response to accounting earnings announcements. Journal of Accounting and Economics 11, 117–141.

Fama, E., French, K., 1993. Common risk factors in the returns on stocks and bonds. Journal of Financial Economics 33, 3–56.

Fama, E., MacBeth, J., 1973. Risks, return, and equilibrium: empirical tests. Journal of Political Economy 81, 607–636.

Ferris, S.P., Yan, X. 2009. Agency costs, governance, and organizational forms: evidence from the mutual fund industry. Journal of Banking and Finance 33, 619–626.

Fung, W., Hsieh, D., 2001. The risk in hedge fund strategies: theory and evidence from trend followers. Review of Financial Studies 14, 313–341.

Fung, W., Hsieh, D., 2004. Hedge fund benchmarks: a risk based approach. Financial Analysts Journal 60, 65–80.

Fung, W., Hsieh, D., 2009. Measurement biases in hedge fund performance data: an update. Financial Analysts Journal 60, 36–38.

Getmansky, M., Lo, A., Makarov, I., 2004. An econometric model of serial correlation and illiquidity of hedge fund returns. Journal of Financial Economics 74, 529–610.

Glaeser, E., Kerr, S., Kerr, W., 2015. Entrepreneurship and urban growth: an empirical assessment with historical mines. Review of Economics and Statistics 97, 498–520.

Goetzmann, W., Ingersoll, J., Spiegel, M., Welch, I., 2007. Portfolio performance manipulation and manipulation-proof performance measures. Review of Financial Studies 20, 1503–1546.

Graham, J., Harvey, C., Rajgopal, S., 2005. The economic implications of corporate financial reporting. Journal of Accounting and Economics 40, 3–73.

Hsu, H.C., Reed, A., Rocholl, J., 2010. The new game in town: competitive effects of IPOs. Journal of Finance 65, 495–528.

Jain, B.A., Kini, O., 1994. The post-issue operating performance of IPO firms. Journal of Finance 49, 1699–1726.

Jensen, M., 1989. Eclipse of the public corporation. Harvard Business Review (September-October), 61–74.

Jensen, M., Meckling, W., 1976. Theory of the firm: managerial behavior, agency costs, and ownership structure. Journal of Financial Economics 3, 305–360.

Joenväärä, J., Kosowski, R., Tolonen, P., 2017. Hedge fund performance: what do we know? Unpublished working paper. Imperial College.

Jorion, P., Schwarz, C., 2014. Are hedge fund managers systematically misreporting? Or not? Journal of Financial Economics 111, 311–327.

Kedia, S., Rajgopal, S., Zhou, X., 2014. Did going public impair Moody's credit ratings? Journal of Financial Economics 114, 293–315.

Liang, B., 2000. Hedge funds: the living and the dead. Journal of Financial and Quantitative Analysis 35, 309–326.

Lim, J., Sensoy, B., Weisbach, M., 2016. Indirect incentives of hedge fund managers. Journal of Finance 71, 871–918.

Loughran, T., Ritter, J.R., 1995. The new issues puzzle. Journal of Finance 50, 23–51.

Lu, Y., Ray, S., Teo, M., 2016. Limited attention, marital events, and hedge funds. Journal of Financial Economics 122, 607–624.

Mitchell, M., Pulvino, T., 2001. Characteristics of risk in risk arbitrage. Journal of Finance 56, 2135–2175.

Mullally, K., 2017. Outside ownership in the hedge fund industry. Unpublished working paper. University of Alabama.

Naik, N., Ramadorai, T., Strömqvist, M., 2007. Capacity constraints and hedge fund strategy returns. European Financial Management 13, 239–256.

Newey, W., West, K., 1987. A simple, positive semi-definite, heteroscedastic and autocorrelation consistent covariance matrix. Econometrica 55, 703–708.

Ozik, G., Sadka, R., 2015. Skin in the game versus skimming the game: governance, share restrictions, and insider flows. Journal of Financial and Quantitative Analysis 50, 1293–1319.

Pástor, L., Stambaugh, R., 2003. Liquidity risk and expected stock returns. Journal of Political Economy 111, 642–685.

Poterba, J., Summers, L., 1995. A CEO survey of U.S. companies' time horizons and hurdle rates. Sloan Management Review 37, 43–53.

Pozen, R.C., Clay, T.M., 2012. Man Group (A). Harvard Business School Case 9-312-128.

Sadka, R., 2012. Hedge fund performance and liquidity risk. Journal of Investment Management 10, 60–72.

Stein, J., 2005. Why are most funds open-end? Competition and the limits to arbitrage. Quarterly Journal of Economics 120, 247–272.

Sun, Z., Wang, A., Zheng, Lu, 2012. The road less traveled: strategy distinctiveness and hedge fund performance. Review of Financial Studies 25, 96–143.

Teo, M., 2011. The liquidity risk of liquid hedge funds. Journal of Financial Economics 100, 24–44.

White, H., 1980. A heteroskedasticity-consistent covariance matrix estimator and a direct test for heteroskedasticity. Econometrica 48, 817–838.

Wooldridge, J., 2002. Econometric Analysis of Cross Section and Panel Data. MIT Press, Cambridge, Massachusetts, USA.

Yan, S., Zheng, L., 2017. Does conflict of interest matter? Evidence from the hedge fund industry. Unpublished working paper. University of Missouri.

Yin, C. 2016. The optimal size of hedge funds: conflict between investors and fund managers. Journal of Finance 71, 1857–1894.
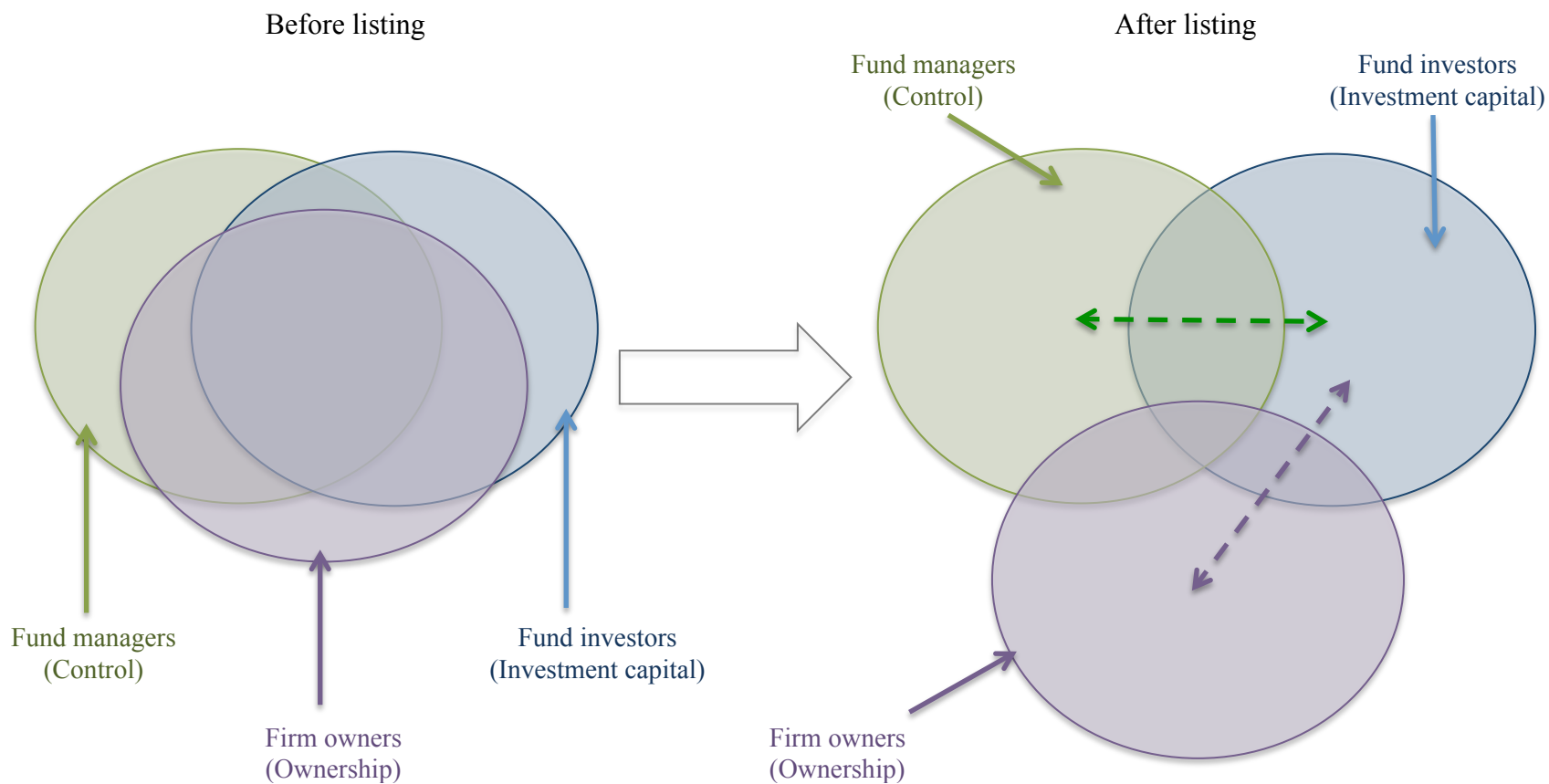
Fig 1. Separation of ownership, control, and investment capital when an asset management firm goes public. Typically, a privately held asset management firm is controlled by its founder-owners, who also invest a substantial percentage of their net worth in the funds managed by the firm. This engenders a tight alignment between ownership, control, and investment capital. Going public, weakens this alignment as the founders of the firm sell-out to new shareholders who neither invest alongside the limited partners nor manage the hedge funds run by the firm, leading to the separation of ownership from control and investment capital. Moreover, the founders may not invest the substantial proceeds from the IPO in the funds managed by the firm, thereby distancing control from investment capital. The dashed double arrow connectors denote conflicts of interest that impact fund investors.
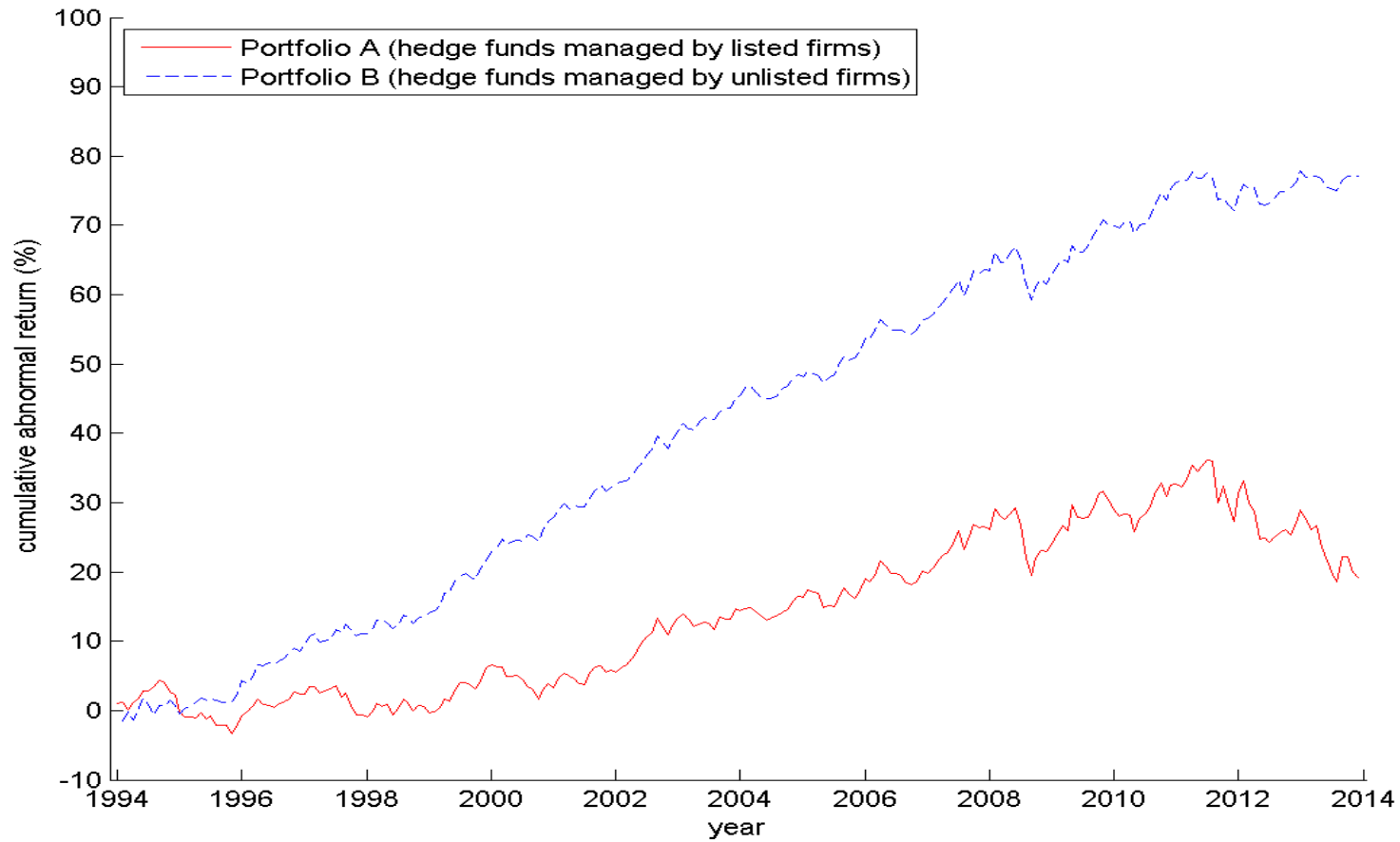
Fig 2. Cumulative abnormal returns of hedge funds managed by listed firms versus hedge funds managed by unlisted firms. Equal-weighted portfolios of hedge funds are constructed by sorting funds based on whether they are managed by listed firms. Cumulative abnormal return is the difference between a portfolio's excess return and its factor loadings multiplied by the Fung and Hsieh (2004) risk factors. Factor loadings are estimated over the entire sample period. The sample period is from January 1994 to December 2013.

Table 1
Summary statistics

This table reports the number of hedge funds and the total hedge fund assets managed by listed firms and by unlisted firms. We determine fund management companies' public listing status by leveraging on several sources: S&P Capital IQ, the SEC's Investment Adviser Public Disclosure website, Factiva, and the fund management companies' websites. Specifically, for each fund management company, we perform a search in S&P Capital IQ and SEC's Investment Adviser Public Disclosure, which provide information about the company's current and prior corporate parents. Once we identify a parent and subsidiary relationship, we obtain the effective public listing date for the fund management company by checking the "M&A/Private Placements" section in S&P Capital IQ, conducting a Factiva news search, and perusing the corporate history from the fund management company's website. The sample period is from January 1994 to December 2013.

	Listed firms			Unlisted firms		
Year	Number of management companies	Number of hedge funds	Total AUM (US$m)	Number of management companies	Number of hedge funds	Total AUM (US$m)
1994	12	39	$2,548	789	1,187	$60,808
1995	20	68	$4,241	886	1,423	$78,583
1996	27	86	$6,822	1,087	1,758	$97,291
1997	32	109	$10,949	1,253	2,069	$138,441
1998	34	100	$11,115	1,366	2,275	$148,410
1999	42	124	$17,539	1,400	2,267	$183,196
2000	49	144	$22,425	1,553	2,590	$210,932
2001	51	156	$27,770	1,682	2,881	$261,629
2002	57	184	$25,256	1,769	3,034	$289,290
2003	65	245	$35,956	1,999	3,522	$421,120
2004	72	295	$53,008	2,215	4,021	$571,768
2005	83	328	$60,948	2,404	4,466	$633,386
2006	100	427	$86,705	2,517	4,652	$834,923
2007	111	523	$123,558	2,567	4,746	$1,041,548
2008	109	451	$75,800	2,362	4,157	$710,135
2009	115	543	$99,171	2,372	4,109	$721,271
2010	110	584	$104,829	2,252	3,915	$811,890
2011	110	700	$125,195	2,047	3,590	$823,782
2012	118	873	$169,988	2,197	3,915	$916,657
2013	113	856	$199,335	2,083	3,662	$995,804

Table 2
Portfolio sorts on fund management company listing status

Every January, hedge funds are sorted into two portfolios based on whether they are managed by listed firms or by unlisted firms. The post-formation returns on the two portfolios over the next 12 months are linked across years to form a single return series for each portfolio. Portfolio A is the equal-weighted portfolio of hedge funds managed by listed firms. Portfolio B is the equal-weighted portfolio of hedge funds managed by unlisted firms. In Panel A, we report the results for the full sample of hedge funds. In Panel B, we report the results for hedge funds with AUM greater than US$20 million. Hedge fund portfolio performance is estimated relative to the Fung and Hsieh (2004) factors. The Fung and Hsieh (2004) factors are S&P 500 return minus risk free rate (SNPMRF), Russell 2000 return minus S&P 500 return (SCMLC), change in the constant maturity yield of the U.S. 10-year Treasury bond appropriately adjusted for the duration (BD10RET), change in the spread of Moody's BAA bond over 10-year Treasury bond appropriately adjusted for duration (BAAMTSY), bond PTFS (PTFSBD), currency PTFS (PTFSFX), and commodities PTFS (PTFSCOM). The *t*-statistics, derived from White (1980) standard errors, are in parentheses. The sample period is from January 1994 to December 2013. * Significant at the 5% level; ** Significant at the 1% level.

Portfolio	Excess Return (pct / year)	Alpha (pct / year)	SNPMRF	SCMLC	BD10RET	BAAMTSY	PTFSBD	PTFSFX	PTFSCOM	Adj. R2
Panel A: All hedge funds										
Portfolio A (hedge funds managed by listed firms)	4.29*	0.96	0.32**	0.13**	0.11**	0.20**	-0.01	0.01	0.01	0.60
	(2.41)	(0.90)	(14.35)	(4.83)	(2.71)	(3.99)	(-1.18)	(1.89)	(0.80)	
Portfolio B (hedge funds managed by unlisted firms)	6.18**	3.86**	0.24**	0.14**	0.04	0.17**	0.00	0.01**	0.01*	0.64
	(4.32)	(4.95)	(14.91)	(6.86)	(1.21)	(4.59)	(-0.79)	(3.56)	(2.23)	
Spread portfolio (A - B)	-1.89**	-2.89**	0.08**	0.00	0.08**	0.03	0.00	0.00	-0.01	0.22
	(-3.13)	(-4.73)	(6.10)	(-0.28)	(3.20)	(1.13)	(-1.06)	(-1.22)	(-1.43)	
Panel B: Hedge funds with AUM greater than US$20 million										
Portfolio A (hedge funds managed by listed firms)	3.94*	0.63	0.32**	0.11**	0.10*	0.21**	-0.01	0.01	0.01	0.61
	(2.22)	(0.62)	(14.71)	(4.39)	(2.34)	(4.43)	(-1.76)	(1.88)	(1.16)	
Portfolio B (hedge funds managed by unlisted firms)	5.98**	3.59**	0.24**	0.14**	0.04	0.18**	-0.01	0.01**	0.01*	0.63
	(4.03)	(4.54)	(14.37)	(7.05)	(1.30)	(4.77)	(-1.51)	(3.16)	(2.14)	
Spread portfolio (A - B)	-2.04**	-2.95**	0.08**	-0.03	0.05*	0.04	0.00	0.00	0.00	0.26
	(-3.54)	(-5.46)	(7.01)	(-1.96)	(2.56)	(1.46)	(-1.14)	(-1.04)	(-0.91)	

Table 3
Regressions on hedge fund performance

This table reports results from multivariate regressions on hedge fund performance. The dependent variables include hedge fund return and alpha. RETURN is hedge fund monthly net-of-fee return. ALPHA is Fung and Hsieh (2004) seven-factor monthly alpha where factor loadings are estimated over the last 24 months. The primary independent variable of interest is the listed dummy (LISTED). It takes a value of one if the hedge fund is managed by a listed firm, and a value of zero otherwise. The other independent variables include hedge fund management fee (MGTFEE), performance fee (PERFFEE), redemption notice period in months (NOTICE), minimum investment in USD million (MININV), the natural logarithm of fund size (log(SIZE)) where SIZE is in USD million, fund age in decades (AGE) as well as dummy variables for year and fund investment strategy. The t-statistics for the OLS regressions are derived from White (1980) standard errors, while the t-statistics for the Fama-MacBeth regressions are derived from Newey and West (1987) standard errors. The sample period is from January 1994 to December 2013. * Significant at the 5% level; ** Significant at the 1% level.

Independent variables	OLS Regressions				Fama-MacBeth (1973) Regressions			
	RETURN		ALPHA		RETURN		ALPHA	
LISTED	-0.302**	-0.115**	-0.458**	-0.203**	-0.177**	-0.084**	-0.290**	-0.196**
	(-18.86)	(-6.31)	(-21.65)	(-8.87)	(-3.38)	(-2.97)	(-5.53)	(-6.13)
MGTFEE (%)		0.042**		0.014		0.042		0.013
		(4.04)		(1.05)		(1.81)		(0.52)
PERFFEE (%)		0.003**		0.011**		0.006		0.009**
		(2.80)		(10.05)		(1.59)		(3.16)
NOTICE (months)		0.017**		0.013**		0.021*		0.017*
		(7.67)		(5.16)		(2.44)		(2.31)
MININV (US$m)		0.001**		0.000		0.003		0.005
		(2.66)		(0.87)		(1.08)		(1.80)
log(SIZE)		-0.035**		0.013**		-0.043**		0.022*
		(-11.01)		(3.19)		(-3.87)		(2.33)
AGE (decades)		-0.151**		-0.085**		-0.197**		-0.131**
		(-12.14)		(-5.81)		(-3.94)		(-3.29)
year dummies	No	Yes	No	Yes	No	No	No	No
strategy dummies	No	Yes	No	Yes	No	Yes	No	Yes
Adj. R-squared	0.000	0.026	0.001	0.010	0.004	0.051	0.004	0.032
No. of observations	834,268	693,145	432,028	376,901	240	240	216	216

Table 4
Event study with differences-in-differences analysis

This table reports results from an event study analysis of hedge fund and firm attributes around fund management company's public listing date. Alpha is Fung and Hsieh (2004) seven-factor monthly alpha where factor loadings are estimated over the last 24 months. Event month is the month that the fund management company completes its initial public offering (IPO). The period "before" is the 60-month period before the event month and the period "after" is the 60-month period after the event month. To be included in the analysis, a hedge fund or a hedge fund management company must survive at least 24 months before and after the event month. Funds/firms in the control group are matched to funds/firms in the treatment group based on fund alpha, fund AUM, firm alpha, firm AUM, firm fee revenue or the number of funds managed by the firm in the 24-month pre-event period. For example, in the fund alpha analysis, funds in the control group are matched to funds in the treatment group by minimizing the sum of the absolute percentage differences in monthly fund alpha in the 24-month pre-event period. Panel A reports results at hedge fund level, while Panel B reports results at the fund management company level. The sample period is from January 1994 to December 2013. * Significant at the 5% level; ** Significant at the 1% level.

	Before	After	After - Before
Panel A: Hedge fund attributes			
Fund alpha (pct / month) - treatment group	1.08	-0.20	-1.28*
			(-4.53)
Fund alpha (pct / month) - control group	0.33	0.18	-0.14
			(-1.26)
Difference in alpha (pct / month)	0.76	-0.38	-1.14**
			(-3.78)
Fund AUM (US$m) - treatment group	201.95	346.08	144.12**
			(10.10)
Fund AUM (US$m) - control group	246.33	460.26	213.93**
			(14.90)
Difference in AUM (US$m)	-44.38	-114.18	-69.80**
			(-8.33)
Panel B: Fund management company attributes			
Firm alpha (pct / month) - treatment group	0.68	-0.09	-0.77**
			(-4.81)
Firm alpha (pct / month) - control group	0.31	0.20	-0.11
			(-1.07)
Difference in alpha (pct / month)	0.37	-0.29	-0.67**
			(-3.72)
Firm AUM (US$m) - treatment group	554.44	1415.42	860.97**
			(16.40)
Firm AUM (US$m) - control group	587.00	1107.02	520.02**
			(16.26)
Difference in AUM (US$m)	-32.56	308.40	340.95**
			(6.48)
Firm fee revenue (US$m / month) - treatment group	1.96	3.27	1.30**
			(12.08)
Firm fee revenue (US$m / month) - control group	2.09	2.86	0.77**
			(5.26)
Difference in fee revenue (US$m / month)	-0.13	0.41	0.53**
			(3.96)
Firm number of funds - treatment group	3.34	6.37	3.04**
			(28.62)
Firm number of funds - control group	3.35	3.62	0.27*
			(2.09)
Difference in number of funds	-0.01	2.75	2.77**
			(17.37)

Table 5
Probit model on launching new funds

This table reports results from two probit regressions that model the probability of launching new funds for listed and unlisted hedge fund management companies. The dependent variable (NEWFUNDLAUNCH) takes a value of one if the manager launches at least one new fund in the year, and a value of zero otherwise. All the independent variables are taken from previous year end. The primary independent variable of interest is the listed dummy (LISTED). It takes a value of one if the hedge fund management company is a listed firm, and a value of zero otherwise. The other independent variables include hedge fund firm net-of-fee return from the previous year (RETURN), hedge fund firm rolling alpha from the previous year (ALPHA), the number of hedge funds managed by the management company in the previous year (NFUNDS), fund flow to the fund management company in the previous year (FLOW), firm management fee (MGTFEE), firm performance fee (PERFFEE), firm redemption notice period in months (NOTICE), firm minimum investment in USD million (MININV), natural logarithm of firm size (log(SIZE)) where SIZE is in USD million, firm age in decades (AGE), standard deviation of firm returns in the previous year (RETSTD) as well as year dummies. Firm level metrics such as management fee are constructed by value-weighting the fund level metrics for all funds managed by the firm. The robust z-statistics with standard errors clustered by manager are in parentheses. The sample period is from January 1994 to December 2013. * Significant at the 5% level; ** Significant at the 1% level.

Independent variables	Dependent variable = NEWFUNDLAUNCH	
LISTED	0.210**	0.201*
	(2.94)	(2.43)
RETURN (%)	0.001	
	(0.36)	
ALPHA (%)		0.003
		(0.80)
NFUNDS	0.089**	0.086**
	(12.77)	(12.54)
FLOW	-0.000	0.002
	(-1.11)	(0.67)
MGTFEE (%)	0.030	0.037
	(1.33)	(1.31)
PERFFEE (%)	0.001	0.002
	(0.40)	(0.61)
NOTICE (months)	-0.039**	-0.032**
	(-5.53)	(-4.10)
MININV (US$m)	-0.000	-0.003
	(-1.31)	(-1.48)
AGE (decades)	-0.319**	-0.295**
	(-8.80)	(-7.25)
log(SIZE)	0.136**	0.144**
	(14.89)	(13.31)
RETSTD (%)	0.001	0.005
	(0.20)	(0.61)
Year dummies	Yes	Yes
Pseudo R-squared	0.124	0.139
No. of observations	26,697	19,227

Table 6
Portfolio sorts on fund management company listing status and conflicts of interests

This table reports double sorts on firm listing status and fund or firm agency proxies. In Panel A, hedge funds are first sorted into two groups based on fund manager total delta scaled by fund assets under management (Agarwal, Daniel and Naik, 2009). In Panel B, hedge funds are first sorted into two groups based on their aggregate governance scores (Ozik and Sadka, 2015). As per Ozik and Sadka (2015), high aggregate governance funds are funds with aggregate governance scores ≥ 4 (out of 5), while low aggregate governance funds are funds with aggregate governance scores ≤ 1 (out of 5). In Panel C, hedge funds are first sorted into two groups based on whether the hedge fund manager co-invests in the fund, as measured by the personal capital dummy from the TASS database. Next, funds within each agency metric group are stratified into two portfolios by their fund management company listing status. Portfolio A is the portfolio of hedge funds managed by listed firms. Portfolio B is the portfolio of hedge funds managed by unlisted firms. In Panels D and E, hedge funds managed by listed firms are sorted based on the level of insider ownership and the number of closely held shares as a proportion of total shares outstanding, respectively. In Panel F, hedge funds managed by listed firms are sorted based on whether their IPO prospectuses reveal that existing shareholders are cashing out. Information on the level of insider ownership is obtained for listed firms from their Form ADV Schedule A and B filings. Information on the number of closely held shares is obtained from Datastream. IPO prospectuses are obtained from the Perfect Information filings database. The sample period is from January 1994 to December 2013. However, the effective sample period differs across panels as we also require that each portfolio has at least ten funds. * Significant at the 5% level; ** Significant at the 1% level.

Portfolio	Excess return		Alpha	
Panel A: Sort on managerial total delta scaled by fund AUM	Low	High	Low	High
Portfolio A (hedge funds managed by listed firms)	3.89	6.02**	0.38	3.03**
	(1.83)	(3.14)	(0.31)	(2.49)
Portfolio B (hedge funds managed by unlisted firms)	6.56**	6.44**	4.29**	3.90**
	(4.25)	(3.71)	(5.16)	(4.20)
Spread portfolio (A - B)	-2.67**	-0.42	-3.90**	-0.87
	(-3.46)	(-0.72)	(-6.44)	(-1.42)
Panel B: Sort on fund aggregate governance score	Low	High	Low	High
Portfolio A (hedge funds managed by listed firms)	1.18	6.88**	-1.79	3.93**
	(0.59)	(3.78)	(-1.04)	(4.49)
Portfolio B (hedge funds managed by unlisted firms)	4.62**	7.65**	1.87	5.21**
	(2.78)	(4.24)	(1.53)	(6.98)
Spread portfolio (A - B)	-3.43**	-0.77	-3.66**	-1.28*
	(-3.18)	(-1.31)	(-3.47)	(-2.08)
Panel C: Sort on fund managers' personal capital	No	Yes	No	Yes
Portfolio A (hedge funds managed by listed firms)	4.38	6.99**	-0.88	4.01**
	(1.50)	(3.31)	(-0.39)	(2.73)
Portfolio B (hedge funds managed by unlisted firms)	6.89**	8.51**	2.74	4.56**
	(2.81)	(3.54)	(1.87)	(3.72)
Spread portfolio (A - B)	-2.51*	-1.52	-3.62**	-0.55
	(-2.32)	(-1.35)	(-3.00)	(-0.61)
Panel D: Listed firms sorted by level of insider ownership	Low	High	Low	High
Portfolio A (hedge funds managed by listed firms)	3.60	7.24	0.42	3.04
	(1.03)	(1.10)	(0.21)	(0.87)
Portfolio B (hedge funds managed by unlisted firms)	5.28	5.28	2.99	2.99
	(1.67)	(1.67)	(1.91)	(1.91)
Spread portfolio (A - B)	-1.69	1.96	-2.58**	0.05
	(-1.97)	(0.54)	(-3.16)	(0.02)
Panel E: Listed firms sorted by proportion of closely held shares	Low	High	Low	High
Portfolio A (hedge funds managed by listed firms)	3.74*	5.48*	0.58	1.71
	(2.03)	(2.46)	(0.51)	(1.25)
Portfolio B (hedge funds managed by unlisted firms)	6.53**	6.53**	4.02**	4.02**
	(4.20)	(4.20)	(4.86)	(4.86)
Spread portfolio (A - B)	-2.79**	-1.05	-3.44**	-2.31**
	(-4.19)	(-0.99)	(-5.07)	(-2.67)
Panel F: Listed firms sorted by whether existing shareholders cashed out	Yes	No	Yes	No
Portfolio A (hedge funds managed by listed firms)	3.48	4.90	-1.50	2.80*
	(0.74)	(1.85)	(-0.58)	(2.35)
Portfolio B (hedge funds managed by unlisted firms)	5.60	5.60	3.08*	3.08*
	(1.97)	(1.97)	(2.09)	(2.09)
Spread portfolio (A - B)	-2.12	-0.71	-4.58**	-0.27
	(-0.94)	(-0.86)	(-2.86)	(-0.35)

Table 7
Portfolio sorts on fund management company listing status and stock earnings response coefficient (ERC)

Every January, hedge funds are sorted into two groups based on whether they are managed by listed firms or unlisted firms. Portfolio A is the portfolio of hedge funds managed by listed firms. Portfolio B is the portfolio of hedge funds managed by unlisted firms. The hedge funds in portfolio A are further sorted into two portfolios (A1 and A2) based on firm earnings response coefficient (ERC) as in Easton and Zmijewski (1989). ERC measures the sensitivity of stock returns to firm earnings. ERCs are computed from individual firm level regressions over the full sample period for firms with at least eight quarters of information. Hedge fund portfolio performance is estimated relative to the Fung and Hsieh (2004) factors. The Fung and Hsieh (2004) factors are S&P 500 return minus risk free rate (SNPMRF), Russell 2000 return minus S&P 500 return (SCMLC), change in the constant maturity yield of the U.S. 10-year Treasury bond appropriately adjusted for the duration (BD10RET), change in the spread of Moody's BAA bond over 10-year Treasury bond appropriately adjusted for duration (BAAMTSY), bond PTFS (PTFSBD), currency PTFS (PTFSFX), and commodities PTFS (PTFSCOM). The t-statistics, derived from White (1980) standard errors, are in parentheses. The sample period is from January 2000 to December 2013, which corresponds to the period where there are at least ten funds in each of the high and low ERC portfolios. * Significant at the 5% level; ** Significant at the 1% level.

Portfolio	Excess Return (pct / year)	Alpha (pct / year)	SNPMRF	SCMLC	BD10RET	BAAMTSY	PTFSBD	PTFSFX	PTFSCOM	Adj. R2
Portfolio A1 (hedge funds managed by listed firms with high ERC)	2.70	0.95	0.27**	0.06*	0.05	0.11*	-0.01	0.01	0.01	0.62
	(1.45)	(0.94)	(12.66)	(2.22)	(1.31)	(2.59)	(-1.48)	(1.59)	(0.83)	
Portfolio A2 (hedge funds managed by listed firms with low ERC)	4.91**	3.10**	0.16**	0.12**	0.04	0.14**	-0.01	0.00	0.00	0.53
	(3.27)	(3.17)	(8.01)	(4.80)	(1.02)	(3.36)	(-1.02)	(0.27)	(-0.59)	
Portfolio B (hedge funds managed by unlisted firms)	5.87**	3.63**	0.25**	0.13**	0.06	0.16**	-0.01	0.02**	0.01	0.64
	(3.19)	(3.62)	(11.69)	(5.07)	(1.58)	(3.88)	(-1.95)	(2.99)	(1.19)	
Spread portfolio (A1 - B)	-3.17**	-2.68**	0.02	-0.07**	-0.01	-0.05	0.00	-0.01	0.00	0.07
	(-3.39)	(-3.13)	(1.28)	(-3.31)	(-0.30)	(-1.48)	(0.53)	(-1.62)	(-0.41)	
Spread portfolio (A2 - B)	-0.96	-0.53	-0.08**	-0.01	-0.02	-0.03	0.01	-0.01**	-0.01*	0.26
	(-1.10)	(-0.77)	(-5.68)	(-0.58)	(-0.86)	(-0.89)	(1.39)	(-3.97)	(-2.57)	
Spread portfolio (A1 - A2)	-2.21	-2.15*	0.10**	-0.06*	0.01	-0.03	0.00	0.01	0.01	0.12
	(-1.77)	(-2.02)	(4.70)	(-2.29)	(0.31)	(-0.62)	(-0.47)	(1.26)	(1.33)	

Table 8
Portfolio sorts on Pástor and Stambaugh (2003) liquidity beta and hedge fund management company public listing status

This table reports double sorts on Pástor and Stambaugh (2003) fund liquidity beta and firm listing status. Every January, hedge funds are first sorted into quintiles based on their beta with respect to the Pastor and Stambaugh (2003) aggregate liquidity measure. Liquidity beta is estimated over the past 24 months in the presence of factors from Fung and Hsieh (2004) model. Next, within each liquidity beta group, hedge funds are sorted into two portfolios based on fund management company listing status. The post-formation returns on the resultant ten portfolios over the next 12 months are linked across years to form a single return series for each portfolio. Hedge fund performance is estimated relative to the Fung and Hsieh (2004) model. The Fung and Hsieh (2004) factors are S&P 500 return minus risk free rate (SNPMRF), Russell 2000 return minus S&P 500 return (SCMLC), change in the constant maturity yield of the U.S. 10-year Treasury bond adjusted for the duration of the 10-year bond (BD10RET), change in the spread of Moody's BAA bond over 10-year Treasury bond appropriately adjusted for duration (BAAMTSY), bond PTFS (PTFSBD), currency PTFS (PTFSFX), and commodities PTFS (PTFSCOM). The coefficient estimates on these variables are omitted for brevity. The t-statistics, derived from White (1980) standard errors, are in parentheses. The sample period is from January 1994 to December 2013. * Significant at the 5% level; ** Significant at the 1% level.

| | Sort on Pástor and Stambaugh (2003) liquidity beta | | | | | | | | | |
| | Excess return | | | | | Alpha | | | | |
Portfolio	1 (low beta)	2	3	4	5 (high beta)	1 (low beta)	2	3	4	5 (high beta)
Portfolio A (hedge funds managed by listed firms)	0.07	3.23	2.24	4.34*	5.20	-3.61	0.25	-0.05	1.88	0.82
	(0.03)	(1.81)	(1.54)	(2.57)	(1.63)	(-1.90)	(0.21)	(-0.06)	(1.59)	(0.38)
Portfolio B (hedge funds managed by unlisted firms)	5.60**	5.04**	4.81**	5.26**	6.33**	3.05**	2.88**	2.87**	2.99**	3.71**
	(3.47)	(3.89)	(4.05)	(3.56)	(3.33)	(2.72)	(3.80)	(5.01)	(4.25)	(3.39)
Spread portfolio (A - B)	-5.53**	-1.82*	-2.57**	-0.92	-1.12	-6.66**	-2.63**	-2.91**	-1.11	-2.89
	(-3.20)	(-2.08)	(-4.24)	(-0.91)	(-0.53)	(-4.81)	(-3.24)	(-5.33)	(-1.04)	(-1.64)

Table 9
Bollen and Pool (2012) hedge fund performance flag trigger frequencies

This table reports the percentage of hedge funds that trigger various performance flags at the 10% significance level, sorted on fund management company listing status. The performance flags analyzed include the four performance flags with the highest rejection rates for reporting violations in Bollen and Pool (2012). The four performance flags are Kink, Maxrsq, % Negative, and % Repeat. Kink is triggered when a fund reports a return distribution with a discontinuity at zero. Maxrsq is triggered when a fund delivers an adjusted R-squared that is not significantly different from zero. % Negative is triggered when a fund reports a low number of negative returns. % Repeat is triggered when a fund reports a high number of repeated returns. We test the difference in rejection frequencies for hedge funds managed by listed firms and those managed by unlisted firms. The sample period is from January 1994 to December 2013. * Significant at the 5% level; ** Significant at the 1% level.

	Performance flag trigger frequency		
Hedge fund performance flag	Hedge funds managed by listed firms	Hedge funds managed by unlisted firms	Difference (listed - unlisted)
Kink	25.2%	28.7%	-3.6%**
Maxrsq	46.3%	40.1%	6.2%
% Negative	19.6%	22.8%	-3.2%**
% Repeat	32.6%	40.3%	-7.7%**

Table 10
Instrumental variable analysis

This table reports results from regressions that use an instrumental variable (IV) approach to examine whether the observed differences in hedge fund performance between listed and unlisted hedge fund firms reflect unobserved differences that endogenously determine listing status. Our instrument for listing status exploits the cross sectional differences in hedge fund managers' ability to accumulate capital at the time of founding. We define hedge fund management company founding strategy fund flow (STRATEGYFLOW) as fund manager's strategy fund flow over the 24-month period after inception. The strategy used in STRATEGYFLOW corresponds to the investment strategy of the first fund launched by the firm. We exclude all listed hedge fund firms that go public less than two years after inception. Column 1 shows the first stage probit model of hedge fund listing status on hedge fund management company founding strategy fund flow (STRATEGYFLOW) and the group of control variables used in Table 3. The dependent variable is the listed dummy (LISTED). It takes a value of one if the hedge fund management company is a listed firm, and a value of zero otherwise. The independent variables include hedge fund management fee (MGTFEE), performance fee (PERFFEE), redemption notice period in months (NOTICE), minimum investment in USD million (MININV), the natural logarithm of fund size (log(SIZE)) where SIZE is in USD million, fund age in decades (AGE) as well as dummy variables for year and fund investment strategy. Following Wooldridge (2002), the second stage is estimated by GMM using as instruments the first-stage predicted probability. Column 2 and 3 show the second stage results, where the dependent variables are RETURN and ALPHA. RETURN is hedge fund monthly net-of-fee return. ALPHA is Fung and Hsieh (2004) seven-factor monthly alpha where factor loadings are estimated over the last 24 months. For comparison, columns 4 and 5 report results from regressions analogous to those reported in columns 2 and 3 but without instrumenting for hedge fund listing status. In columns 1, 2, and 3, robust z-statistics are in parentheses. In columns 4 and 5, t-statistics derived from White (1980) standard errors are in parentheses. The sample period is from January 1994 to December 2013. * Significant at the 5% level; ** Significant at the 1% level.

Dependent variables	LISTED	RETURN	ALPHA	RETURN	ALPHA
	IV first stage (probit)	IV second stage		OLS	
LISTED		-1.824**	-2.767**	-0.144**	-0.191**
		(-4.45)	(-6.66)	(-2.79)	(-3.35)
MGTFEE (%)	-0.021*	0.033*	0.022	0.036*	0.026
	(-2.01)	(2.35)	(1.43)	(2.56)	(1.73)
PERFFEE (%)	0.023**	0.001	0.012**	0.000	0.010**
	(19.96)	(1.15)	(9.45)	(0.26)	(8.24)
NOTICE (months)	-0.130**	0.007*	0.005	0.011**	0.012**
	(-23.04)	(2.30)	(1.67)	(4.06)	(4.20)
MININV (US$m)	-0.040**	-0.001	0.001	0.001	0.004*
	(-3.15)	(-0.59)	(0.54)	(0.63)	(2.33)
log(SIZE)	-0.339**	-0.092**	-0.116**	-0.072**	-0.085**
	(-24.01)	(-5.58)	(-6.88)	(-4.56)	(-5.31)
AGE (decades)	0.167**	0.018**	0.029**	0.006	0.011**
	(40.31)	(3.69)	(5.73)	(1.50)	(2.58)
STRATEGYFLOW	0.035**				
	(5.22)				
F-test: STRATEGYFLOW = 0	27.30**				
year dummies	Yes	Yes	Yes	Yes	Yes
strategy dummies	Yes	Yes	Yes	Yes	Yes
Pseudo R-squared	0.111				
R-squared		0.031	0.002		
Adj. R-squared				0.034	0.009
No. of observations	321,597	321,597	321,597	321,597	321,597

Table 11
Robustness tests

This table reports robustness tests on the baseline portfolio sorts. Every January, hedge funds are sorted into two portfolios based on whether they are managed by listed firms or by unlisted firms. The post-formation returns on these two portfolios over the next 12 months are linked across years to form a single return series for each portfolio. Portfolio A is the portfolio of hedge funds managed by listed firms. Portfolio B is the portfolio of hedge funds managed by unlisted firms. Panel A reports results adjusted for backfill bias by removing the return observations before fund listing date. Panel B reports results after unsmoothing returns using the Getmansky, Lo, and Makarov (2004) algorithm. Panel C reports results after adding back fees to form pre-fee returns. Panel D reports results adjusted for dynamic risk exposures by using a rolling 24-month window to calculate factor loadings. Panel E reports results after augmenting the Fung and Hsieh (2004) model with the MSCI Emerging Market Index excess return. Panel F reports results after augmenting the Fung and Hsieh (2004) model with the Agarwal and Naik (2004) out-of-the money call and put option factors. Panel G reports results after augmenting the Fung and Hsieh (2004) model with the Pastor and Stambaugh (2003) liquidity factor. Panel H adjusts for fund termination by assuming that a fund delivers a -10 percent return for the month after it liquidates. Panels I and J report results for two sub-sample periods: January 1994 to December 2003 and January 2004 to December 2013, respectively. Panel K reports results from the portfolio sort analysis at the firm level with firm returns. Panel L reports results with firm returns computed from Thomson Financial 13F stock holdings. The t-statistics, derived from White (1980) standard errors, are in parentheses. The sample period is from January 1994 to December 2013. * Significant at the 5% level; ** Significant at the 1% level.

Portfolio	Excess Return (pct / year)	Alpha (pct / year)	Adj. R2	Portfolio	Excess Return (pct / year)	Alpha (pct / year)	Adj. R2
Panel A: Adjusted for backfill bias				*Panel G: Fung and Hsieh (2004) model augmented with the Pástor and Stambaugh (2003) liquidity factor*			
Portfolio A (hedge funds managed by listed firms)	2.47	-0.62	0.55	Portfolio A (hedge funds managed by listed firms)	4.29*	0.93	0.60
	(1.31)	(-0.53)			(2.41)	(0.80)	
Portfolio B (hedge funds managed by unlisted firms)	4.79**	2.18**	0.70	Portfolio B (hedge funds managed by unlisted firms)	6.18**	4.28**	0.64
	(2.87)	(2.68)			(4.32)	(5.10)	
Spread portfolio (A - B)	-2.32**	-2.80**	0.05	Spread portfolio (A - B)	-1.89**	-3.35**	0.23
	(-3.00)	(-3.71)			(-3.13)	(-5.10)	
Panel B: Adjusted for serial correlation				*Panel H: Adjusted for fund termination*			
Portfolio A (hedge funds managed by listed firms)	4.29*	0.96	0.60	Portfolio A (hedge funds managed by listed firms)	2.84	-0.40	0.59
	(2.41)	(0.87)			(1.61)	(-0.38)	
Portfolio B (hedge funds managed by unlisted firms)	6.18**	3.86**	0.64	Portfolio B (hedge funds managed by unlisted firms)	4.61**	2.31**	0.64
	(4.32)	(4.93)			(3.23)	(3.00)	
Spread portfolio (A - B)	-1.89**	-2.89**	0.22	Spread portfolio (A - B)	-1.77**	-2.72**	0.21
	(-3.13)	(-5.18)			(-2.95)	(-4.45)	
Panel C: Pre-fee returns				*Panel I: Sub-sample analysis (January 1994 - December 2003)*			
Portfolio A (hedge funds managed by listed firms)	7.15**	3.83**	0.62	Portfolio A (hedge funds managed by listed firms)	4.46*	1.58	0.72
	(3.95)	(3.70)			(2.44)	(1.59)	
Portfolio B (hedge funds managed by unlisted firms)	9.79**	7.47**	0.63	Portfolio B (hedge funds managed by unlisted firms)	6.59**	4.55**	0.69
	(6.66)	(9.34)			(4.15)	(5.25)	
Spread portfolio (A - B)	-2.64**	-3.64**	0.24	Spread portfolio (A - B)	-2.12**	-2.97**	0.21
	(-4.55)	(-6.43)			(-2.94)	(-3.63)	
Panel D: Adjusted for dynamic risk exposures using 24-month rolling betas				*Panel J: Sub-sample analysis (January 2004 - December 2013)*			
Portfolio A (hedge funds managed by listed firms)	4.49*	0.02	n.a.	Portfolio A (hedge funds managed by listed firms)	4.11	-0.25	0.57
	(2.32)	(0.02)			(1.35)	(-0.13)	
Portfolio B (hedge funds managed by unlisted firms)	6.53**	3.44**	n.a.	Portfolio B (hedge funds managed by unlisted firms)	5.77*	2.82*	0.66
	(4.20)	(3.69)			(2.43)	(2.22)	
Spread portfolio (A - B)	-2.05**	-3.42**	n.a.	Spread portfolio (A - B)	-1.66	-3.07**	0.21
	(-3.31)	(-4.92)			(-1.71)	(-3.17)	
Panel E: Fung and Hsieh (2004) model augmented with an emerging markets equity factor				*Panel K: Management company level returns*			
Portfolio A (hedge funds managed by listed firms)	4.29*	1.68	0.74	Portfolio A (hedge funds managed by listed firms)	4.78**	1.74	0.62
	(2.41)	(1.93)			(2.86)	(1.83)	
Portfolio B (hedge funds managed by unlisted firms)	6.18**	4.32**	0.73	Portfolio B (hedge funds managed by unlisted firms)	6.78**	4.47**	0.68
	(4.32)	(6.45)			(4.75)	(6.16)	
Spread portfolio (A - B)	-1.89**	-2.64**	0.32	Spread portfolio (A - B)	-2.01**	-2.73**	0.21
	(-3.13)	(-4.61)			(-3.59)	(-5.49)	
Panel F: Fung and Hsieh (2004) model augmented with the Agarwal and Naik (2004) out-of-the money call and put option factors				*Panel L: Management company returns constructed from 13F stock holdings*			
Portfolio A (hedge funds managed by listed firms)	4.29*	2.46*	0.66	Portfolio A (hedge funds managed by listed firms)	9.19*	1.56	0.88
	(2.41)	(2.41)			(2.28)	(1.83)	
Portfolio B (hedge funds managed by unlisted firms)	6.18**	4.56**	0.63	Portfolio B (hedge funds managed by unlisted firms)	12.01**	3.73**	0.95
	(4.32)	(5.16)			(2.61)	(3.85)	
Spread portfolio (A - B)	-1.89**	-2.10**	0.25	Spread portfolio (A - B)	-4.67*	-2.17*	0.38
	(-3.13)	(-3.51)			(-1.94)	(-2.36)	