Private Equity Portfolio Company Fees

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Abstract

In private equity, General Partners (GPs) receive fee payments from companies whose boards they control. Fees amount to $20 billion evenly distributed over time, representing over 6% of equity invested by GPs. They do not vary with business cycles, company characteristics, or GP performance. Fees vary significantly across GPs and are persistent within GPs, even after accounting for fee rebates to LPs. GPs charging the least raise more capital post financial crisis and are backed by more skilled LPs. GPs increase fees prior to going public. We discuss how these results could be explained by optimal contracting and tax arbitrage.

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1. Introduction

Since the 2008 financial crisis, Private Equity (PE) firms have gone from managing $1 trillion to managing $4.3 trillion (Preqin, 2016). From public filings we know that over that time period, the private equity divisions of Carlyle, KKR, Blackstone and Apollo collectively earned i) $20 billion in carried interest, which is paid if the return exceeds a threshold level, ii) $13 billion in management fees, which is a fixed fee, and iii) a minimum of $3 billion in 'net monitoring and transaction fees' (Appendix Table 1).

While the former two sources of fees have been extensively studied by e.g. Gompers and Lerner (1999), Metrick and Yasuda (2010), and Robinson and Sensoy (2013), we know little about monitoring and transaction fees besides summary statistics reported in practitioner memos and informal surveys. Moreover, these fees are puzzling because it is not clear for which services they are being earned, and they are being paid by companies whose board members are employed by the PE firm receiving these fees. In fact, these fees recently became a public policy focus with the SEC fining several PE firms and state treasurers demanding full disclosure.[1]

Using a comprehensive hand-collected dataset, this paper describes the contracts underlying transaction and monitoring fees, quantifies those fees, and studies their variation across fund managers, business cycles, and company types. In addition, we attempt to reconcile these fee arrangements with relevant optimal contracting theories.

Most private equity funds are organized as limited partnerships, with private equity firms (e.g. Blackstone) serving as General Partners (GPs) of the funds, and institutional investors providing most of the capital as Limited Partners (LPs). Limited Partnership Agreements (LPAs) are signed at the funds' inception and define the expected payments by LPs to GPs: the management fee and carried interest. The amount of fees charged to portfolio companies (such as transaction and monitoring fees) is not specified in the LPA: they are contracted upon in Management Services Agreements (MSAs), which are signed by GPs and representatives of the company at the time of the

[1] On July 21st 2015, thirteen state and city treasurers wrote to the SEC to ask for private equity firms to reveal the monitoring and transaction fees they charge investors. In August 2015, one of the largest private equity investors said that it will no longer invest in funds that do not disclose all of their fees. The SEC announced on October 7th 2015, that it "will continue taking action against advisers that do not adequately disclose their fees and expenses" following a settlement by Blackstone for $39 million over so-called accelerated monitoring fees.

transaction, hence ex-post LPA. The LPA, however, states the fraction of each type of portfolio company fees that is rebated against the management fee due by LPs (subject to a number of exceptions).

As limited partnerships last for over 10 years, LPAs are necessarily incomplete contracts. It is difficult to write and foresee the numerous contingencies that can arise over such a long period of time. The earliest foundation of transaction cost economics, such as Williamson (1971), argues that incomplete contracts imply the need for ex-post adaptation. The procurement literature, for example, highlights the importance of allowing agents to charge ex-post adaptation costs, as shown in e.g. Crocker and Reynolds (1993), Bajari and Tadelis (2001), and Bajari, Houghton, and Tadelis (2014). We may need a combination of an ex-ante contract such as the LPA, which is standard and similar across GPs, followed by an ex-post adjustment contract such as the MSA. This would imply that portfolio company fees should be predominantly company- and time-specific, not GP-specific. Companies that are riskier or more difficult to monitor may command higher fees, and fees may increase for all companies when LBOs are more costly to execute: in times of higher credit spreads, lower risk premium, or lower credit supply, as argued by Axelson et al. (2013), and Haddad, Loualiche and Plosser (2017).

There are several other theoretical arguments to support the view that MSAs are part of an optimal contracting device. We examine four such arguments here. First, as LPs need to learn about GPs' talent and pay GPs accordingly, it may be optimal to start with a standard and low compensation, and to let GPs adjust it upward if they are successful [see Berk and Green (2004), Robinson and Sensoy (2013)]. Second, GPs have less financial incentives when their carried interest is 'out-of-the-money', and MSAs can be used to reset their incentives. Similarly, when a company is in financial distress, equity holders have less incentive to perform since some of the benefits accrue to debtholders, as in Myers (1977). Discretionary adaptation fees could solve this old problem. Third, as fees are subordinated to debt, they can be a commitment device by GPs to repay debt in order to earn the fees, as argued by Malenko and Malenko (2015). Fourth, following Axelson, Strömberg, and Weisbach (2009), MSAs can counteract a GP's incentive to invest in bad projects when they are getting close to their investment period deadline. These arguments imply that certain

GP characteristics should relate to fee levels such as the GPs' past and current performance, the GP's reputation with creditors, or the fund age at the time of LBO inception.

Alternatively, these fees may be camouflaged dividends. The idea, building on Polsky (2014), is that GPs transfer cash out of the company and call it a fee rather than a dividend because fees, unlike dividends, are deductible from corporate taxes. GPs then share the tax savings with LPs via a reduction in management fees. Under this tax view, we expect GPs to charge more at times when more taxes are being paid (i.e. in good times), and to companies with larger tax bills. GPs should rebate at least 60% of the portfolio company fees to LPs because the maximum marginal corporate tax rate is 40%. We may also expect LPs to reward GPs who generate larger tax savings.

We manually collect comprehensive information about portfolio company fees: we examine 25,000 pages of relevant SEC filings covering 1,044 GP investments in 592 Leveraged Buy-Out (LBOs) transactions, whose total enterprise values (TEVs), including add-on acquisitions, add up to $1.1 trillion. SEC filers need to disclose i) 'material definitive agreements' such as credit agreements and MSAs; ii) previous fiscal year or currently contemplated 'related party transactions' worth more than $120,000; and iii) financial information for the preceding three years. As a result, SEC filings provide annual information on portfolio company fees. LBOs with SEC filings are essentially those that ended their PE sponsorship via an Initial Public Offering, and LBOs with publicly traded debt.

We retrieve the underlying contracts (MSAs) and record the time-series of the two main portfolio company fees. A transaction fee is charged at the time of LBO inception and when 'add-on' acquisitions are made. The sum of the transaction fees in our sample is $10 billion. Monitoring fees are charged quarterly during the life of the investment; they add up to a similar amount. These two fees thus reach near to $20 billion, or 6% of the equity invested by GPs on behalf of their investors, and are basically constant over time. Importantly, MSAs indicate that transaction fees are paid on top of what it costs to acquire the company and monitoring fees do not require actual work to be performed to trigger their payment (director fees are separate).

To evaluate optimal contracting theories we first study how the fees relate to LBO characteristics (industry, earnings volatility, leverage, and GP ownership) and to business- and LBO-industry cycles. However, we find no statistically significant relations. Notably, fees are not higher at times when it is more difficult to execute and monitor LBO investments, or at times of lower

corporate profits. Adding time fixed effects only marginally increases R-squared values. This evidence is not consistent with the hypothesis derived from the procurement literature or with the 'tax view.' Moreover, contrary to the predictions of the tax view, only half of the companies have positive earnings before tax and these companies do not pay more fees.

Some optimal contracting theories predict that fees should vary at the GP level, and we find strong evidence of fee persistence. When we control for GP past fee policy, the R-squared doubles. However, fees are not related to any of the GP characteristics suggested by the theories we reviewed (e.g. GP past performance).

Albeit perhaps anecdotal and subject to the usual endogeneity caveats, we look at the decision by GPs to sell parts of their companies. In 2006-2008, three GPs decided to deviate from the traditional partner ownership model and their partners sold parts of their equity stakes in IPOs. The IPO literature, such as DeGeorge and Zeckhauser (1993), shows that the cash flow of firms going public tends to increase around the time of their IPO, presumably because IPO firms pump up their performance in order to fetch higher valuations at the offering . In addition, the two types of portfolio company fees should affect GP valuation differently: ongoing ten-year fixed monitoring fee contracts have a larger impact on valuations than (one-time non-recurring) transaction fees. This is what we observe: the three selling GPs doubled their monitoring fees while the other three comparable GPs decreased these fees.

These results focus on fees charged to companies and we find it difficult to rationalize the fee arrangements. One potential source of inefficiency could be overly passive LPs. If we switch to analyzing fees charged to LPs (instead of companies) we need to account for the rebate policy of GPs. We collect these data from a collection of LPAs and from online sources.[2]

We find a negative correlation between the fraction of fees rebated by GPs and the relative amount they charge to the portfolio companies. This negative correlation exacerbates both the persistence and differences in fees charged to LPs across different GPs.

[2] We need to bear in mind that information on rebate rates is noisy because different GPs use different rules to compute the amount to be effectively rebated and some LPs receive a different rebate rate via side letters.

Following Cavagnaro et al. (2015) we proxy LP 'skill' by the average performance of the private equity funds in which an LP invested. For each GP we then compute the average 'skill' across its LP base. We find that GPs with lower fees have an LP base that has higher skills.

We then study the sensitivity of capital-flows to fees. It is arguably not until the aftermath of the financial crisis that the existence of portfolio company fees became public information. How did LPs react when information about these fees started piling up? We find that the growth in amount of capital raised post-crisis (2009 to 2015) is significantly negatively related to the amount of portfolio company fees charged by GPs pre-crisis. This result holds after we control for past performance, which indicates that high-fee GPs were 'penalized' both for lower performance (fees mechanically reduced performance) and for these fees per se. Results are also similar if we use pre-rebate or post-rebate portfolio company fees charged.

If we simply rank GPs by the amount of fees they charge, of those charging the most, half have not raised a new fund since the crisis (and the other half raised much smaller funds). In contrast, the GPs that charge the least have all raised a new fund, in a relatively short time, and raised more money post-crisis than pre-crisis. This evidence of LPs rewarding low-fee GPs contradicts both the optimal contracting view and the tax view.

To sum up, this is the first study to quantify the fees that companies have paid to GPs. We assemble a comprehensive body of empirical evidence and find it difficult to reconcile these fee arrangements with our two main hypotheses. We find indicative evidence that less skilled LPs are those that backed high-company-fee chargers and once the news about these fees became widespread, LPs strongly reduced their capital allocations to high-company-fee GPs.

Overall, it seems that market forces are at work similar to what Brown, Gredil, and Kaplan (2017) argue about potential accounting manipulations by GPs. GPs that charge the highest company-fees tend to be outliers, backed by less skilled LPs, and raise significantly less capital going forward. A caveat is that it took two decades for these market forces to manifest themselves. Perhaps increased regulatory intervention has been decisive in helping investors to coordinate, especially among the 'less skilled' investors. We note that SEC fines have been small compared to the amount of fees we document. In addition, in October 2015 the SEC fined one prominent GP for insufficient disclosure of accelerated monitoring fees. We find that such fees are not ubiquitous

across GPs but are nonetheless charged by many GPs, not just one. Also, we show that transaction fees do not cover transaction costs but 'financial advice' provided by GPs for the purchase of a company by a third party. This may fall under the definition of a 'broker.' GPs did not register as such and the law would require a refund of $10 billion (in our sample alone). But as we find that these fees are present as far back as we can go, it would be difficult for the SEC to now implement the 'broker dealer' rule.

The paper continues as follows: Section 1 describes the content of MSAs and presents the related literature. Section 2 discusses the data and key descriptive statistics. Section 3 is dedicated to the cross-section of fees charged in different LBOs. Section 4 studies the cross-section of fees charged by GPs. Section 5 analyses the LP standpoint. Section 6 concludes by discussing possible future research, policy implications, and whether portfolio company fees are a question of the past, or not.

2. Management Services Agreements: Content and related literature

We begin with some institutional details about the working of private equity funds. Next, we describe the content of Management Service Agreements (MSAs). Finally, we review the literature, formulate hypotheses about the motivation behind MSAs, and list empirical implications.

2.1. Institutional details

Private equity comprises various types of investments: venture capital, real estate etc. The largest category of private equity investments is Leveraged Buy-Out (LBO) whereby a fund takes control of a company using a significant amount of debt. From the start of the global financial crisis to the end of 2014, LBO firms have raised more than $1 trillion of capital. Carlyle, KKR, Blackstone and Apollo – the four largest LBO firms – alone have raised $100 billion dollars.

An LBO fund is a private partnership between i) a group of asset owners (e.g. pension funds, sovereign wealth funds) called Limited Partners (LPs) and ii) an LBO firm called General Partner (GP). A contract is signed at the time of fund inception between a GP and its LPs: i.e., the Limited Partnership Agreement (LPA). LPAs govern the LP-GP relationship for the life of the fund which is at

least ten years; they are described in detail in studies by Gompers and Lerner (1999) and Metrick and Yasuda (2010).

LPs commit capital to GPs and the latter are given five years to find suitable investments to spend that committed capital. When GPs find a suitable investment, they call the necessary amount of capital from the LPs, arrange the acquisition, and usually take control of the board of directors, i.e. assign the majority of the seats to their representatives.[3] In turn, the board of directors appoints the executive team. A Management Services Agreement (MSA) is then signed between GPs and the executive team.

LPAs specify a management fee LPs need to pay GPs every quarter (about 0.5% of capital committed per quarter), and a carried interest (20% of profits is paid to GPs if an internal rate of return of at least 8% per annum net of all fees is reached). In addition, LPAs mention that portfolio company fees may be charged and they specify what fraction of each type of portfolio company fee will be refunded. The refund, also called rebate or offset, reduces the management fee due in a given quarter. If there is more money to be refunded than management fees due, then the excess may be rolled over to the next quarter (the roll-over rules, the list of exceptions, the methodology etc. are specified in the LPA).

Notice that LPs do not negotiate on the content of MSAs and therefore do not negotiate the level of the fees charged. MSAs are ex-post contracts for LPs and in practice, LPs are not shown MSAs. LPs may negotiate only on management fees, carried interest, and the fraction of portfolio company fees that is rebated against the management fees due. In other words, the possibility that MSAs will be in place is mentioned in the LPA but the content of MSAs is not described in LPAs.

Figure 1 provides a detailed illustration of the situation at the time of the investment. LPs provide the equity to a shell company. This transaction is organized, a.k.a. 'sponsored', by GPs. GPs control the board of the shell company and thus appoint the senior executive team. The shell company then takes over the assets of a company incorporated in the US, thereby buying-out its equity and debt holders. The shell company now has the assets of the targeted company, and it becomes the portfolio company. It is controlled by the GP and has the capital structure of the shell

[3] Cronqvist and Fahlenbrach (2013) show a reduction in board size post-LBO by 1.3 directors to 8.3, 5.5 of which are private equity sponsor representatives. Cornelli and Oguzhan (2015) show that 33% of the seats on the board are taken by LBO sponsors after the LBO.

company. The executive team signs a Lending Agreement (LA) with the lenders and a Management Services Agreement (MSA) with the GPs.

The situation of the executive team in an LBO setting is particularly interesting. On the one hand executives are appointed by GPs, making them de facto their employees. It is difficult for them to reject an MSA. In fact, GPs sometimes sign the MSA on behalf of the executive team. On the other hand, executives have a significant equity ownership – typically 10 to 20 percent of the most junior equity tranche. Fees represent an ex-post dilution of the executives' equity ownership in the company. Executives are thus expected to negotiate the MSA as part of their overall compensation package.[4]

Lenders also have a say. As ex-post cash transfers out of the company are detrimental to debtholders, lenders request MSAs and usually obtain clauses such as subordination of payments to the sponsors to payment to the lenders. Lenders may also raise the cost of financing for GPs that charge higher fees. This situation is reminiscent of the LBO model presented in Axelson, Strömberg, and Weisbach (2009), where lenders act as ex-post gatekeepers.

Importantly, GPs need to raise a new fund every two to four years in order to have sufficient capital to seize investment opportunities at any point in time. In other words, GPs need to go back to LPs regularly to obtain new capital commitments: the LP-GP interaction is a 'repeated game.' Deceived LPs commit less, if at all, to GPs' next fund, which disciplines the GP as long as the GP has a positive probability to raise a follow-on fund.

2.2. Description of Management Services Agreements

In the Appendix we show the Management Services Agreement of the largest LBO to date: *Energy Futures Holding (EFH)*. This agreement was entered on October 10, 2007. The Total Enterprise Value (TEV) is $45 billion. The MSA starts by mentioning that EFH 'retains' the three GPs (KKR, TPG and Goldman Sachs) to provide services to the company. The 14-people board of EFH counts three representatives for each of the three GPs; hence the GPs control the board of EFH.

[4] Anecdotally, a serial PE executive told us that he does not accept appointments by certain GPs because their MSAs are 'excessive.' Another executive told us that he refused to pay GP expenses and could do this because he was doing well.

Section 1 specifies a $35 million annual ‘advisory fee’, a.k.a. ‘monitoring fee.’ This fee increases by 2% per year. Corresponding services are broadly defined as ‘certain management, consulting and financial services.’ Interestingly, the MSA states that these services are of ‘the type customarily performed by such Managers.’ All fees mentioned in the MSA are split according to the respective ownership of equity by the three GPs, which may or may not coincide with how the workload is shared.

Section 2 states that if the company is prohibited from paying the fees due (e.g. because of a lending agreement) fees will be paid when it is no longer prohibited to pay them. Fees are then usually carried forward with a compounded interest rate of 10-15% per annum.

Section 3 contains the transaction fee: $300 million is charged for ‘financial advisory services and capital structure review.’ Lehman Brothers worked in connection with the acquisition and receives $6 million of the $300 million; this is not recorded in our dataset because Lehman Brothers is not a GP in this transaction.

Section 4 covers post-acquisition fees: each proposed acquisition, merger, recapitalization, structural reorganization, dispositions of assets etc. generates a fee for the GPs that is equal to 1% of the transaction value, subject to the consent of the board of directors, which is controlled by the GPs.

Section 5 authorizes GPs to invoice the company for ‘reasonable’ expenses in connection with their task. Traditionally, management fees paid by LPs are seen as covering the cost of acquiring, monitoring and disposing of businesses for GPs (e.g. GPs need to hire lawyers, visit companies). MSAs shift some of these expenses to the company and LPs do not get any rebate of these expenses. Importantly, this section implies that the $300 million transaction fee does not cover external costs of acquiring a company.

Section 12 states that the agreement is in place until 2019, i.e. for twelve years. Termination can be triggered by mutual consent, or by a change of control or IPO, but this is up to the company, hence the board of directors, hence the GPs. In this event, GPs receive a ‘termination fee’ equal to the present value of the advisory fees up to 2019 (discount rate is the risk-free rate of a maturity-matching US T-Bill). By definition the termination fee is not related to actual work since the

termination can be decided at any time and (de facto) unilaterally. The work related to a change of control (e.g. IPO) is covered in section 4: a 1% fee can be charged for it.

Sections 15 to 17 are partly waiving fiduciary duties: for example, section 15 states that the GPs cannot be held liable in case they have not performed any services or if the services were not satisfactory. Note that individuals signing on behalf of the company are working for TPG and KKR: Jeffrey Liaw was Vice President at TPG since 2005 and Jonathan Smith was at KKR since 2000.

Among these MSAs[5], we note that in the one of Hospital Corporation of America, the founding family receives $29 million of transaction fees while it is unclear how the founding family can contribute to the legal, accounting or advisory work it is said to cover. In that MSA, the monitoring fee increases each year by the growth in adjusted EBITDA and is therefore performance dependent. The list of refundable expenses includes the use of privately owned airplanes, a.k.a. private jets, 'as determined by the party seeking reimbursement.' In Harrah's Entertainment MSA the rate charged for 'subsequent fees' is not specified and kept flexible: it is what 'internationally-recognized investment banks' would charge. The termination fee calculation is subjective as it requires an estimate of fees that would have been received absent termination.[6]

The MSA of the West Corporation LBO by TH Lee mentions first-class airfare or charter (i.e. private jets) as eligible expenses, it lists expenses that can be claimed by the GPs and all the expenses related to the transaction (i.e. payments to advisors, accountants, lawyers etc). One distinguishing element is that the termination fee is the present value of monitoring fees for seven years irrespective of when the contract comes to an end. Hence the MSA could stop after nine years and there would be seven years' worth of fees still to be paid. An IPO for that company actually occurred in March 2013, seven years after acquisition, meaning that the private equity firms received 14 years of monitoring fees on that investment. When we look at the two MSAs from Simmons (1998 one by Fenway partners and the 2003 one by TH Lee) we observe that the 2003 MSA is very

[5] The online appendix contains additional MSAs.

[6] "…a lump-sum amount equal to the net present value of the remaining Transaction Fee, the Monitoring Fee, the Subsequent Fee (…) using an annual discount rate equal to the then-current rate of interest on the Company's revolving credit facility, and assuming that EBITDA would have grown at a rate equal to the greater of (x) 6%, compounded annually and (y) the compounded annual EBITDA growth rate for the last two completed fiscal years." It seems difficult at the time of contract termination to know how many and how much post acquisition fees would have been charged going forward for example. Similarly, it is difficult to reliably forecast future EBITDAs.

different to the 1998 MSA, but the 2003 MSA of TH Lee is similar to that of West Corporation although the two companies have little in common a priori. This is a first indication that MSAs seem more related to GPs than to company characteristics.

Drawing from the entire sample, we find that half of the MSAs last for ten years. Termination fees, if present, are usually equal to the present value of fees until contract expiration. It is common for executives to agree not to sue GPs in case of conflicting interests or unsatisfactory provision of services. Executives/companies refund transaction costs and business expenses that GPs deem reasonable. MSAs state that several GP initiatives trigger an additional fee payment ('post acquisition fees'); it is left to the discretion of GPs.[7] Note also the potential for indirect fees such as GPs hiring a law firm for the company at a premium price and receiving a kick-back from the law firm.

In a nutshell, transaction and monitoring fees appear to be ex-post discretionary compensation items; a fraction of these fees are refunded to LPs, but the amount is discretionary.

2.3. Related literature and hypotheses

Using a survey, Metrick and Yasuda (2010) are the first to provide magnitudes for transaction fees and monitoring fees. They do not express a particular judgement regarding these fees, stating that these are: '…just another way for BO funds to earn a revenue stream. While it may seem odd that funds are effectively paying themselves a fee to run companies that they own, the sharing rules with LPs can make this an indirect way for the LPs to pay the GPs for their services. From the perspective of the LPs, it should not matter whether these payments come directly through management fees or indirectly through monitoring fees, as long as the GP can create sufficient value to justify them.' In this section, we draw from the literature in Finance, Law and Industrial Organization to derive a set of hypotheses.

2.3.1. MSAs as a solution to an optimal dynamic incomplete contracting problem

[7] These additional payments may or may not trigger a rebate to LPs. E.g. in an SEC filing a GP called Riverside states that partners have invoiced portfolio companies for a range of services they have performed and these payments do not qualify for the rebate on portfolio company fees described in their LPA.

As pointed out by Adams, Hermalin, and Weisbach (2010), corporate governance models must abstract away from the complex and multifaceted solutions of the principals' problem. There may be a contracting model that can rationalize all the aspects of the MSAs. Here we mention a number of possible 'optimal contracting' explanations that we attempt to bring to the data but we would not claim to be comprehensive.

We begin with mechanisms studied in the Industrial Organization literature. The buyout industry seems to partly fit both the theories of three-tier hierarchies and the dynamic incomplete contract theories used in procurement contract design.

Three-tier hierarchy models feature a principal, a supervisor and an agent. In our context, the three tiers would be LPs, GPs and executives respectively. Tirole (1986) points out that the analysis of hierarchical structures does not boil down to the compounding of basic agency costs, due to the possibility of collusion via implicit or explicit side contracting between the agent and the supervisor, which he then introduces in a three-tier hierarchy model. The ensuing literature studies the conditions under which such collusion may be beneficial and, when it is not, how to minimize the negative effects. MSAs fit well the definition of side-contracts in that literature but the models studied do not allow for a repeated game setup. In addition, the literature focuses on asymmetric information and information manipulation by the supervisor and the agent in order to 'fool' the principal. As a result, most mechanism designs that have been developed so far may not apply to our context.

An exception is the intuition developed by Itoh (1993) and Holmstrom and Milgrom (1990) that side contracting may result in an efficient risk allocation between the supervisor and the principal, allowing principals to save on risk compensation. It seems plausible that LPs allow GPs to enter MSAs in order to reduce the volatility of GP profits, hence reduce GP income risk, and that in turn allows LPs to pay GPs less on average.

The procurement literature in Industrial Organization may be more directly related to the problem at hand despite it featuring only two layers: a principal and an agent. This literature deals with incomplete contracting in a (long-term) dynamic setting and the central question is how to implement state contingent effort. The solution in this literature is often to have an initial minimal and standard contract (like the LPA) and then allowing for adaption costs to be paid to the agent. MSAs could be viewed as such adaptation tools. If it becomes more costly to execute and monitor LBOs

because of tighter credit conditions, for example, then GPs can still perform optimally their task because the extra cost can be recouped via MSAs. Hence fees should be higher for riskier companies, and at times of higher LBO environmental complexity: e.g. times of high credit spreads, following Axelson et al. (2013), and lower risk premium, following Haddad, Loualiche and Plosser (2017).

In the private equity literature, the main model of security design (or fund design) is that elaborated by Axelson, Strömberg, and Weisbach (2009). The authors argue that the central friction between GPs and LPs is the incentives GPs have to engage in negative net present value projects once LPs have committed the capital. The reason is that GPs can be better off spending LPs' cash commitments even when it slightly hurts returns. This effect is particularly severe when GPs get close to their five years investment deadline. Axelson, Strömberg, and Weisbach (2009) argue that lenders act as the ex-post gatekeeper to prevent 'GPs going for broke.' They do not allow for the presence of MSAs in their model, but MSAs could significantly counteract GP's incentive to invest in bad projects because they offer compensation that can be performance sensitive and is ex-post LP commitment time. An empirical implication is that portfolio company fees are higher when funds are closer to their investment deadline, i.e. when funds are older at the time of the LBO.

Recent literature analyzes the cross-section of management and carried interest fees charged across a large sample of funds. Robinson and Sensoy (2013) show empirically that funds with higher management and carried interest fees have higher gross-of-fees returns and similar net-of-fees returns compared to other funds. Similarly, Huther et al. (2015) show that GPs which use a more expensive carry structure (deal-by-deal instead of whole fund carry) have higher returns. From that stream of work, one may anticipate that GPs using extra layers of fees are those performing best. In a similar vein, we could think of ex-post discretionary fees as a way for GPs to fully capture the price for talent. Chung et al. (2012) argue that GPs capture their talent rent by raising larger funds: fees do not change but the basis goes up, and thus the profit. This is reminiscent of the mechanism in the Berk and Green (2004) model. From this literature, we conjecture that it may be optimal to start with a standard and relatively low compensation and allow GPs to adjust compensation upward using portfolio company fees as and when GPs are successful. An empirical implication is that fees are positively and primarily related to the past and current performance of

GPs. However, we could also have a negative and non-linear relationship between fees and current GP performance because ex-post fees can reset the incentives of GPs whose carried interest is 'out-of-the-money'.

Monitoring fees described above could be seen as a layer of junior debt. In private equity the tension between debt-holders and equity-holders is mainly determined by the GP's reputation with lenders, as shown by Demiroglu and James (2010), Ivashina and Kovner (2011), Hotchkiss, Strömberg, and Smith (2014), and Malenko and Malenko (2015). On the one hand, more reputable GPs obtain debt at a lower cost and could 'afford' to charge more portfolio company fees. Hence, monitoring fees should increase with GP creditor-reputation. On the other hand, monitoring fees could be a commitment device used by low creditor-reputation GPs because they need to repay yearly coupons on senior debt first in order to receive regular monitoring fees. Similarly, they need to repay the senior debt in full in order to receive accelerated monitoring fees. In this case, less reputable GPs need to charge more portfolio company fees.

In addition, if a company is in financial distress, it is well known that equity-holders have less incentive to work hard because the benefit of their work will primarily accrue to debtholders. With an MSA in place, supervisors have a sharp incentive to generate extra cash flows because they can be compensated for it (via increased monitoring fees for example). An empirical implication is that companies that are more at risk of financial distress pay higher fees, and that fees go up in times of high general financial distress.

Despite their variety, there are common predictions of these optimal contracting views. GP fund flows should be insensitive to the amount of portfolio company fees since LPs have no reason to sanction or reward GPs as a function of their fee policy. Under these optimal views, it is unclear why GPs would rebate any fees to their LPs. In fact, GPs should retain a significant fraction of the portfolio company fees they charge otherwise the benefits highlighted above would not materialize. And we would not expect any time-cycles in the average fraction rebated.

2.3.2. Tax optimization

In Tax Notes, Polsky (2014) argues that monitoring fees lack compensatory intent and are, instead, dividends: '…monitoring fee payments are payments made by the portfolio company to

benefit shareholders in their capacity as shareholders. While the private equity firm formally receives the monitoring fee payment, the private equity fund, which is the entity that holds shares in the portfolio company, receives all or nearly all of the economic benefit of the monitoring fees through management fee offsets. Thus, monitoring fees are non-compensatory payments that benefit shareholders, also known as dividends.'

In general, tax arbitrage could be a motivation for charging both transaction and monitoring fees. Under this view, GPs receive a special dividend at the time of investment inception ('transaction fee'), when certain events occur (e.g. 'fee for recapitalization', 'fee for asset disposal', 'termination fee') and receive a regular annual dividend ('a monitoring fee'). The regular dividend is either fixed, or expressed as a fraction of EBITDA, which then resembles a 'dividend yield'. These dividends are dressed up as 'services fees' in order to be treated as an expense by the company, hence be tax deductible. LPs benefit as long as the rebate is high enough and the part of the fees that is not rebated can be seen as the compensation of the GP for intermediating this tax saving.

We derive some empirical implications from this tax arbitrage view. All else being equal, GPs that charge more fees offer more tax savings, and therefore should have higher returns and attract higher subsequent capital flows from LPs. In addition, more fees should be charged when companies have positive earnings and tax payments because the tax savings are then immediate (rather than carried forward). This prediction should hold both in the time-series (at times of larger corporate profits) and in the cross-section. Finally, GPs should rebate at least 60% of the fees to LPs as the maximum marginal corporate tax rate is 40%.

2.3.3. Other related papers

Kaplan and Strömberg (2003) show that venture capital contracts between GPs and portfolio company executives are close to those predicted by financial contracting theories. Kaplan and Strömberg (2004) argue that agency and hold-up problems are important to those contracts' design and monitoring, but that risk sharing is not. Cumming (2008) shows that stronger GPs' control rights increase the likelihood that an investment exits by trade sale.

Gompers and Lerner (1999) present the first study of LPAs. Metrick and Yasuda (2010) build a model to estimate the expected revenue to GPs as a function of their LPA for a large sample of

funds. Litvak (2009) offers a legal critique of these agreements. Phalippou and Gottschalg (2009) compute the value of different fee arrangements based on observed private equity fund cash flows.

More broadly, our findings are related to Jensen's (1989) conjecture that interests are well aligned between all parties in private equity. Axelson, Strömberg, and Weisbach (2009) show that the financial structure of LBO funds minimizes agency conflicts between GPs and LPs. Barber and Yasuda (2017), and Brown, Gredil, and Kaplan (2017) study whether GPs can fool LPs by manipulating net asset values when fundraising. Arcot et al. (2015) analyze the conflicting interests between LPs and GPs in the context of secondary buyouts. Outside of private equity, Cronqvist and Nilsson (2003) estimate the agency costs of controlling minority shareholders.

A large literature on 'collusion under asymmetric information' follows Tirole's (1986) work: e.g. Kofman and Lawarrée (1993), Khalil and Lawarrée (1995), Laffont and Martimort (1997), Faure-Grimaud, Laffont, and Martimort (2003), and Laffont and Martimort (2000). This literature focuses on collusive behavior between supervisors and agents where supervisors are auditors or regulators. The closest study in that literature is perhaps that of Celik (2009) who proposes that principals should contract with both the supervisor and the agent to manipulate the communication between the supervisor and the agent. In our context, LPs would offer GPs a monetary reward if the GP only signs MSAs that are approved by LPs ex-post.

Other related studies cover GP monitoring activities, such as Bernstein, Giroud, and Townsend (2016), Cornelli, Kominek, and Ljungqvist (2013), and Celikyurt, Sevilir, and Shivdasani (2014); operating performance improvements in LBOs, such as Cohn, Mills, and Towery (2014) and Guo, Hotchkiss, and Song (2011); shrouded attributes such as Gabaix and Laibson (2006); CEO fixed effects, such as Bertrand and Schoar (2003); non-private equity investment funds' compensation structures, such as Tufano and Sevick (1997) for mutual funds, and Goetzmann, Ingersoll, and Ross (2003) and Agarwal, Daniel, and Naik (2009) in hedge funds; and executive pay, with a group of papers arguing that CEOs set up their own pay, such as Bebchuk, Cremers, and Peyer (2011), and Hartzell and Starks (2003), while others, such as Kaplan (2009), disagree.

3. Data

3.1. Data source

Our sample consists of U.S.-based companies that went through a Leveraged Buy-Out (LBO) sponsored by a private equity firm, and that had to file with the Securities and Exchange Commission (SEC). Companies subject to an LBO must file with the SEC if they are publicly traded when targeted (so-called 'public-to-private LBOs'), if they end their private equity sponsorship via an Initial Public Offering (IPO), or if they issue publicly traded debt. SEC filings are publicly available electronically since 1995.

Our set of IPO-exited LBOs comes from the Cao and Lerner (2009) sample between 1981 and 2006, and then from Capital IQ from 2007 to 2013. The rest of our sample comes from Capital IQ: the list of public to private LBOs, and all the transactions classified as US LBOs with a TEV of $10 million or more, excluding sponsor firms with less than five LBOs listed in Capital IQ, and selecting the sub-set of companies for which post-LBO EBITDA is available.[8] In order to compare fees across companies, we need to scale them. In practice, transaction fees are expressed as a fraction of TEV. Requiring this information in Capital IQ reduces our sample by one third.[9]

SEC filers need to declare i) 'material definitive agreements' such as credit agreements and MSAs; ii) previous fiscal year's 'related party transactions' which describe any *non-arm's length* fee agreement worth more than $120,000; and iii) financial information for the preceding three years. As a result, filings provide annual information on portfolio company fees. Yet, the large amount of SEC filings, changes in company names, and overall complexity of LBO transactions make the data collection process tedious and non-trivial: we spent an average of three hours per company.

Filings do not always cover all years from inception to exit of the LBO. For example, LBOs exited via IPO with no publicly traded debt are required to report fees only for the three years prior to the IPO. If the LBO is held for more than three years, we do not know whether an initial transaction fee has been paid. We exclude 112 such LBOs and end up with 592 LBOs in our sample. 140 of these 592 LBOs still have 'incomplete' fee information.

[8] The latter filter selects companies that had to file periodic statements with the SEC. In addition, we cross check with a sample of public to private transactions taken from Capital IQ as these transactions often have publicly traded debt. In addition, as Guo, Hotchkiss, and Song (2011) and Hotchkiss, Strömberg, and Smith (2014) also assembled datasets of LBO sponsored companies that filed with the SEC, we also use their data to cross-check ours.

[9] We rescue 40 observations by using 'total asset' value post LBO reported by Capital IQ. Regressing TEV on total asset (in the sample for which both variables are available) generates a unit slope and an R-squared of 70%; showing that this substitution is reasonable.

3.2. Descriptive statistics: Portfolio Company Fees

We begin by analyzing key descriptive statistics drawn from the 454 LBOs with 'complete' fee information, i.e. LBOs which are exited and had to report their related party transactions from investment inception to the exit to the SEC. We distinguish between five fee categories. As described in the previous section, the LBO transaction fee is for 'financial advisory services and capital structure review' in connection with the acquisition of the LBO target company. Similarly, transaction fees may be charged when GPs sponsor an add-on acquisition for that LBO target company (the latter being called a platform investment in this case). We label these fees 'add-on transaction fees.'

Monitoring fees are charged to compensate for services broadly defined as 'certain management, consulting and financial services' made during the life of the investment. They are also sometimes referred to as advisory fees and are not contingent on services being actually carried out. We distinguish between the regular monitoring fees, i.e. those paid during the investment's life, and the accelerated monitoring fees, which are paid at exit (also referred to as 'termination fees.')

There are a number of additional portfolio company fees. For example, 'director fees' compensate directors for serving on the board of portfolio companies. As they are a priori arms' length related party transactions they do not need to be recorded in SEC filings. An important fee seems to be 'break-up and topping fees.' We do not see them in SEC filings. It is unclear how these fees are charged: they may be rolled up in the transaction fees of successful acquisitions and thus indirectly recorded as transaction fees.

The first line of Table 1 – Panel A shows that different fees are charged at different frequencies. The most frequent fee is the LBO transaction fee: only 25% of the companies do not pay it. However, only 16% of companies do not pay any of the fees.

The most controversial fee is probably the termination fee (a.k.a. accelerated monitoring): of these five types of fees it is the only type that generated a fine from the SEC (as of 2015). We observe that as many as 72% of the LBOs do not charge any termination fees. Interestingly, the majority of MSAs do have a provision for termination fees, which means that GPs voluntarily forgo this fee in most cases. Overall, termination fees represent only 15% of the whole fee bill. Transaction fees represent nearly half of all fees (45% for LBO + 4% for add-ons).

< Table 1 >

To put these fees into perspective we need to scale them by a measure of company size. Transaction fees and 'other' fees are often quoted as a function of TEV while monitoring fees tend to be annuities and/or a function of EBITDA. We use different measures of company size: TEV (including that of any add-on acquisition), total EBITDA generated during the life of the investment, total sales generated during the life of the investment, and the equity deployed by LBO funds in that transaction (again, including that of any add-on acquisition).

Fees add up to 1.75% of TEV. The two transaction fees together represent 0.88% of TEV. The two monitoring fees together are of similar magnitude at 0.72% of TEV. Fees are about half when expressed as a function of sales and about twice as much when expressed as a fraction of EBITDA. Specifically, fees represent 3.6% of the total EBITDA, i.e. about 1% of EBITDA per year (the average holding period is four years). Interestingly, the relative transaction fees and monitoring fees both coincide with the lower bound of the range that Metrick and Yasuda (2010) gather via interviews: 1% to 2% for transaction fees, and 1% to 5% of EBITDA per year for monitoring fees.

Table 1 – Panel B shows the fees broken down per exit channel. Not surprisingly our sample is dominated by IPO-exits but we have many exits via sales (both to strategic buyers and financial buyers), and bankruptcies. In fact, our fraction of bankruptcies, both in number (15%) and value (19%), are close to those reported by Hotchkiss, Strömberg, and Smith (2014) who estimate default rates at 17.9%.

All of the fees are virtually the same across exit types except for accelerated monitoring fees. Recall also that accelerated monitoring fees are contentious because they represent a payment for services that will not occur. But IPO-exits are only partial exits. GPs stay involved with the companies past the IPO date. An explanation for the finding that GPs often forgo charging this fee and for its mere existence (paying for a service that will not be rendered) is that GPs get paid at the time of the IPO for the monitoring they might continue to do afterwards. When the exit is not an IPO, monitoring stops and termination fees are hardly ever charged then.

LBOs that went bankrupt have the same transaction fees and regular monitoring fees as the rest of the sample. These LBOs were not a priori more burdened than other LBOs fee-wise. More generally, this indicates that there is no obvious cash transfer away from debtholders.[10]

Table 1 – Panel C shows the fees broken down per year of LBO inception. About one third of the LBOs took place before 1998. In dollar terms however they represent only 17% of the sample. The 1999-2002 period was relatively cold for the LBO industry. A boom started in 2003-2004, accelerated in 2005-2006 and reached a peak in 2007-2008. What is striking is the consistency of the fees across these significant industry cycles: 1.74%, 1.65%, 1.91%, 1.86%, and 1.53%. We have only 19 LBOs that occurred post-crisis and fees seem higher due to higher accelerated monitoring fees. Only accelerated monitoring fees and 'other' fees exhibit more of a cycle, and the cycles seem to be the opposite. Accelerated monitoring fees seem highest when other fees are lowest. Yet, there are no dramatic changes from one period to the next for either one of these fees.

The important take away from this panel is that although portfolio company fees started to be widely discussed in the press and practitioner reports post-crisis, they have existed since as far back as we can get. They are not a phenomenon that appeared in the 2004-2008 boom before disappearing with the crisis. They have always been around and with similar magnitudes throughout.

Table 1 – Panel D lists companies that paid the most fees. The top five companies alone paid a total of $2.59 billion (in 2014 US dollars). At the top of this ranking is TXU which is also the largest LBO to-date. The fees total $666 million even though it did not charge any termination fees, nor add-on transaction fees. Relative to TEV, it is below the overall sample average.

Three of these top five payers exited via an IPO (First Data Corp, HCA, Freescale Semiconductor). Harrah's entered into an IPO too but only a small part of the company was floated. A few months later, it filed for bankruptcy. The rest of the LBOs in the 'complete sample' paid nearly $12 billion in fees, bringing the total to $14.5 billion. Note that all figures are brought to 2014 US dollars using the CPI index. This has an impact on absolute amounts but not on relative amounts.

3.3. Overall fee bill

[10] This is nonetheless a point of tension. There have been lawsuits where lenders have accused GPs of charging excessive fees prior to companies going bankrupt. E.g. Buffet's restaurant lawsuit was settled for $28 million.

We now add the 'incomplete' sample. This sample includes 57 LBOs that are not exited, hence their fee series is incomplete by definition. In addition, there are 81 LBOs that are exited but had to file with the SEC for only part of the investment period. Adding these 138 incomplete observations to form an augmented sample not only minimizes the loss of information on these partial fee time-series but also makes the sample more representative: most of these incomplete observations are not IPO-exited deals (that is why they are more likely to be incomplete.) Yet, we need to complete the time-series of monitoring fees in that sample to avoid introducing a downward bias in fee estimates. The procedure is detailed in an internet appendix (not included here due to space constraint).

Table 1 – Panel E shows that in the augmented sample of 592 observations, we have $10 billion of transaction fees, $8.1 billion of monitoring fees, and about $1.5 billion of 'other' fees, bringing the total to nearly $20 billion. The aggregated TEV is $1.12 trillion (2014 dollars), which means that in this augmented sample fees are still about 1.75% of TEV.

The rest of the paper focuses on transaction fees and monitoring fees because we cannot impute 'other' fees for the part of the sample that is incomplete. In addition, although reported as 'non-arms' length related party transactions to the SEC, the 'other' fees are typically fees for clearly identified investment banking services. Notice that we do not record director fees, break-up fees, expense claims, and kick-backs from portfolio company suppliers. We label portfolio company fees as the sum of transaction fees and monitoring fees; but the actual portfolio company fees are more than what we report here.

3.4. Economic relevance: A back-of-the-envelope calculation using CalPERS data

To put these fee amounts in context, we make a back-of-the-envelope calculation using CalPERS data. By the same token, this exercise further illustrates some of the mechanics we discussed above.

As shown in Table 1 - Panel A, portfolio company fees represent 6.2% of the aggregate equity value invested by GPs on behalf of their LPs. CalPERS invested $41.4 billion across private equity funds with vintage years 1991 to 2008, and would have then paid $2.6 billion in portfolio company fees. As specified in LPAs, however, a fraction of these fees is rebated against the management fees due. How much is the average rebate rate?

Carlyle, KKR, Blackstone and Apollo – the four largest LBO firms – are publicly listed. They publish their revenue sources every quarter. Apollo collected $1.28 billion (between 2007 and 2012) and rebated 61% of this amount. KKR collected $2.4 billion (from 2007 to 2014) and rebated 39% of this amount. Other GPs do not disclose this information. We assume that the effective rebate rate for 1991-2008 vintage years is 50%, implying a rebated amount of $2.6 billion*50% = $1.3 billion.

We assume that the management fees due by CalPERS is 2% of capital committed for the funds first five years and 1% of half of the capital invested for another five years. We do not discount for simplicity, and obtain $5.4 billion.

The amount of management fees called by GPs would then be $5.4 billion minus $1.3 billion, i.e. $4.1 billion. CalPERS current reporting system (and that of most other LPs) would record $4.1 billion of management fees paid. Note that CalPERS provide the details of the management fees paid in its comprehensive annual report since 2003. The last fiscal year available is 2013, and over these eleven years, management fees paid add up to exactly $4.1 billion.[11]

CalPERS recently reported the carried interest paid on the sample of non-liquidated funds ($3.4 billion of realized carry plus $1.7 billion of unrealized carry). We estimate a carry for all 1991-2008 funds and find it to be $5.3 billion. When we compare our estimate to the actual number reported by CalPERS for the overlapping sample, we are very close and thus confident this is a good estimate.

To sum up, over the last 25 years, CalPERS paid: $4.1 billion of management fees, $5.3 billion of carried interest, and (estimated) portfolio company fees of $2.6 billion, which they have not tracked so far. In comparison to the two widely known fees, portfolio company fees do not seem negligible for LPs.

< Table 2 >

4. Fees and Company Characteristics

4.1. Descriptive statistics: Company characteristics

Table 2 presents descriptive statistics for the sample of LBO transactions. The unit of observation is an LBO. On average, monitoring fees are about $14 million and transaction fees are

[11] To be precise, one would need to add the years 2002 and before, plus year 2014, which had not been published at the time of the paper's completion, and subtract fees of vintage years 2009 to 2013; our estimate of the sum of this all is close to zero.

$17 million. TEV (which includes that of any add-on acquisition), averages $1.7 billion. The median is lower at $638 million - this is due to some large deals in our dataset (e.g. Energy Futures). In addition, as the LBOs in our sample have either issued public debt, went through an IPO, were public-to-private, or some combination of these events, they tend to be larger than average.

The rest of the descriptive statistics are in line with those shown in the literature and in practitioner reports, indicating that besides a tilt towards larger transactions, our sample is representative. Leverage averages 63%. The average holding period is 4.1 years with an interquartile range of two to six years. The average TEV to (Last Twelve Months; LTM) EBITDA ratio is 9.4 and the average Debt to LTM EBITDA is 6.2. These two figures are high, but in line with what is usually reported for large LBOs. The median LBO takes place in 2002. Hence our sample counts a large number of LBOs that occurred prior to the 2003-2008 boom. 37% of the LBOs have made add-on acquisitions. We also estimate a cash-on-cash (equity) multiple realized by GPs and find that it averages 2.63, with a median at 1.65, which is in the ballpark of what is reported in other studies; see e.g. Lopez-de-Silanes, Phalippou, and Gottschalg (2015).

Relative to TEV, monitoring fees are more widely distributed than transaction fees, but relative to EBITDA, it is the opposite. On average there are 1.76 GPs sponsoring an LBO and together they own 86% of the equity; the rest of the equity is usually mostly owned by management. The amount of fees collected per dollar of equity intermediated by GPs is therefore higher than per dollar of TEV: nearly 4% on average for both monitoring fees and transaction fees.

The Compound Average Growth Rate (CAGR) per annum for both Sales and EBITDA is 17/18%, which is high but includes externally financed add-on acquisitions. Interestingly, the (present value of) Earning Before Tax (EBT) during investment life is negative on average. This is mainly due to debt interest payments. As a result, we also observe that the average (present value of) corporate taxes paid during investment life is nearly zero, i.e. there is as much corporate tax credit cumulated as tax paid overall. The benefits of further lowering corporate taxes using portfolio company fees is therefore probably more limited than at first sight.

4.2. Regression analysis

We analyze the determinants of fees paid by a given company. Table 3 – Panel A shows results with the natural logarithm of monitoring fees as the dependent variable whereas Table 3 –

Panel B shows results with the natural logarithm of transaction fees as the dependent variable. We therefore analyze absolute fee levels (in log) and use as independent variables (the log of the present value of) i) yearly EBITDAs generated during the life of the LBO; ii) debt raised (at LBO inception and thereafter); and iii) Total Enterprise Value (at LBO inception, plus add-on acquisitions).[12] The rest of the 'base' control variables are those with a valid entry for each observation.

The first three specifications test whether fees are time dependent. Ex-post adaptation fees may be higher when it is difficult to execute and monitor LBOs because GPs need to exert more effort. The first specification introduces proxies for 'difficult' LBO times: level of credit spreads, following Axelson et al. (2013), and expected equity risk premium, as in Haddad, Loualiche, and Plosser (2017).[13]

The second specification introduces a scaled measure of buyout activity as constructed by Haddad, Loualiche, and Plosser (2017) and similar to that proposed by Kaplan and Strömberg (2009). None of these three variables are statistically significant. To assess whether any alternative proxies for business or industry cycle could play a role, we introduce quarter of LBO-inception fixed effects in the third specification. The increase in R-squared is negligible.

Next we control for holding period and thus run the specification on the sub-sample of realized investments. Holding period is not statistically significant: GPs do not charge more or less depending on how long they hold (and thus monitor) the investment for.

The next three specifications introduce company characteristics discussed in the hypothesis section. We start with a dummy variable that is equal to one when Earnings Before Tax (EBT) is negative (and zero otherwise). Although the tax benefits of monitoring fees are lesser when EBT is negative, we observe a positive and not a negative coefficient (albeit not significant).

[12] We also run this analysis with ratios: fees relative to TEV or EBITDA, control for leverage ratio (Debt to TEV), buying multiple (TEV to EBITDA). Results are similar: company characteristics are not significantly related to fees.

[13] We take the value of these variables in the quarter of investment inception. Results are similar if we use the average of these variables during the life of the investment. Alternative proxies for LBO cycles are not significant either. We used the spread between the ratio of EBITDA to Enterprise Value and high yield rate proposed by Kaplan and Strömberg (2009) to measure the expected return on LBOs. We used the VIX index which measures implied volatility from option prices, and the debt market overvaluation proxy of Harford, Martos-Vila, and Rhodes-Kropf (2014).

The sixth specification introduces EBITDA growth (realized during the investment), and we find that it is not statistically significant. As we may be concerned with reverse causality we also use the growth in EBITDA prior to the LBO and the ratio of TEV to EBITDA at LBO inception as a measure of expected growth. None of these variables are significant either (non-tabulated). To evaluate risk, we use EBITDA volatility and find that it is not statistically significant (EBITDA volatility prior to the LBO is not significant either; non-tabulated). We note that the amount of debt raised is not related to fees but it is unclear whether more debt is associated with higher risk.[14] In the last specification, we find no relation between fees and the equity return realized by GPs.

Among the core control variables we note that EBITDA is strongly related to monitoring fees, but not TEV. In addition, more fees are charged if more GPs are investing in the LBO and there is a positive time trend in amount of monitoring fees charged.

Results in Panel B focus on transaction fees (instead of monitoring fees) and are overall similar to those in Panel A. The main difference is that TEV is related to transaction fees. This was expected since these fees are often expressed as a function of TEV. More surprisingly is the significant positive relation with EBITDA. It means that at the time of LBO inception a higher transaction fee is charged on companies with higher anticipated EBITDA (it is also significant if we use the last twelve months EBITDA at the time of LBO inception).

We conclude that fees are insensitive to business and industry cycles, and to fundamental company characteristics such as earnings growth and volatility. In non-tabulated results, we use other characteristics available in Capital IQ (e.g. transaction type: divisional buyout, public-to-private) and find that these variables are not significant either. We control for industry fixed effects throughout and the impact of these fixed effects on R-squared values is negligible (non-tabulated; we also use different measures of industry classification and obtain similar results). We also run these specifications with fee ratios as dependent variables: Monitoring fees to EBITDA, Transaction fees to TEV, Monitoring fees to Equity, Transaction fees to Equity. The results are similar.

< Table 3 >

5. Portfolio Company Fees and GP Characteristics

[14] Companies that are ex-ante less risky are financed with more debt, see Gompers, Kaplan and Mukharlyamov (2016)

In the previous section we find that proxies for company riskiness, difficulty to monitor, and tax liabilities do not appear to be related to amounts charged to companies by GPs. This is not consistent with what either the 'risk-sharing' or the 'tax' hypotheses would have predicted. We now test the optimal contracting views that predict that it is GP characteristics that are the key drivers of what companies need to pay (e.g. past GP performance, GP reputation).

5.1. Fees charged to a portfolio company by a given GP

When several GPs invest in a given LBO they do not all receive the same amount of fees. Transaction fees are often split according to ownership; it is less often the case for monitoring fees. There are on average 1.76 GPs invested in a given LBO and thus 1,044 observations of a 'given GP participating in a given LBO.' Descriptive statistics for this sample are shown in Table 4. A given GP charges on average $7.8 million in monitoring fees and $9.6 million in transaction fees. We observe more zeros here, with more than 25% of the GP-LBO pairs having no monitoring fees (same for transaction fees). EBITDA and TEV are scaled by GP ownership so we can compute meaningful ratios at the GP level: monitoring fees to EBITDA and transaction fees to TEV. In addition, we construct the average (relative) fee charged by a given GP in prior LBOs. We have 375 unique GPs, hence the number of observations here drop by as much, down to 669.

5.2. GP capital flows, past performance, and LP base

We match our sample to the Preqin database that contains the size and vintage year of 22,675 private equity funds. We compute the amount raised by a given GP post-LBO and pre-LBO, and GP age at the time of LBO inception. These statistics cannot be computed for GPs that do not raise external capital (e.g. captive bank-run funds) and excluding these cases reduces our sample to 842 observations.

We also measure the amount of capital raised by each GP post financial crisis (vintage years 2009 to 2015) and the amount of capital raised over the ten vintage years preceding the crisis (1999 to 2008). We require that GPs raised some capital between 1999 and 2008, which reduces sample size to 764. On average fundraising was halved. We also compute the age of the fund at the time of LBO inception, but the identity of the funds through which the GP operated is not always available in

SEC filings; there are 700 observations and funds are on average 1.9 years old at the time of the LBO.

Next, we match our sample to the Preqin database that contains performance data for 7,328 private equity funds. Following Harris, Jenkinson, and Kaplan (2014), in the absence of detailed cash flow data, we use cash-on-cash fund multiple as a measure of fund performance: the sum of all distributions plus the residual value of ongoing investments in a fund divided by the sum of all of the capital invested, net of all fees for LPs (including monitoring and transaction fees, and reflecting any rebated amount). Pre- (post-) LBO GP performance is value weighted and includes funds raised by the GP over the preceding (following) ten years. The average multiple in our sample is 1.98 pre-LBO and 1.65 post-LBO; similar to statistics reported by, e.g., Harris, Jenkinson, and Kaplan (2014). When a GP has more than two funds pre LBO we also compute performance volatility. In addition, we compute GP performance statistics over the ten years pre 2008 crisis: average multiple across GPs is 1.67 and average volatility across GPs is 0.57. Pre-LBO (pre-crisis) GP performance data is available for 683 (765) observations out of the 842 observations which involve a GP raising external capital. For the sub-set of observations for which we know fund identity and its performance, we compute a dummy variable that is one if fund IRR is below 8% and is zero otherwise, as a proxy for 'whether the fund is out of the carry.' It is the case for 22% of the funds (634 observations).

Next, we match our sample to the Preqin Limited Partners database that contains 29,409 PE fund investments made by 2,576 LPs. Following Cavagnaro et al. (2015) we proxy LP skill by the average performance of the private equity funds an LP invested into. Specifically, for each LP, we compute the average performance (measured by Cash Multiples) of the private equity funds it has invested into (as of the time of the LBO); this variable is 'LP past performance'. Then, for each GP we compute the average 'LP past performance' across all of its LPs and label this 'LP skills.'

5.3. Fees implicitly charged to its LPs by a given GP

GPs rebate part of the fees they charge companies to their LPs. As a result, if we study how fees charged relate to GP characteristics we should not only consider the 'gross' amount (that charged to companies) but also consider the 'net' amount (what is kept by the GP after any rebate to LPs).

As mentioned above, the fraction of transaction and monitoring fees rebated is specified in the LPAs. We have a dataset of 278 LPAs obtained from a fund-of-funds, and 26 LPAs that are available online. In addition, three academics shared with us fee datasets derived from LPAs they received from LPs.[15] Furthermore, information on rebate policy of certain GPs could be found on the internet (e.g. minutes of pension fund investment committee meetings, SEC Advisor registration form ADV part 2, SEC reports on GPs fined for their portfolio company fee practices).[16] Overall, we observe the rebate applied to portfolio company fees for 597 GP-LBO observations. We find that the average rebate is 70% for monitoring fees and 72% for transaction fees; with an inter-quartile range from about 25% to 80%. Rebate rates are only relevant for GPs raising outside capital; hence coverage is 597/842= 71%.

The many 100% rebates we observe are difficult to explain for any optimal contracting theory. If GPs do not retain any of the fees charged to the agent, why would these fees be charged in the first place? A 100% rebate rate is consistent with the tax view but that view is difficult to reconcile with the many rebates below 50% because there is hardly any marginal corporate tax rate above 50%.

There are 202 GP-LBO observations with no portfolio company fees charged and for which we do not know the rebate policy. For these observations, however, net fees and gross fees are both equal to zero, irrespective to the rebate policy. We thus observe a net monitoring fee and net transaction fee for 799 observations; this is 77% of the overall sample (see internet appendix for details). Net of rebate, more than half of the LBO-GP observations have zero portfolio company fees.

It is interesting to look at heterogeneity of fee policy across GP net and gross of rebates. We observe that there is a large range of fees charged by different GPs: the inter-quartile range for monitoring fees (relative to EBITDA), for example, is 0% to 2.6%. If we run a simple one-way ANOVA test for equality of all mean fees across GPs the null hypothesis that all means are equal is strongly rejected. But GPs charging more could be those rebating more, implying that net of rebates there is less, and perhaps little, heterogeneity across GPs. Net of rebate, the inter-quartile range of

[15] These academics also obtained this information from fund-of-funds' internal databases (which contain LPAs of funds they considered invested into but have not necessarily invested into.) Note that these datasets contain private equity funds that are not LBO-focused, or not US-focused. As a result, these data sources cover 39% of our sample.

[16] Details are provided in the online appendix.

monitoring fees (relative to EBITDA) is reduced to 0% to 0.7%, but the mean is lower as well. If we compute the coefficient of variation (aka relative standard deviation), which is equal to standard deviation over mean, we obtain 1.36 for gross relative monitoring fees and fifty percent more (2.07) for net relative monitoring fees (results are similar for transaction fees). Hence relative standard deviation is higher for net fee. Consistent with this, we also find a negative correlation between rebate rates and gross fees and we also reject the null that all GP mean fees are equal when using net fees.

< Table 4 >

5.4. Important GP characteristics proposed in the literature

We construct two important variables proposed in the literature. First is the GP time-varying market share to proxy for GP's reputation with lenders as suggested by Demiroglu and James (2010): the number of LBOs sponsored by a GP divided by the total number of LBOs observed over the past 36 months (using Capital IQ). The average market share is small at 0.32%. Even the top quartile market share is only 0.43%; this is because we equally weight each LBO. The main reason why researchers have not value weighted is that TEV information is often missing. Second, we compute a more general measure of GP (lack of) reputation, proposed by Barber and Yasuda (2017), but it is available only for a subset of observations: this variable is equal to one if the GP does not have a top quartile fund in its track record according to the Preqin performance dataset, and zero otherwise. GP lacks reputation in 35% of the observations in our dataset; but this measure can be computed only for a sub-sample of our observations.

Finally, as in Acharya et al. (2013) we collect the biographies of the founding partners for each GP and record the fraction of these partners with graduate degrees (on average 69%), with a consulting background (on average 10%), and with an investment banking background (41%).

< Table 5 >

5.5. Regression analysis: Fees charged to companies by a given GP

We test the GP-based hypotheses described in section 1.3. The dependent variable is the fee charged by a given GP in a given LBO. Table 5 – Panel A shows the results for monitoring fees relative to EBITDA (gross of any rebate). We scale monitoring fees by EBITDA because results in

Table 3 indicate that monitoring fees are primarily related to EBITDA. Also, we work with scaled fees in contrast to Table 3 because we compare fees over time in several specifications. Since fees are related to measures of company size, we need to compare scaled fees rather than absolute fee levels.

The first specification includes all the characteristics that are available for all the observations. We first note the statistical significance of the dummy variable that is one if the GP made this investment after 2003 and has filed an S-1 form and is zero otherwise (labelled 'GP going public'). We will motivate and zoom in on this finding in the next section.

Cavagnaro et al. (2015) show that LPs vary in terms of skills and exhibit performance persistence. GPs backed by LPs with higher track record are therefore more likely to be backed by more skilled LPs. In the second specification, we observe that the most skilled LPs invest less in GPs with a high monitoring fee. This result is not consistent with any of our hypotheses and we discuss this finding further in the conclusion.

In the third specification, we introduce past fees charged by each GP, and the effect is large. The coefficient is 0.75, the t-statistics about 9 and the R-squared doubles (35%). Importantly, in these regressions, we cluster standard errors at the GP level which decreases *t*-statistics compared to what is obtained with other clustering choices (this is due to the GP-level persistence in fees). The finding of a strong persistence in fee policy implies that GP characteristics drive differences in fees charged.

We introduce a set of GP characteristics to test empirically the series of GP-based 'optimal contracting' views described in section 1.3. We begin with proxies for GP reputation (market shares, GP lack of reputation, GP age, amount of capital raised previously). None of these four proxies are statistically significant. Results are the same if these four control variables are included one at a time. We also find that the age of the fund at the time of the investment is not significant either.

Next, we study founders' backgrounds. The motivation here is twofold: i) Acharya et al. (2013) show that prior experience (being a consultant versus investment banker) has a material influence on the GP strategies;[17] ii) monitoring fees may be related to 'consultant' type of work while transaction fees may be related to investment banking type of work, hence having prior experience

[17] Reduction in sample size forces us to drop the variable called GP going public as it is zero for most observations.

in those fields may matter. We find that having partners with graduate degrees and a consulting background are both positively correlated with monitoring fees.

A set of variables related to GP past performance is added in the sixth specification. We use i) the average fund multiple generated on prior funds to measure past performance at the time of LBO inception; ii) a dummy variable that is equal to one if the fund investing in the focal LBO has an IRR below 8% to proxy for 'GP is out of the carry'; iii) the volatility of the multiple generated across previously raised funds as a measure of risk. None of these variables are significant at the 5% level test. We tried multiple combinations (use of IRR instead of Multiple, change in fund weighting schemes, use only the performance of the fund that is invested in the focal LBO etc.) We also run these specifications with fee level as a dependent variable rather than scaled fees, and with each control variable included one at a time. Results are similar. Past and current performance measures are never significant and if anything GPs with better past performance charge less (not more).[18]

As mentioned above, fees net of rebate are more relevant to LPs. Table 5 – Panel B shows the same regression output with post rebate fees. Results are similar. To sum up, results in Table 5 are at odds with 'optimal contracting' views.

5.6. LPs reaction to fees: Flow-Fee sensitivity analysis

We investigate the impact fee policy has on fund raising effort by GPs. This is a way to test whether LPs reward or penalize GPs that charge more fees. All of the hypotheses discussed in section 1.3 predict that GPs charging more portfolio company fees are not penalized by their LPs: capital flows should be either neutral or positively related to portfolio company fees. Furthermore, LPs should be particularly rewarding GPs that charge more fees *net* of rebate.

We run a multiple regression analysis where the dependent variable is the increase in capital raised pre- to post- LBO for a given GP (results are not tabulated). We find that the performance pre-LBO is strongly related to the change in capital raised. This is consistent with the literature: there is a

[18] To preserve space we do not tabulate results with transaction fees; they are similar. Transaction fees are persistent, negatively related to LP-skills and unrelated to measures of GP reputation and past performance. Older GPs charge less transaction fees, and GP with more volatile past performance charge higher transaction fees. GP background variables are not significant. We also run F-tests for the statistical significance of fixed effects, as in Bertrand and Schoar (2003). We find that quarter, year, and industry fixed effects are all not jointly significant, but GP fixed effects are highly significant.

strong flow-performance relationship in private equity [e.g. Robinson and Sensoy (2013)]. None of the other explanatory variables are significant. In particular, fees do not matter, whether we measure them gross or net of rebate. This result is robust to several changes in specification: e.g. we varied the post-LBO starting date (1 year, 2 years, etc. after LBO inception, or starting when the LBO is exited). Such evidence is consistent with LPs not minding these fees but it is not generally consistent with an LP-GP collusion to save on taxes.

Arguably, portfolio company fees became a point of tension and growing concern only after the financial crisis. The main association of LPs (ILPA) became vocal about these fees, asking that they should at least be 100% rebated to LPs. Newspaper coverage of these fees became more prevalent. The Dodd-Frank act included a provision for the SEC to investigate potential conflicts of interest in private equity, including an investigation of these fees. In a speech in May 2012, the SEC said it found violations of security laws for about half of the GPs under investigation. Two years later the SEC started to fine certain GPs. Google trend time-series for 'management services agreement' shows zero hits up until November 2009, then peaks, and stays equally 'googled' thereafter. The 2008 financial crisis may then offer an opportunity to measure LPs reaction to portfolio company fees becoming public information.

The regression results in Table 6 use growth in fundraising from pre to post 2008 as a dependent variable. Here, monitoring fees are consistently negatively related to the growth in capital raised, whether measured gross or net of rebate. Transaction fees are not significant across specifications though. The cross effect between fees and distance to the crisis shows that GPs with low transaction fees closer to the financial crisis raised more capital (all else equal), i.e. GPs that charged high transaction fees early on are not penalized for it. We also note that the rebate rate per se is not related to growth in fundraising and that effects are similar for gross and net monitoring fees.[19]

The finding that higher fees coincide with significantly lower future fundraising is perhaps the most difficult to reconcile with either the tax view or the optimal contracting view. LP's welfare is increasing in the amount charged in fees according to the tax view. Under the optimal contracting

[19] We also observe a strong positive relationship between growth in capital raised and past performance. We cluster standard errors at the GP level, i.e. we effectively consider all observations from one GP to be unique. Other choices of clustering (e.g. a double clustering on year and GP, or year and portfolio company) lead to higher t-statistics.

view there should be no significant relationship. It is plausible that GPs who charged more were those facing challenges with their investments and that is why they raised less money going forward. Yet, the effect holds after controlling for past performance. Hence LPs' reactions are beyond the effect of poor performance. It means that fees per se make LPs walk away from high-portfolio-company-fee GPs. This finding is however consistent with more skilled LPs avoiding GPs charging the highest portfolio company fees (see Table 5 – specification 2).[20]

< Table 6 >

These results may feel 'black box' and it is perhaps instructive to provide some economic magnitudes. Panel A – Table 7 lists the GPs with the lowest fees. These GPs have a total fee to TEV ratio below 1% and a total fee to EBITDA ratio below 2%. In fact, there is a gap between these GPs and the rest of the GPs. The GP with the highest fees in this list charges 0.8% (of TEV) and 1.4% (of EBITDA), while the next more expensive GPs charge respectively 1%, 1%, 1.1%, 1.2% (of TEV) and 2%, 2%, 2%, 2.1% (of EBITDA).

The GPs listed here have all raised funds post-crisis. A few of these GPs raised significantly more post-crisis than pre-crisis and press coverage of these fundraising events indicate that these GPs are in high demand; we illustrate this in the columns to the right of the panel.

Panel B is clearly different. We list the top quartile GPs in terms of fees (anonymized). It is important to bear in mind that this list is indicative rather than definitive. A number of assumptions are made to reach a per GP figure, the ranking also somewhat varies as a function of the scaling choice. We choose TEV and EBITDA based on our empirical results but other choices lead to slightly different rankings. Finally, we only have a subset of the investments made by a GP. There is significant persistence which gives some comfort that a sub-sample can provide a good proxy.

With these caveats in mind we observe that nearly half of these top fee quartile GPs did not raise a fund post crisis which basically means that they are out of business. Most of the GPs that did raise a new fund raised less than pre-crisis. There are nonetheless some exceptions. From the number of investments and TEV we see that none of the largest six GPs are part of this list. In particular, Blackstone, which is the only GP fined by the SEC on monitoring fee practices, is not part

[20] We also test for the possibility that GPs that anticipate getting out of business increase fees, i.e. they syphon what is left on the portfolio companies' cash account. But we find that changes in capital flows are unrelated to changes in fees.

of this list. This indicates that the SEC has not focused on GPs that charged extreme fees, but instead seems to have focused on 'famous' GPs.[21]

< Table 7 >

5.7. GPs selling their own company and change in fee policy

There is an interesting and potentially relevant event we can study here: in 2007-2008, three GPs filed an S-1 form in preparation for their IPOs. Blackstone filed an S-1 on June 21st 2007, KKR filed an S-1 on July 3rd 2007, and Apollo filed an S-1 form on April 8th 2008. GPs detail their fee income in these forms, including portfolio company fees, so that potential investors can value the 'GP' accurately.

A large literature, starting with DeGeorge and Zeckhauser (1993), argues and shows empirically that the incentives of managers to report increased revenues in the three years prior to the IPO are 'strong'. However, as modelled by DeGeorge and Zeckhauser (1993) the relationship between the decision to go public and an increase in fees might go the other way: those GPs that anticipated an unusual surge in fees decided to go public.[22] In other words, we need to separate out a timing story from a manipulation story.

First, we note that in our context, there are six GPs that are standing out by their size and three of them 'sell' part of their shares while the other three do not (Bain Capital, Carlyle and TPG). Appendix Table 2 – Panel A shows that past performance and past capital raised are similar across these large GPs. This is important because under the timing story, GPs who sold shares are those with superior reputation and this is what enabled them to both sell their shares and raise their fees. In other words, superior reputation is what causes both the selling event and a change in fees. In the private equity literature, reputation has been proxied by measures of past performance, as in e.g. Barber and Yasuda (2017), and past deal volume, as in e.g. Demiroglu and James (2010). Under these measures, the two sets of GPs are similar, which contradicts the timing argument. Moreover, comments in the press indicate that GPs had different underlying philosophies, rather than different timing opportunities.

[21] Results are similar if we use fees net of rebate. Most of the GPs listed in Panel A fully refund portfolio company fees.

[22] This hypothesis requires that the market does not have perfect foresight regarding these fees. Otherwise, it would price the trade-off between more fees now and more fees later. But note that these fees were essentially unknown back then.

In our setup, we have an additional way to separate out the timing story from the manipulation story. An important aspect is that the two types of portfolio company fees should affect valuations differently. On-going ten-year fixed monitoring fee contracts have a larger impact on investment company valuations than one-time past transaction fees. The latter fees are non-recurring while the monitoring fees are future contractual obligations that will be paid. Under the manipulation story, unlike under the timing story, monitoring fees should increase more than transaction fees.

Appendix Table 2 – Panel B shows fees for LBOs executed prior to 2002 and for LBOs executed in 2003 or later (pooled observations per GP). In the first sub-period, the three selling GPs charged lower monitoring fees (except for GP 2) than the other three large GPs and charged a similar amount to the rest of the GPs. The same is observed for transaction fees. Post-2003, we observe that monitoring fees (relative to EBITDA) increase by a staggering 80% for the three selling GPs. Their transaction fees also increase but more modestly: 32% overall. In contrast, two of the other three large GPs kept their monitoring fees constant. GP 4 had abnormal monitoring fees pre-2002 and then charged fees in line with the average post-2003.[23] The rest of the GPs increased monitoring fees relative to EBITDA by 35% and slightly decreased their transaction fees.[24] Results are similar with fees net of rebate.

There are hypotheses other than the timing and manipulation stories that one may postulate. For example, GPs who prepare to sell their company increase monitoring activities. However, GPs are highly incentivized to work as much as possible via the earning of carried interest and fees from managing future large funds [see Chung et al. (2012)]. It is difficult to think that GPs need shareholders pressure to monitor. In addition, any additional monitoring from those going public does not appear in higher performance as there is little return difference between the two sets of GPs.

[23] GP4 had large monitoring fees pre 2002 because of several quick flips: held companies for about one year then brought them public and charged a termination fee. Hence compared to one year of EBITDA these fees were large.

[24] The release date of the S-1 form is known, but some preliminary S-1 forms circulated prior to this. This means that the event is not precisely dated. By default, as preliminary forms were filed in 2006 and the last three fiscal years of revenues are discussed in those forms, we compare fees charged by GPs up until 2002 with those they charged from 2003 onwards. In robustness tests, we use other break years (2004, 2005) and find similar results (non-tabulated).

We acknowledge that the experiment is imperfect. Yet, we note i) the strong economic magnitudes; ii) the difference between changes in monitoring fee and transaction fee; and iii) the performance before and after the decision to sell shares is similar. These findings may indicate that GP patience plays a role in the determination of portfolio company fees. GPs that are under pressure to generate high income in the short run increase fees that are more discretionary and less salient.

6. Conclusion

In contrast to other fees charged by GPs, monitoring and transaction fees are not well documented. In addition, these fees are contentious because they are charged by GPs to companies whose board is controlled by these same GPs. During the 2008 financial crisis the providers of capital complained about these fees and, as a result, many GPs announced they would refund 100% of these fees going forward. Does this mean that fees appeared right before the crisis and disappeared right after, making our research an anecdotal and historical case study?

First, we find that at best 70% of these fees were rebated on average across GPs. In addition, even when a refund of 100% is mentioned in the LPA, the effective refund can be less because there are restrictions and further complications in those calculations that effectively reduce the rebated amount. Furthermore, we find that management service agreements contain more than just transaction fee and monitoring fee payment schedules. These agreements waive a number of GP fiduciary duties, contain several other fees that can be charged and that we have not included (e.g. break-up and topping fees), and allow GPs to claim wide ranging and discretionary set of expenses. Also, potential kick-back arrangements with suppliers to these companies may present the largest potential for conflicts of interest, and these are not addressed in either the LPA or the MSA. Hence, the issue of the potential for GPs conflicts of interest and their resolution in practice seems to be a highly relevant question.

In addition, this paper shows that these fees are commonplace and are not a new phenomenon. From as far back as we can measure them, we see a similar amount being charged, irrespective of business cycles. Overall, nearly $20 billion has been charged across 592 companies, representing 3.6% of all earnings (before interest, tax, debt and amortization) that these companies generated while being under GPs control. Even if these fees were to be 100% refunded to investors

going forward, the amounts charged are economically relevant and significantly impact the finances of a large number of corporations. It is important to know why and when companies pay these fees.

Another potential take away from our work is that, perhaps coincidentally, it is not until the SEC started to look into these agreements that practice started to change. This would give credit to the controversial idea that regulatory intervention is necessary even when so-classified 'sophisticated' parties contract with one another. Our study may offer a large-scale case study in corporate governance: How is the tension between ownership and control [Jensen and Meckling (1976)] solved in a $4 trillion market in which participants are classified as 'sophisticated', hence exempt from SEC oversight (up until recently)? Monitoring and transaction fees are non-arms' length fees that PE firms can charge to their portfolio companies while some of the fund managers sit on the company's board of directors. In a nutshell, in a lightly regulated industry, agents wrote contracts that *could* divert cash away from their principals. Our results indicate that the least skilled principals are those most exposed.

In terms of more specific policy implications, our results indicate that the GPs that the SEC has targeted so far are more 'big names' than 'worst offenders'. The fine amounts are also not commensurate with the amount we report here. One could argue that either these fees are accepted and no fine is expected, or these fees are not accepted and the fines should be higher. Moreover, accelerated monitoring fees are the fees that have attracted most regulatory and media attention. But we show that accelerated monitoring fees are only charged if and when companies go public. If monitoring fees are accepted practice then it is difficult to see why a fee charged at the time of the IPO that covers the monitoring of the GPs post IPO would not be accepted. In addition, we do not observe situations in which GPs just siphon all the cash flows out of portfolio companies via transaction or monitoring fees even when companies are in financial distress. More generally, we do not observe any tunneling of the type and nature documented in the literature for other industries and countries, such as Jian and Wong (2010) in China; Baek, Kang, and Lee (2006), and Bae, Kang, and Kim (2002) in South Korea; Bertrand, Mehta, and Mullainathan (2002) and Siegel and Choudhury (2012) in India. Perhaps, overall, market forces are at work.

Our study relates to a broader literature in industrial organization. The buyout industry seems well suited to study the three-tier principal-supervisor-agent model with supervisor-agent side

contracting, originally devised by Tirole (1986). This literature is primarily theoretical and our paper offers a large scale empirical study of a supervisor-agent side contract. Furthermore, these models are mainly developed in a static setting. In this paper, we highlight that the repeated interaction between the supervisor and the principal influences the nature of side contracts. Our empirical analysis may then inform future three-tier hierarchy models in dynamic settings.

Many questions remain open but hopefully, this first paper to study portfolio company fees and management service agreements will stimulate further research in this field.

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Table 1: Fees Charged to Portfolio Companies

This table shows descriptive statistics for the five categories of portfolio company fees we collected data on: LBO transaction fees, which are charged at LBO inception; add-on transaction fees, which are charged when add-on acquisitions are made; regular monitoring fees, which are charged during the life of the LBO investment; accelerated monitoring fees, which are charged when the LBO investment is exited; and 'other' fees, which are charged during the life of the LBO investment and which comprise predominantly refinancing fees. Total Enterprise Value (TEV) is the sum of the Total Enterprise Values of the original LBO and that of any add-on acquisitions all expressed in 2014 US dollars. 'Total sales' is the sum of yearly sales figures all expressed in 2014 US dollars, from LBO inception to exit; similarly, 'Total EBITDA' is the sum of yearly EBITDA figures all expressed in 2014 US dollars, from LBO inception to exit. Equity ownership by GPs is equal to Equity (equal to TEV minus net debt) times the sum of the ownership of all the GPs participating in the transaction. Statistics in Panels A to D are based on the 'complete sample' of 454 LBOs.

Panel A: Fee types and amounts

	LBO transaction	Add-on transactions	Regular monitoring	Accelerated monitoring	Other	All
Fraction of LBOs that are charged this fee	75%	19%	70%	28%	21%	84%
Total amount of this fee charged as a fraction of	-	-	-	-	-	-
Total fees	45%	4%	25%	15%	11%	100%
Total Enterprise Value	0.81%	0.07%	0.44%	0.28%	0.15%	1.75%
Total sales	0.26%	0.02%	0.14%	0.09%	0.05%	0.57%
Total EBITDA	1.66%	0.15%	0.91%	0.57%	0.30%	3.59%
Equity ownership by GPs	2.87%	0.26%	1.56%	0.98%	0.52%	6.19%

Panel B: Fees per exit channel

			Fee as a fraction of Total Enterprise Value (TEV)					
	No. of obs.	TEV	LBO transaction	Add-on transactions	Regular monitoring	Accelerated monitoring	Other	Total
Bankruptcy	68	154,668	0.82%	0.03%	0.49%	0.00%	0.10%	1.44%
Sale (strategic or financial)	133	194,899	0.73%	0.13%	0.40%	0.07%	0.15%	1.48%
Initial Public Offering	253	480,621	0.84%	0.06%	0.44%	0.45%	0.16%	1.95%
Total	454	830,188	0.81%	0.07%	0.44%	0.28%	0.15%	1.75%

Panel C: Fees over time (LBO inception date)

	No. of obs.	TEV	Fees as a fraction of Total Enterprise Value (TEV)					
			LBO transaction	Add-on transactions	Regular monitoring	Accelerated monitoring	Other	Total
1990-1998	163	138,852	0.72%	0.25%	0.41%	0.16%	0.21%	1.74%
1999-2002	98	90,271	0.77%	0.10%	0.46%	0.19%	0.14%	1.65%
2003-2004	80	118,941	1.04%	0.02%	0.39%	0.38%	0.08%	1.91%
2005-2006	66	193,413	0.82%	0.06%	0.46%	0.40%	0.12%	1.86%
2007-2008	28	237,731	0.75%	0.01%	0.46%	0.16%	0.16%	1.53%
2009-2012	19	50,981	0.85%	0.01%	0.47%	0.58%	0.18%	2.09%
Total	454	830,188	0.81%	0.07%	0.44%	0.28%	0.15%	1.75%

Panel D: Companies that paid the highest fees

(millions of 2014 US dollars)	TEV	LBO transaction	Add-on transactions	Regular monitoring	Accelerated monitoring	Other	Total	As a fraction of TEV
Energy Future (fka. TXU)	51,733	349	0	238	0	79	666	1.29%
First Data Corporation	32,195	302	0	168	75	59	604	1.88%
Hospital Corporation of America	39,719	174	3	72	194	89	532	1.34%
Harrah's Entertainment	30,418	223	0	178	0	0	402	1.32%
Freescale Semiconductor	20,230	221	0	92	73	0	385	1.91%
Total	174,295	1,270	3	748	342	228	2,590	1.49%
Other companies	655,893	5,456	599	2,914	1,953	989	11,910	1.82%
Total	830,188	6,725	602	3,662	2,295	1,217	14,500	1.75%

Panel E: Total fee paid

(millions of 2014 US dollars)	No. of obs.	TEV	LBO transaction	Add-on transactions	Regular monitoring	Accelerated monitoring	Other	Total	As a fraction of TEV
Complete Sample	454	830,188	6,725	602	3,662	2,295	1,217	14,500	1.75%
Augmented Sample without imputed fees	592	1,116,411	9,209	707	5,051	2,425	1,491	18,884	1.69%
Augmented Sample with imputed fees	592	1,116,411	9,209	818	5,705	2,425	1,491	19,648	1.76%

Table 2: Descriptive Statistics – Sample of LBOs

This table shows descriptive statistics for the 592 LBOs in our full sample; it shows for each variable the number of observations, mean, 25th percentile, 50th percentile (median) and 75th percentile. Monitoring fees are the sum of regular and accelerated monitoring fees; similarly, transaction fees are the sum of LBO and add-on transaction fees (see Table 1). Total Enterprise Value and Total EBITDA are defined in Table 1. Holding period is the number of years between the year of LBO inception and year of LBO exit (year of IPO if partially exited this way). LBO_TEV is the total enterprise value at the time of LBO inception; similarly, LBO_debt is the total debt at the time of LBO inception. LTM stands for Last Twelve Months prior to LBO inception. The ratio of TEV (*debt*) over EBITDA is computed only when LTM EBITDA is positive. Equity ownership by GPs is the fraction of equity owned by all the GPs who sponsor the LBO. 'Buyout volume (scaled)', and 'EBITDA/EV - High Yield spread' are taken from Haddad, Loualiche, and Plosser (2017); we take the value of these variables in the quarter of investment inception. Sales (*EBITDA*) CAGR is computed as Sales (*EBITDA*) in the year of LBO Exit divided by Sales (*EBITDA*) in the year of LBO inception to the power one over holding period. Volatility of Sales over total asset (*EBITDA over total asset*) is computed using the yearly ratios of Sales over total asset (*EBITDA over total asset*) figures. Top 4 auditor is one if the main GP auditor is a top four accounting firm (source: Preqin). Total Earnings Before Taxes, aka EBT (*total corporate taxes paid or credited; aka Tax*) is the sum of EBT (*Tax*) figures all expressed in 2014 US dollars, from LBO inception to exit.

	No. of obs.	Mean	St. Dev.	25th	Median	75th
Monitoring fees	592	13.73	29.70	0.23	4.46	12.41
Transaction fees	592	16.94	34.83	1.24	6.15	16.82
Total Enterprise Value (TEV)	592	1,747	4,241	316	638	1,476
Total EBITDA	592	977	2,481	156	366	883
Leverage (*100)	592	62.8	16.5	53.2	64.1	74.0
Holding period	526	4.10	2.74	1.95	3.40	5.97
LBO_TEV to LTM EBITDA	486	9.4	4.6	6.4	8.6	11.4
LBO_Debt to LTM EBITDA	481	6.2	4.6	4.0	5.6	7.4
Bankrupted (1/0)	592	0.14	0.34	0.00	0.00	0.00
IPO exited (1/0)	592	0.47	0.50	0.00	0.00	1.00
Time trend	592	2001	5	1998	2002	2005
Add-ons (1/0)	592	0.37	0.48	0.00	0.00	1.00
Transaction fees (% of TEV)	592	1.1%	0.9%	0.4%	1.0%	1.5%
Monitoring fees (% of TEV)	592	1.1%	1.2%	0.0%	0.7%	1.6%
Transaction fees (% of Total EBITDA)	592	2.4%	2.8%	0.4%	1.6%	3.4%
Monitoring fees (% of Total EBITDA)	592	1.9%	2.3%	0.1%	1.2%	2.6%
Equity ownership by GPs	592	0.86	0.16	0.79	0.91	0.98
Number of GPs	592	1.76	1.05	1.00	1.00	2.00
Credit spread	592	0.84	0.24	0.66	0.81	0.96
Equity risk premium	592	2.26	5.36	-1.60	1.28	6.56
Buyout volume (scaled)	592	20.5	11.5	13.3	18.1	28.1
EBITDA/EV - High Yield spread	592	2.63	1.20	2.11	2.95	3.40
Sales CAGR	547	0.17	0.26	0.03	0.09	0.20
Volatility of Sales over Total Asset	530	0.16	0.14	0.06	0.12	0.24
EBITDA CAGR	479	0.16	0.32	0.00	0.09	0.24
EBITDA volatility	479	0.33	0.27	0.15	0.25	0.45
Top 4 auditor (1/0)	177	0.95	0.22	1.00	1.00	1.00
A GP employee is part of the PC signatures	296	0.39	0.49	0.00	0.00	1.00
Total EBT	576	-175	1,708	-105	-2	65
Total EBT is negative (1/0)	576	0.51	0.50	0.00	1.00	1.00
Total corporate taxes paid or credited	563	0.9	307.4	-4.2	8.5	40.1
EBITDA CAGR prior to LBO	424	0.18	0.30	0.01	0.12	0.27
EBITDA Volatility prior to LBO	448	0.44	0.32	0.18	0.36	0.59
Estimated GP's return on equity	477	2.63	3.03	0.75	1.65	3.35

Table 3: Deal Characteristics and Portfolio Company Fees

This table shows the results from OLS regressions. Standard errors are clustered by LBO years, and corresponding t-statistics are reported under each coefficient in italics. Each company is classified into one of the Fama-French 48 industries classification based on SIC code. 'a', 'b', and 'c' refer to statistical significance at the 1%, 5%, and 10% level respectively. Variables are as defined in Table 2. Panel A uses (log) Monitoring Fees as the dependent variable, while Panel B uses (log) Transaction Fees as the dependent variable.

Panel A: Regression results, (log) Monitoring Fees as Dependent Variable

EBITDA during investment (log)	0.52[a]	0.50[a]	0.50[a]	0.42[a]	0.53[a]	0.44[a]	0.52[a]
	7.08	*6.29*	*6.41*	*4.15*	*6.51*	*5.13*	*6.40*
Total Enterprise Value (log)	0.14	0.08	0.07	0.19	0.07	0.39[b]	0.26
	0.90	*0.43*	*0.40*	*0.95*	*0.41*	*2.30*	*1.57*
Debt raised (log)	0.04	0.06	0.07	0.01	0.05	-0.09	-0.08
	0.39	*0.47*	*0.50*	*0.10*	*0.37*	*-0.73*	*-0.67*
Equity ownership by GPs	0.48	0.48	0.48	0.48	0.42	0.29	0.29
	1.44	*1.23*	*1.24*	*1.26*	*1.05*	*0.72*	*0.85*
Number of GPs	0.13[b]	0.13[b]	0.13[b]	0.14[b]	0.12[b]	0.09	0.16[a]
	2.26	*2.22*	*2.22*	*2.42*	*2.25*	*1.63*	*3.18*
Bankrupted (1/0)	-0.29[c]	-0.26	-0.26	-0.28	-0.27	-0.35[c]	-0.37[c]
	-1.79	*-1.54*	*-1.55*	*-1.63*	*-1.64*	*-1.77*	*-1.83*
IPO exited (1/0)	0.08	0.06	0.06	0.15	0.09	0.12	-0.01
	0.91	*0.59*	*0.59*	*1.26*	*0.90*	*1.06*	*-0.13*
Time trend	0.06[a]	0.08[b]	0.08[a]	0.08[a]	0.08[a]	0.06[a]	0.07[a]
	2.94	*2.43*	*4.14*	*3.50*	*4.57*	*5.66*	*5.71*
Add-ons (1/0)	0.17[c]	0.04	0.04	0.04	0.07	0.23[b]	0.18[c]
	1.84	*0.35*	*0.34*	*0.35*	*0.72*	*2.31*	*1.82*
Credit spread	0.16	0.27					
	0.56	*0.61*					
Equity risk premium	0.01	0.02					
	1.04	*0.46*					
Buyout volume (scaled)		0.00					
		0.10					
Holding period				0.04			
				1.53			
Total EBT is negative (1/0)					0.18		
					1.57		
EBITDA CAGR						0.05	
						0.34	
EBITDA volatility						0.08	
						0.44	
Estimated GPs return on equity							-0.02
							-0.21
Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Quarter of LBO inception Fixed Effects	No	No	Yes	No	No	No	No
Adjusted R-squared	0.41	0.43	0.44	0.43	0.45	0.43	0.44
Number of observations	592	592	592	526	576	479	477

Panel B: Regression results, (log) Transaction Fees as Dependent Variable

EBITDA during investment (log)	0.21[a]	0.23[a]	0.23[a]	0.27[a]	0.30[a]	0.19[b]	0.23[a]
	2.93	*2.79*	*2.83*	*3.32*	*2.67*	*2.29*	*2.87*
Total Enterprise Value (log)	0.58[a]	0.59[a]	0.59[a]	0.59[a]	0.61[a]	0.55[b]	0.64[a]
	3.16	*2.81*	*2.87*	*2.87*	*2.75*	*2.33*	*2.70*
Debt raised (log)	0.13	0.13	0.12	0.10	0.08	0.16	0.11
	1.00	*0.92*	*0.87*	*0.72*	*0.56*	*1.00*	*0.72*
Equity ownership by GPs	0.29	0.24	0.26	0.19	0.31	0.33	0.31
	1.30	*0.90*	*0.94*	*0.69*	*1.12*	*1.34*	*1.52*
Number of GPs	0.13[a]	0.13[a]	0.13[a]	0.12[b]	0.12[b]	0.12[a]	0.14[a]
	3.03	*2.70*	*2.65*	*2.54*	*2.52*	*2.70*	*3.50*
Bankrupted (1/0)	-0.01	0.03	0.02	0.00	0.08	0.04	0.12
	-0.13	*0.22*	*0.16*	*0.00*	*0.58*	*0.33*	*0.73*
IPO exited (1/0)	0.10	0.08	0.06	0.12	0.06	0.15	0.11
	1.17	*0.86*	*0.70*	*1.31*	*0.57*	*1.63*	*1.14*
Time trend	0.02	0.03	0.00	0.00	-0.01	0.02	0.00
	1.05	*1.00*	*-0.16*	*-0.23*	*-0.60*	*1.36*	*0.32*
Add-ons (1/0)	0.40[a]	0.31[b]	0.32[a]	0.35[a]	0.34[a]	0.41[a]	0.41[a]
	4.15	*2.56*	*2.63*	*2.84*	*2.82*	*3.60*	*3.98*
Credit spread	-0.28	-0.26					
	-0.96	*-0.40*					
Equity risk premium	0.01	0.00					
	0.66	*-0.07*					
Buyout volume (scaled)		-0.04					
		-1.15					
Holding period				-0.03			
				-1.02			
Total EBT is negative (1/0)					0.24[b]		
					2.35		
EBITDA CAGR						-0.06	
						-0.42	
EBITDA volatility						0.13	
						0.76	
Estimated GPs return on equity							0.08
							0.79
Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Quarter of LBO inception Fixed Effects	No	No	Yes	No	No	No	No
Adjusted R-squared	0.52	0.52	0.52	0.54	0.51	0.54	0.56
Number of observations	592	592	592	576	526	479	477

Table 4: Descriptive Statistics of the GP-LBO Sample

This table shows the descriptive statistics of the GP-LBO sample. The unit of observation is a GP participating in an LBO. The table shows for each variable the number of observations, mean, 25th percentile, 50th percentile (median) and 75th percentile. As there are 1.76 GPs on average across 592 LBOs, we have 1044 observations. Construction of the variables is detailed in the text.

	No. of	Mean	St. Dev.	25th	Median	75th
Monitoring fees per GP	1044	7.79	16.05	0.00	1.92	8.43
Transaction fees per GP	1044	9.60	18.76	0.00	2.83	11.70
Total EBITDA during investment per GP	1044	490	1,237	52	168	474
Total Enterprise Value per GP	1044	898	2,048	99	306	816
Monitoring fees (% of EBITDA)	1044	1.9%	2.6%	0.0%	0.9%	2.6%
Transaction fees (% of TEV)	1044	1.1%	1.2%	0.0%	1.0%	1.7%
Prior GP LBOs monitoring fees (% of EBITDA)	669	1.4%	1.4%	0.3%	1.1%	1.9%
Prior GP LBOs transaction fees (% of TEV)	669	1.3%	1.0%	0.7%	1.2%	1.7%
Change in Monitoring fees (% of EBITDA)	669	0.7%	2.1%	-0.4%	0.0%	1.5%
Change in Transaction fees (% of TEV)	669	0.0%	1.1%	-0.7%	0.0%	0.5%
Distance to GFC	1044	6.45	4.59	3.00	6.00	10.00
Monitoring fees (% of EBITDA) * Distance to	1044	10.4%	21.0%	0.0%	2.0%	11.5%
Transaction fees (% of TEV) * Distance to GFC	1044	7.7%	12.4%	0.0%	2.2%	11.4%
GP ownership	1044	48.6%	33.1%	17.0	45.0	80.3%
GP age	842	10.4	9.0	3.0	10.0	16.0
Amount raised post LBO by GP	842	6,388	8,109	700		8,150
Amount raised pre LBO by GP	842	6,496	9,082	721		8,207
Growth in amount raised pre to post LBO by	842	46%	126%	-37%	0%	100%
Amount raised post GFC by GP	774	6,792	7,833	804		
Amount raised pre GFC by GP	774					
Growth in amount raised pre to post GFC by	774	-49%	51%	-83%	-63%	-29%
GP fund age	700	1.92	1.74	1.00	2.00	3.00
Pre LBO GP performance	683	1.98	0.49	1.66	1.98	2.23
Post LBO GP performance	664	1.65	0.44	1.37	1.60	1.90
Pre LBO GP performance volatility	518	0.58	0.25	0.48	0.59	0.72
Pre-GFC GP performance	765	1.67	0.37	1.55	1.72	1.87
Pre-GFC GP performance volatility	686	0.57	0.22	0.47	0.62	0.72
Fund is out of the carry	634	22%	41%	0%	0%	0%
LP skills (average past return)	714	1.58	0.08	1.55	1.58	1.61
Rebate rate for monitoring fees	597	70%	29%	50%	80%	100%
Rebate rate for transaction fees	597	72%	24%	50%	80%	100%
Net monitoring fees (% of EBITDA) per GP	799	0.6%	1.3%	0.0%	0.0%	0.7%
Net transaction fees (% of TEV) per GP	799	0.3%	0.5%	0.0%	0.0%	0.4%
Prior GP LBOs net monitoring fees (% of	569	0.6%	1.0%	0.0%	0.2%	0.7%
Prior GP LBOs net transaction fees (% of TEV)	569	0.4%	0.5%	0.0%	0.2%	0.6%
GP Market Shares (*100)	1044	0.32	0.42	0.00	0.18	0.43
GP lacks reputation	683	0.35	0.48	0.00	0.00	1.00
Founding partners have a graduate degree	615	0.69	0.39	0.50	1.00	1.00
Founding partners have a consulting	615	0.10	0.24	0.00	0.00	0.00
Founding partners have a I-banking	615	0.41	0.36	0.00	0.33	0.67

Table 5: GP Characteristics and Portfolio Company Fees

This table shows results from OLS regressions. Dependent variable is Monitoring Fees Relative to EBITDA per GP. The unit of observation is a GP participating in an LBO. Variables are described in Table 4. 'other control variables' are never significant: Bankrupted (1/0), Time trend, and Add-ons (1/0). Industry and Quarter of LBO inception Fixed Effect are always included.Standard errors are clustered by GP; the corresponding t-statistics are reported under each coefficient in italics. 'a', 'b', and 'c' refer to statistical significance at the 1%, 5%, and 10% level respectively.

Panel A: Dependent variable is Monitoring Fees Relative to EBITDA per GP *gross of any rebate*

Total EBITDA per GP (log)	-1.12[a]	-1.21[a]	-1.09[a]	-1.08[a]	-1.25[a]	-1.14[a]
	-6.74	*-6.23*	*-6.01*	*-5.15*	*-6.62*	*-4.49*
Total Enterprise Value per GP (log)	0.55[a]	0.52[a]	0.47[a]	0.53[b]	0.44[b]	0.67[b]
	3.37	*2.68*	*2.61*	*2.46*	*2.26*	*2.54*
IPO exited (1/0)	0.26	0.47[b]	0.77[a]	0.48[c]	0.46[b]	0.77[b]
	1.44	*2.09*	*3.72*	*1.79*	*1.97*	*2.45*
Total equity ownership by GPs	-2.00[a]	-2.64[a]	-2.47[a]	-2.02[c]	-2.66[a]	-2.28[c]
	-2.79	*-2.93*	*-2.69*	*-1.90*	*-2.59*	*-1.70*
Number of GPs	0.33[a]	0.43[a]	0.34[a]	0.55[a]	0.42[a]	0.47[a]
	3.51	*3.42*	*3.24*	*3.96*	*3.13*	*2.72*
GP ownership	2.01[a]	2.54[a]	2.12[a]	1.96[a]	2.29[a]	1.52[b]
	4.64	*4.43*	*4.20*	*3.33*	*3.85*	*2.07*
GP Market Shares (*100)	0.24	-0.25	0.01	0.13	0.25	0.09
	1.24	*-1.01*	*0.04*	*0.40*	*1.14*	*0.24*
GP going public	1.04[a]					
	3.33					
LP skills (average past return)		-3.32[a]				
		-2.83				
Prior GP LBOs monitoring fees (% of EBITDA)			0.75[a]			
			9.43			
GP lacks reputation				0.19		
				0.67		
GP age				-0.02		
				-1.37		
Amount raised pre LBO by GP (log)				-0.01		
				-0.10		
GP fund age				-0.04		
				-0.61		
Founding partners have a graduate degree (%)					1.00[a]	
					3.20	
Founding partners have a consulting background (%)					1.79[a]	
					3.53	
Founding partners have a I-banking background					0.32	
					0.89	
Pre LBO GP performance						-0.74[c]
						-1.91
Fund is out of the carry						-0.19
						-0.52
Pre LBO GP performance volatility						0.15
						0.25
Other control variables and Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R-squared	0.18	0.22	0.35	0.20	0.24	0.21
Number of observations	1044	714	669	609	595	451

Panel B: Dependent variable is Monitoring Fees Relative to EBITDA per GP *net of any rebate*

Total EBITDA per GP (log)	-0.47[a]	-0.60[a]	-0.58[a]	-0.55[a]	-0.58[a]	-0.59[a]
	-3.57	*-3.70*	*-4.90*	*-3.58*	*-4.33*	*-3.68*
Total Enterprise Value per GP (log)	0.36[a]	0.42[a]	0.33[a]	0.43[a]	0.31[b]	0.50[a]
	2.66	*2.64*	*3.02*	*2.63*	*2.32*	*3.01*
IPO exited (1/0)	0.22[b]	0.32[b]	0.39[a]	0.31[b]	0.17	0.33[b]
	2.22	*2.44*	*4.28*	*2.03*	*1.48*	*2.19*
Total equity ownership by GPs	-0.89[b]	-1.44[a]	-1.06[b]	-0.73	-1.36[b]	-0.66
	-2.26	*-2.58*	*-2.36*	*-1.17*	*-2.41*	*-0.88*
Number of GPs	0.23[a]	0.31[a]	0.18[a]	0.27[a]	0.23[a]	0.20[b]
	3.69	*3.65*	*3.07*	*2.93*	*2.83*	*1.98*
GP ownership	1.32[a]	1.48[a]	1.22[a]	0.96[a]	1.27[a]	1.01[a]
	5.09	*4.25*	*4.63*	*2.84*	*3.45*	*2.60*
GP Market Shares (*100)	0.11	-0.18	0.19[b]	-0.01	0.41[a]	0.01
	0.84	*-1.04*	*2.24*	*-0.03*	*3.24*	*0.04*
GP going public	0.51[b]					
	2.01					
LP skills (average past return)		-1.54[b]				
		-2.37				
Prior GP LBOs net monitoring fees (% of EBITDA)			0.79[a]			
			8.51			
GP lacks reputation				-0.18		
				-1.02		
GP age				0.02		
				1.52		
Amount raised pre LBO by GP (log)				-0.20[b]		
				-2.20		
GP fund age				-0.05		
				-1.31		
Founding partners have a graduate degree (%)					0.53[a]	
					3.33	
Founding partners have a consulting background (%)					3.02[a]	
					7.31	
Founding partners have a I-banking background					0.37[c]	
					1.91	
Pre LBO GP performance						-0.10
						-0.38
Fund is out of the carry						-0.03
						-0.17
Pre LBO GP performance volatility						-0.26
						-0.82
Other control variables and Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R-squared	0.16	0.18	0.47	0.14	0.36	0.10
Number of observations	799	571	569	523	507	412

Table 6: Flow-fee sensitivity analysis around the Global Financial Crisis

This table shows results from OLS regressions. In Panel A, the dependent variable is the increase in capital raised over the ten years prior to the LBO inception year and capital raised over the ten years after the LBO inception year. In Panel B, the dependent variable is the increase in capital raised over 1999-2008 and capital raised over 2009-2015. t-statistics are reported under each coefficient in italics and are based on standard errors clustered by GP. 'a', 'b', and 'c' refer to statistical significance at the 1%, 5%, and 10% level respectively. Variables are as defined in Table 4. GFC stands for the Global Financial Crisis of 2008. Distance to the crisis is the number of years from LBO inception year to 2008.

Dependent variable: Growth in capital raised from 1999-2008 to 2009-215 time periods						
Monitoring fees (% of EBITDA)	-0.02[b]	-0.02[c]	-			
	-2.08	*-1.85*	*-2.36*			
Transaction fees (% of TEV)	-0.02	-0.12[a]	-0.03			
	-0.81	*-2.93*	*-0.72*			
Monitoring fees (% of EBITDA) * Distance to GFC		-0.04	0.06			
		-0.24	*0.28*			
Transaction fees (% of TEV) * Distance to GFC		1.33[b]	0.32			
		2.35	*0.55*			
Rebate rate for monitoring fees			0.16			
			0.88			
Net monitoring fees (% of EBITDA) per GP				-	-	-
				-2.26	*-2.28*	*-2.07*
Net transaction fees (% of TEV) per GP				0.05	-0.06	-0.09
				0.75	*-0.54*	*-0.98*
Net monitoring fees (% of EBITDA) * Distance to					0.11	0.00
					0.42	*-0.01*
Net transaction fees (% of TEV) * Distance to GFC					1.63	2.18[b]
					1.23	*2.11*
Pre-GFC GP performance						0.70[a]
						5.22
Other control variables	Yes	Yes	Yes	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Quarter of LBO inception Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R-squared	0.06	0.07	0.09	0.06	0.06	0.26
Number of observations	774	774	577	643	643	636

Table 7: Current GP fundraising situation and portfolio company fees charged

This table shows the recent fundraising activities of those GPs charging the least portfolio companies fees, and compares the post-crisis fundraising to fees charged for those GPs charging the highest portfolio company fees. 'Out of business' means that no fund has been raised since 2009; so classified GPs may nonetheless be actively managing their portfolio of companies and may raise a fund in the future. Post-crisis fundraising can also be classified as: Large decrease (between -50% and -99.9%), decrease (between -15% and -50), stable (between -15% and 15%), increase (between 15% and 33%), and large increase (above 33%). GPs in Panel A have a total fee to TEV ratio below 1%, while GPs in Panel B have a total fee to TEV ratio above 2.5%. In Panel A, GPs are sorted by alphabetical order; in Panel B, GPs are anonymized. TEV is in millions of 2014 US dollars. Note that fees are not adjusted for deal size and other characteristics that impact fee levels, and GP fee levels are based on a subset of the investments made by each GP.

Panel A: GPs charging the lowest amount of portfolio company fees

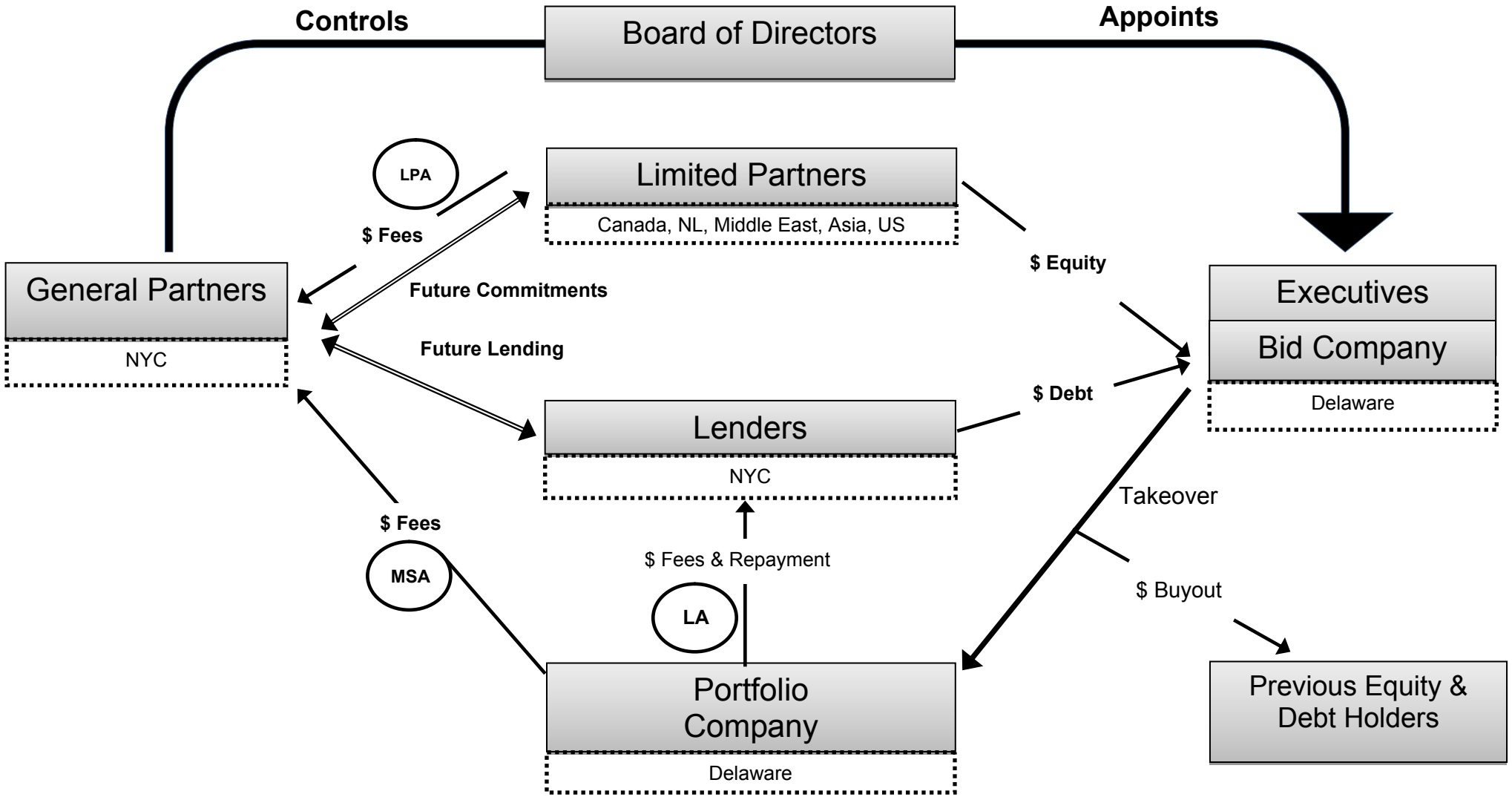
GP name	Post-crisis fundraising	Size and vintage years of flagship funds	Fundraising duration *(latest fund)*
ABRY Partners	Stable	Fund VIII raised $1.9b, oversubscribed. Fund VII raised $1.6b in 2011	6 months
Advent International Corp	Large Increase	Fund VIII raised $13b in 2016; fund VII raised $11b in 2011; both oversubscribed. Fund VI raised $10b i 2008	8 months
Avista Capital	Large Decrease	Fund III raised $1.4b in 2013, slightly undersubscribed. Fund II raised $1.8b in 2008	2.5 years
CCMP	Stable	Fund III raised $3.6b in 2014, oversubscribed. Fund II raised $3.4b in 2007	2.25 years
Centerbridge	Large Increase	Fund III raised $6b in 2014, oversubscribed. Fund II raised $4.4b in 2011	4.5 months
Cerberus Capital Mngt	Decrease	Raising Fund VI, target of $3.5b. Fund V raised $2.6b in 2013, undersubscribed. Fund IV raised $7.5b in 2006	2 years
First Reserve Corp	Large Decrease	Fund XIII raised $3.4b in 2014, undersubscribed. Fund XII raised $9b in 2009	2.3 years
Fortress	Decrease	Fund IV raised $5b in 2015, oversubscribed. Fund III raised $4.3b in 2012	n/a
Hellman & Friedman	Large Increase	Fund VIII raised $11b in 2014, their largest ever, oversubscribed. Fund VII raised $8.9b in 2011.	6 months
Norwest Equity	Increase	Fund X raised $1.6b in 2015. Fund IX raised $759m in 2008	n/a
Oaktree Capital Mngt	Stable	Raising Fund IV. Fund III raised $1b in 2010, oversubscribed. Fund II raised $1b in 2004	n/a
Odyssey Partners	Large Increase	Fund V raised $2b in 2014, oversubscribed. Fund IV raised $1.5b in 2009	5 months
Onex Corporation	Large Increase	Fund IV raised $5b in 2014, their largest ever, oversubscribed. Fund III raised $4.7b in 2009	9 months
Summit Partners	Decrease	Fund IX targets $3b. Fund VIII raised $2.7b in 2012. Fund VI raised $3b in 2006	7 months
TA Associates	Increase	Fund XII raised $5.3b in 2015, oversubscribed. Fund XI raised $4b in 2010	5 months
Thoma Cressey Equity Prtnrs	Large Increase	Fund XI raised $3.7b in 2014, oversubscribed. Fund X raised $1.3b in 2012	4 months
Walnut Investment Prtnrs	Stable	Fund V raised $150m in 2010, oversubscribed. Fund IV raised $53m in 2004	8 months
Warburg Pincus	Stable	Fund XII raised $12b. Fund XI raised $11b in 2012. Fund X raised $15b in 2007	6 months

Panel B: GPs charging the highest amount of portfolio company fees compared to TEV

	Post-crisis fundraising	Fees/TEV	Fees/EBITDA	No. of obs.	TEV
GP1	Out of Business	0.077	0.136	2	403
GP2	Large Decrease	0.072	0.141	2	267
GP3	Out of Business	0.066	0.096	1	639
GP4	Stable	0.062	0.145	1	283
GP5	Out of Business	0.058	0.084	2	500
GP6	Stable	0.051	0.137	4	860
GP7	Out of Business	0.047	0.109	1	182
GP8	Decrease	0.042	0.079	1	1271
GP9	Decrease	0.041	0.063	10	2276
GP10	Increase	0.040	0.083	4	581
GP11	Large Decrease	0.039	0.029	3	187
GP12	Decrease	0.038	0.057	3	950
GP13	Decrease	0.037	0.074	13	5510
GP14	Large Decrease	0.035	0.069	4	1206
GP15	Stable	0.034	0.075	1	492
GP16	Large Decrease	0.034	0.045	1	426
GP17	Out of Business	0.033	0.083	4	929
GP18	Out of Business	0.033	0.057	7	2302
GP19	Out of Business	0.032	0.036	6	1597
GP20	Stable	0.030	0.110	1	320
GP21	Large Decrease	0.030	0.086	10	3322
GP22	Out of Business	0.030	0.057	4	1797
GP23	Out of Business	0.029	0.043	16	3813
GP24	Out of Business	0.029	0.058	8	3991
GP25	Out of Business	0.029	0.020	3	926
GP26	Decrease	0.028	0.065	8	13309
GP27	Decrease	0.026	0.032	1	194
GP28	Out of Business	0.026	0.085	10	15202
GP29	Out of Business	0.026	0.045	5	1411

Figure 1: The private equity model

Simplified version of the private equity model. It abstracts from i) the offshore fund which intermediates between LPs and bid companies, ii) the separation between the investment advisory firm and the general partner vehicle (which together form the transaction sponsor), and iii) intermediary offshore holding companies that fully own the bid company. Contracts are shown in circles. Double arrows show repeated interactions between two parties. Places in the dotted lines show the typical geographical location of the headquarters. LPA, MSA and LA refer to Limited Partnership Agreement, Management Services Agreement, and Lending Agreement respectively.



Appendix: Management Service Agreement of Energy Future Holdings

This letter serves to confirm the retention by Energy Future Holdings Corp. (the "Company") of Kohlberg Kravis Roberts & Co. L.P. (the "KKR Manager"), TPG Capital, L.P. (the "TPG Manager"), Goldman, Sachs & Co. (the "GS Manager" and together with the KKR Manager and the TPG Manager, the "Managers" and each a "Manager") to provide management, consulting and financial services to the Company and its divisions, subsidiaries and affiliates (collectively, the "Company Group"), as follows:

1. The Company has retained the Managers, and each Manager hereby agrees to accept such retention, to provide to the Company Group, when and if called upon, certain management, consulting and financial services of the type customarily performed by such Managers. Commencing on the date hereof (the "Effective Date"), the Company agrees to pay the Managers an aggregate annual fee (the "Advisory Fee") in an amount equal to $35,000,000 (thirty five million dollars), which amount shall increase by 2% annually (…) The Managers shall split the Advisory Fee so that (i) the KKR Manager shall initially receive a portion of the Advisory Fee equal to $12,727,500 (twelve million seven hundred twenty seven thousand and five hundred dollars) (ii) the TPG Manager shall initially receive a portion of the Advisory Fee equal to $12,727,500 (twelve million seven hundred twenty seven thousand and five hundred dollars) and (iii) the Goldman Manager shall initially receive a portion of the Advisory Fee equal to $9,545,000 (…).

2. To the extent the Company is not permitted to pay the Advisory Fee by reason of any prohibition on such payment pursuant to the terms of any debt financing agreement or instrument of the Company or any of its subsidiaries, the payment by the Company to the Managers, of the Advisory Fee shall be deferred and shall not be due and payable until immediately on the earlier of (i) the first date on which the payment of such deferred Advisory Fee is no longer prohibited under the applicable agreement or instrument and the Company is otherwise able to make such payment, and (ii) total or partial liquidation, dissolution or winding up of the Company.

3. In consideration for structuring services rendered by the Managers and Lehman Brothers Inc. in connection with the acquisition of the outstanding shares of the Company by Parent pursuant to the Agreement and Plan of Merger, dated as of February 25, 2007, by and among Texas Energy Future Holdings Limited Partnership ("Parent"), Texas Energy Future Merger Sub Corp. and the Company (the "Merger Agreement"), which services included, but were not limited to, financial advisory services and capital structure review (the "Initial Services"), the Company agrees to also pay the Managers and Lehman Brothers Inc. a one-time transaction fee in an aggregate amount equal to $300,000,000 (three hundred million dollars) (the "Merger Fee"), payable immediately upon the Closing (as defined in the Merger Agreement), which Merger Fee shall be apportioned so that (i) the KKR Manager shall receive a portion of the Merger Fee equal to $106,840,909.09 (one hundred and six million eight hundred and forty thousand nine hundred and nine dollars and nine cents), (ii) the TPG Manager shall receive a portion of the Merger Fee equal to $106,840,909.09 (one hundred and six million eight hundred and forty thousand nine hundred and nine dollars and nine cents), (iii) the Goldman Manager shall receive a portion of the Merger Fee equal to $80,130,681.82 (eighty million one hundred and thirty thousand and six hundred eighty one dollars and eighty two cents) and (iv) Lehman Brothers Inc. shall receive a portion of the Merger Fee equal to $6,187,500.00 (six million one hundred and eighty seven thousand and five hundred dollars).

4. The Company shall, with respect to each proposed transaction, including, without limitation, any proposed acquisition, merger, full or partial recapitalization, structural reorganization (including any divestiture of one or more subsidiaries or operating divisions of any member of the Company Group), reorganization of the shareholdings or other ownership structure of the Company Group, sales or dispositions of assets or equity interests or any other similar transaction (each, a "Transaction") directly or indirectly involving the members of the Company Group, pay to the Managers an aggregate

fee (a "Transaction Fee") equal to 1% of the Transaction Value, or such lesser amount as the Managers and the Company may agree, any such Transaction Fee to be apportioned so that (i) the KKR Manager shall receive a portion of any Transaction Fee equal to four elevenths of such Transaction Fee (ii) the TPG Manager shall receive a portion of any Transaction Fee equal to four elevenths of such Transaction Fee and (iii) the Goldman Manager shall receive a portion of any Transaction Fee equal to three elevenths of such Transaction Fee. The Company, on behalf of the members of the Company Group, may agree to pay a Transaction Fee in excess of 1% of the Transaction Value of a Transaction, subject to the consent of the board of directors of the Company. (…)

5. In addition to any fees that may be payable to the Managers under this agreement, the Company shall (…) reimburse the Managers and their affiliates and their respective employees and agents, from time to time upon request, for all reasonable out-of-pocket expenses incurred, including unreimbursed expenses incurred prior to the date hereof, in connection with this retention and/or transactions contemplated by the Merger Agreement, including travel expenses and expenses of any legal, accounting or other professional advisors to the Managers or their affiliates. The Managers may submit monthly expense statements to the Company or any other member of the Company Group (…)

12. This agreement shall continue in effect from year to year unless amended or terminated by mutual consent. In addition, in connection with the consummation of a Change of Control (as defined in the Partnership Agreement) or an IPO (as defined in the Partnership Agreement), the Company may terminate this agreement by delivery of a written notice of termination to the Managers. In the event of such a termination by the Company of this agreement, the Company shall pay in cash to the Managers (i) all unpaid Advisory Fees payable to such Manager hereunder, all unpaid fees payable to such Manager pursuant to Section 4 of this agreement and all expenses due under this agreement to such Manager with respect to periods prior to the termination date, plus (ii) the net present value (using a discount rate equal to the yield as of such termination date on U.S. Treasury securities of like maturity based on the times such payments would have been due) of the Advisory Fees that would have been payable with respect to the period from the termination date through the twelfth anniversary of the Effective Date (…) to be apportioned so that (i) the KKR Manager shall receive a portion of such fees equal to four elevenths of the aggregate amount of such fees (ii) the TPG Manager shall receive a portion of such fees equal to four elevenths of the aggregate amount of such fees and (iii) the Goldman Manager shall receive a portion of such fees equal to three elevenths of the aggregate amount of such fees. (…)

15. Each party hereto waives all right to trial by jury in any action, proceeding or counterclaim (whether based upon contract, tort or otherwise) related to or arising out of our retention pursuant to, or our performance of the services contemplated by this agreement. (…)

17. Except in cases of gross negligence or willful misconduct, none of the Managers (…) shall have any liability of any kind whatsoever to any member of the Company Group for any damages, losses or expenses (including, without limitation, special, punitive, incidental or consequential damages and interest, penalties and fees and disbursements of attorneys, accountants, investment bankers and other professional advisors) ...

If the foregoing sets forth the understanding between us, please so indicate on the enclosed signed copy of this letter in the space provided therefor and return it to us, whereupon this letter shall constitute a binding agreement among us. Very truly yours,

ENERGY FUTURE HOLDINGS CORP.
By: /s/ Jeffrey Liaw
Title: Authorized Signatory
By: Texas Energy Future Capital Holdings LLC, its general partner
By: /s/ Jonathan D. Smidt

By: KKR & Co. L.L.C, its general partner
By: /s/ Marc S. Lipschultz

By: Tarrant Capital, LLC
By: /s/ Clive Bode

By: GOLDMAN, SACHS & CO.
By: /s/ Kenneth A. Pontarelli

By: LEHMAN BROTHERS INC.
By: /s/ Ashvin Rao

Appendix Table 1: Income streams of the 'Big-4'

This table shows the income stream for the private equity segment of the four private equity firms that are publicly listed. These firms are also considered to be the four largest private equity firms according to PEI magazine 2014 ranking.

	2008	2009	2010	2011	2012	2013	2014	2015	Total
Apollo									
Fund management fees	245	261	259	263	277	285	315	296	2,201
Monitoring and transaction fees Gross	330	148	163	156	276	n/a	n/a	n/a	1,073
Fee offsets	-209	-99	-101	-98	-154	n/a	n/a	n/a	-661
Monitoring and transaction fees Net	121	49	60	58	122	78	58	-7	539
Carried interest	-845	311	1,322	-449	1,668	2,517	232	26	4,782
All fees	-479	621	1,641	-128	2,066	2,880	605	315	7,521
Blackstone									
Fund management fees	269	271	263	332	349	368	416	503	2,771
Monitoring and transaction fees Net	52	86	72	133	100	97	135	36	711
Carried interest	-430	338	309	71	258	728	1,977	757	4,008
All fees	-110	695	644	536	707	1,193	2,528	1,296	7,489
Carlyle									
Fund management fees	523	536	538	511	496	472	565	577	4,218
Monitoring fees net	14	16	15	31	18	23	18	14	149
Transaction fees net	20	12	22	35	19	21	51	8	188
Monitoring and transaction fees Net	34	28	36	66	37	44	69	22	336
Carried interest	-688	495	1,264	854	770	1,874	1,354	686	6,609
All fees	-132	1,059	1,838	1,431	1,303	2,389	1,988	1,285	11,161
KKR									
Fund management fees	396	415	396	430	424	460	453	466	3,440
Monitoring fees gross	97	158	87	164	117	120	135	265	1,143
Transaction fees gross	23	58	96	167	97	150	215	145	951
Fee offsets	-13	-74	-53	-145	-97	-137	-199	-195	-913
Monitoring and transaction fees Net	108	142	130	186	116	134	151	214	1,181
Carried interest	-1,160	746	605	139	684	794	1,229	1201	4,238
All fees	-656	1,303	1,131	755	1,223	1,387	1,381	1,882	8,406

Appendix Table 2: GP going public and fees

Panel A shows the amount raised and the performance of the funds raised by six GPs. GPs are anonymized. Average Multiple and IRR are weighted by fund size. Panel B shows the sum of fees charged by a given GP, over a given time period divided by either EBITDA or TEV. EBITDA (*TEV*) is adjusted by GP equity ownership. Three GPs filed an S1 form: Apollo (4/8/2008), Blackstone (3/22/2007) and KKR (7/3/2007). Three similarly large GPs remained private in 2007: Bain capital, Carlyle and TPG.

Panel A: Change in capital flows and performance for the largest six GPs

	Vintage years: 1980- 2002			Vintage years: 2003 - 2008		
	Total raised	Average Multiple	Average IRR	Total raised	Average Multiple	Average IRR
GPs filing an S1 form						
GP 1	11.97	2.10	23.08	30.03	1.78	17.06
GP 2	14.29	2.05	22.57	37.90	1.52	10.08
GP 3	19.53	2.45	15.61	44.94	1.55	10.73
GPs 1, 2 and 3	45.79	2.23	19.73	112.87	1.60	12.20
Similar GPs not filing an S1 form						
GP 4	10.96	2.26	19.37	29.55	1.47	8.89
GP 5	11.02	2.49	20.33	31.66	1.54	12.12
GP 6	15.12	2.26	20.73	45.45	1.45	9.88
GPs 4, 5 and 6	37.10	2.33	20.21	106.66	1.48	10.27

Panel B: Fee policy pre- and post-2003

	Fees charged 1980-2002 (LBOs)			Fees charged from 2003 (LBOs)			% change in fees charged	
	Monitoring (% of EBITDA)	Transaction (% of TEV)	No. of obs.	Monitoring (% of EBITDA)	Transaction (% of TEV)	No. of obs.	Monitoring (% of EBITDA)	Transaction (% of TEV)
GPs filing an S1 form								
GP1	1.05%	0.78%	9	1.94%	0.99%	23	85%	26%
GP2	1.38%	1.37%	10	2.31%	1.60%	21	68%	16%
GP3	0.77%	0.56%	14	1.44%	0.84%	18	87%	51%
GPs 1, 2 and 3	1.02%	0.82%	33	1.83%	1.08%	62	80%	32%
Similar GPs not filing an S1 form								
GP4	4.05%	2.06%	17	1.34%	1.03%	24	-67%	-50%
GP5	1.35%	1.05%	8	1.22%	0.52%	18	-9%	-50%
GP6	1.37%	0.95%	13	1.56%	0.61%	18	14%	-36%
GPs 4, 5 and 6	2.14%	1.39%	38	1.38%	0.74%	60	-35%	-47%
Rest of GPs	1.20%	0.84%	484	1.62%	0.74%	367	35%	-12%