Private Equity Debt Funds: Who Wins and Who Loses?

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ABSTRACT

We exploit a unique data set to provide the first analysis of the structure, performance and gain distribution of deals financed by the same private equity firm on the equity and debt sides (related deals). Most related deals are carried out by a few large and experienced PE firms. In support of the conflict of interest hypothesis, we document a transfer of value from debt to equity funds in related transactions relative to unrelated transactions. Yet, the overall value impact of related deals (debt and equity combined) is positive and limited partners of PE-affiliated debt funds do not loose overall. Related deals generate sizable gains for PE firms, most likely through the better ex-post incentives of these deals.

Keywords: Private equity; debt funds; performance; related deals; conflict of interest; incentives

JEL classification: G20; G23; G32

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1. INTRODUCTION

Private equity (PE) firms acquire companies using a significant amount of debt (e.g., Metrick and Yasuda, 2010; Jenkinson, Kim, and Weisbach, 2021). Leverage is crucial as it enables them to make larger deals or reduce their own equity capital investment. The PE market is dominated by large, well-established players, consistently outperforming a large number of smaller PE firms (e.g., Kaplan and Schoar, 2005; Korteweg and Sorensen, 2017). In the search for leverage, some of these large PE firms have raised their own debt funds (PE-affiliated funds) which are very often used to finance deals carried out by equity funds of the same PE firm (related deals). This strategy may help explain part of the superior returns of large PE firms. However, it may also be a source of conflicts of interest as the same PE firm is on the equity and the debt side and fund participants may not have the same objectives. The potential conflict of interest has started to raise voices from market participants asking for more transparency of related deals.[1] Today, we still lack a systematic analysis of the terms, nature and returns of related deals in PE. In this paper, we provide the first such analysis looking at the performance, gain distribution and structure of related deals in comparison to unrelated deals, and provide some insights as to what may explain the existence of such deals.

Economic theory is ambiguous about the benefits and costs of related deals in PE. Two hypotheses predict different patterns of performance and gain distribution. One view emphasizes the benefits of related deals emerging from the informational advantages of these arrangements. Informational advantages in related deals may emerge for two distinct reasons. First, based on adverse selection, PE firms with may use the private information collected by the equity fund during the due diligence process and invite their own affiliated debt fund to participate in the best deals. Second, closer to moral hazard, the close ties between the debt and the equity funds align incentives and reduce hold-up problems as changes in financing needs can be more quickly addressed in such structures (Rajan, 1992). If incentives are enhanced and information flows better, related deals may lead to higher performance which may end up benefiting both the equity and the debt fund limited partners. The informational advantage view, where close ties

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[1] See, for instance, the British Private Equity & Venture Capital Association report entitled "Guide to Private Equity Debt Funds, which points out the risk of "cherry-picking" (Source: https://www.bvca.co.uk/Portals/0/library/documents/Guide%20to%20PE%20Fund%20Finance/Debt%20Fund%20Guide-May14-web.pdf; viewed on December 21, 2021). Other concerns are raised by Travers Smith, an international law firm (Source: https://www.traverssmith.com/media/3219/in-practice-private-equity-sponsors-as-lenders.pdf; viewed on December 21, 2021).

between parties are beneficial, is close to the theoretical ideas of credit rationing (Stiglitz and Weis, 1981) and the empirical work on related lending (i.e., Gershenkron, 1961; Aoki, Patrick, and Sheard, 1994; Hoshi, Kashyap, and Scharfstein, 1991).

An alternative view, resting on agency theory, would argue that the close ties of debt and equity funds in related deals may provide one party the opportunity to benefit from the other. A conflict of interest could arise if the PE firm uses its affiliated debt fund to finance its equity fund's deals for which it has trouble finding debt financing or if the terms offered to its debt fund are below arm's length standards. In a setting close to the one in Jensen and Meckling (1976) and La Porta et al., (2006), an incentive to expropriate debt fund limited partners exists as long as the PE manager's exposure to the equity fund's cash flows is greater than her exposure to the debt fund's cash flows. In this case, related deals could incentivize valu transfer from the debt fund to the equity fund, making debt fund limited partners relatively worse off than in unrelated deals. A milder version of the conflict of interest view would arise if equity funds were the only beneficiaries of the gains of the close ties created in related deals, and offered market terms to affiliated debt funds stripping them from the higher performance of related dals. The conflict of interest hypothesis is similar to the self-dealing view proposed by Johnson et al. (2000) and La Porta et al. (2002, 2006), and consistent with the empirical evidence in Morck and Nakamura (1999), Kang and Stulz (1997), and La Porta, Lopez-de-Silanes, and Zamarripa (2003).

Which of the two alternative hypothese drives related PE deals is an empirical question that we bring to the data. In this paper, we put together the first data set to analyse related and unrelated PE deals using detailed transaction-level information from the CEPRES private equity database. Previous studies using the CEPRES data set only had access to the subset of PE transactions. Instead, we are the first to gather the data for all private debt transactions. This unique feature of our data allows us to simultaneously analyse both the equity and debt side of PE deals.[2] Out data contains information about the participating equity and debt funds, their management firms, and the

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[2] We use the term "deal" to identify all the investments done by one or multiple private equity and private debt firms on the debt and the equity sides of a company at a specific time. We use the term "transaction" to identify the investment done by a specific PE firm either on the debt side (i.e., debt transaction) or the equity side (i.e., equity transaction).We classify a deal as "related" if the same PE firm participates in the financing of the equity and the debt sides of the deal using its own equity and debt funds. We classify a deal as "unrelated" if the PE firm only participates in the financing of the equity side and unaffiliated private debt funds finance the debt side of the deal.

contractual features of each transaction. A unique element of our data is the detailed information on debt terms of each transaction (e.g., interest rates, equity kickers, and debt tranches). In addition, we have cash flow data for each transaction during the entire period (i.e., payments of dividends, interest, and repayment of loan principal). Finally, we also collect data on the operational performance of the target companies at the time of entry and exit.

Our final sample includes 2,147 equity transactions and 1,835 debt transactions with at least one debt fund and one equity fund involved in the deal.[3] There are 1,109 funds (793 equity and 316 debt funds) run by 281 different PE management firms involved in these transactions. The number of different underlying target companies in the sample is 1,257 with 251 of them having the same PE firm on the equity and debt side. The sample is representative of the full sample of PE deals available in the entire CEPRES database in terms of deal size, IRR, and performance multiples.

Our descriptive statistics provides a first look at the differneces between related and unrelated deals. The data shows that close to 20% of deals with at least one equity and one debt fund investing are related deals. Over 70% of related deals involve exactly one debt and one equity fund of the same PE management firm, while the rest include more than one fund on either side. The vast majority of related deals are carried out by experienced fund managers. Interestingly, although 46 PE management firms managed debt and equity debt funds simulataneously, all related transacctions are carried out by only 22 PE firms. The other 24 firms never engage in related deals. When PE firms do related transactions, they do lots of them: related transactions represent 30% (33%) of the transactions (committed capital) of equity funds and 44% (51%) of the transactions (committed capital) of their affiliated debt funds.

We organize our econometric analysis of related transactions in three parts. The first set of results establishes our main empirical findings about the overall performance and the gain distribution between equity and debt funds in related transactions. In order to explore the two opposing hypotheses outlined above, we use a multivariate setting analysing whether related transactions and unrelated transactions have different performance outcomes for the

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[3] The original database includes many more PE deals, but we only consider those deals with at least one debt fund and one equity fund involved in the deal to create an appropriate sample to test our hypotheses on relatedness.

participating equity and debt funds. At the transaction level, we find that, controlling for fund and deal characteristics, related debt transactions under-perform relative to unrelated debt transactions, while related equity transactions over-perform relative to unrelated equity transactions.

Robustness tests including different sets of controls and fixed effects and matching regressions produce the same results. Importantly, we also restrict the sample of analysis in several ways to make the observations more comparable. We restrict the sample to the transactions carried out by the 22 PE firms that engage in related deals, and to those carried out by PE firms that have an affiliated debt fund and could therefore have structure a related deal if they wanted. Finally, we restrict the sample to Northern American deals, which constitute a significant part of the full sample. This allows us to reduce the international variability of some key explanatory variables related to practice and legal and institutional differences. In all these robustness checks, our conclusions remain the same. In fact, the economic significance is generally larger than the one we obtain with the full sample of transactions and without matching. The thrust of the results lead us to conclude that at the transaction level, affiliated debt funds get expropriated by equity funds in related transactions. The evidence is difficult to reconcile with the information view and suggests that, at first sight, the pattern of transaction-level returns of related deals is better explained by the conflicts of interest view. These findings are important to the the extent that the limited partners of the equity and debt funds are different.

The first set of results raise the question of whether there is an overall gain of related deals or if this is simply a zero-sum game involving a transfer from debt limited partners to equity limited partners. Our findings show that there is an overall positive gain for the PE firms managing debt and equity funds in related deals. From our regression analysis, the average the annual returns of debt funds for related transactions are 2.3 percentage points lower than those for unrelated transactions. In contrast, the average annual returns of related equity fund transactions are 7.9 percentage points higher than those of unrelated equity fund transactions. Taking into account the difference in investment sizes and a five-year average holding period, a back-of-the-envelope calculation gives an average profit differential of over 20 million dollars for PE funds on each related deal. Since related deals represent on average a third of the portfolio of PE equity funds that engage in related deals (i.e., five target companies) this gives an overall

gain of more than 100 million dollars over the lifetime of the average equity fund. This amount is economically significant as the average PE equity fund size is 1.2 billion dollars.

The second part of our empirical analysis digs deeper to try to understand the potential sources of relative underperformance of related debt transactions. We can think of two main explanations. First, PE managers use their debt-affiliated funds to finance their relatively worse deals for which they could not find outside financing. But this explanation seems at odds with sizeable overall gains documented in the previous section. Second, PE managers exploit their reputation and are to offer worse terms in related debt transactions than those offered by PE funds in unrelated transactions. For this second explanation to make sense economically, debt investors of PE-affiliated debt funds need to be somehow compensated by the PE manager so they do not lose out overall. Otherwise, they will not participate in future debt funds.

We start by analysing the contractual provisions of related and unrelated debt transactions. Is the relative underperformance of related debt transactions a result of different deal terms? And if so, which ones? Analysing these differences may also help us understand the mechanism through which the transfer takes place. We find significant differences between the terms of related and unrelated debt transactions in a multivariate setting. There is a relative loss in the fixed part of the remuneration of related debt transactions: annual interest rate spreads are significantly lower, to the tune of 1.5 percentage points. Morevover, the fraction of total interest payment coming from PIK notes is 12% lower than in unrelated debt transactions. On the other hand, debt funds involved in related transactions secure more warrants, therefore holding more of the upside potential, than debt funds of unrelated debt transactions. However, it seems that the upside potential does not end up translating into a sufficient compensation for the loss in the fixed component of the remuneration. Interestingly, debt funds involved in related transactions are granted more monitoring power through board seats and acting as the lead investor.

Second, why would limited partners of PE affiliated debt funds that engage in related transactions continue to invest in the PE firm's debt fund if they lose out? We investigate different potential explanations consistent with this fact. We analyse if they really lose out once we consider the overall fund-level performance of the debt fund. Our calculations show that at the fund level, affiliated debt funds that engage in related debt transactions break even

due to the relative outperformance of their unrelated transactions. This finding may seem puzzling at first since other PE funds seem to be offering affiliated debt funds better terms than the equity fund of their own PE firm. But our data suggests that in the search for increased leverage, PE firms without affiliated debt funds offer more attractive terms to be able to raise debt.

The third and final part of our empirical analysis explores the potential reasons behind the underlying source of the documented overall gain in related deals. This gain may stem from at least two distinct sources. The first hypothesis relies on ex-ante informational advantage obtained during the due diligence phase. PE equity funds that engage in related deals may be able to identify better targets and therefore, the target companies are better from the onset. Here it is important to note that our results control for fund experience. The second hypothesis involves better ex-post incentives. Under this view, the close ties between equity and debt funds of related deals lead to lower agency costs and reduced hold-up problems as actions are internalized through the related structure.

To analyse this set of issues, we collect additional data on the operating performance of the PE target companies. We examine their operating performance at time of the transaction and the performance change over the holding period, using as much information as it is available for a large set of transactions. We find that targets are (if anything) on average smaller when they are related transactions, but there is no significant difference in terms performance and other firm characteristics at the time of transaction origination. Although we do not have enough pre-entry information to carry out a full-fledge pre-trend analysis, this evidence alleviates the concen that related transactions are different at orginiation and does not support the informational advantage or adverse selection arguments for engaging in such deals. In contrast, we find that related transactions generate higher value-added during the holding period, even when controlling for risk differences between portfolio companies. It seems that equity funds carrying out related transactions add more value and thereby increase the efficiency of the portfolio companies behind these deals. These findings point to a reduction in agency costs in related deals. A couple of differences in structure of related transactions are also consistent with lower agency costs and better incentives. Equity funds in related transactions are syndicated less often and have higher skin-in-the game owning a larger fraction of target companies (57% versus 43% for unrelated transactions). Finally, the higher monitoring power of debt funds gaining

seats on the companies' board more frequently, and the potential for reduced hold up problems and the potential of easier debt renegotiations in case of need, are additional features of related deals that help align incentives and may translate in higher value added.

Our paper makes several contributions. First, to the best of our knowledge, we are the first to study related deals in PE. Our dataset is uniquely suited to study this phenomenon, as we are able to analyse the structure of the deals, the economic implications of such transactions, and the performance distribution among participating debt and equity PE funds. One exception in this area is Liebscher and Mählmann (2017) who study Collateralized Loan Obligation (CLO) funds managed by PE firms. Their paper shows that CLO funds investing in related deals achieve high returns when trading in the secondary market, a finding consistent with the information channel hypothesis. Our study differs from theirs in terms of the transaction origination, as CLO funds mostly (but not exclusively) invest in deals through traded corporate bonds purchased on the open market post-transaction. Our data enables us to go further examining relatedness at transaction origination.

Our paper is also related to a recent but growing literature on private debt and direct lending (Block et al 2022; Böni and Manigart, 2022; Jang, 2022; Loumioti, 2022). The focus of these studies is different from ours since most debt funds are not managed by PE firms. For instance, Block et al. (2022) offers an indepth survey of private debt funds. Jang (2022) studies more directly middle-market buyouts and identifies key stylized facts about private debt used in these transactions. We extend this literature providing and indepth analysis of the structure and performance of transactions involving private debt and private equitycontrasting related unrelated transactions. The richness of our data enables us to be the first to analyse the equity and the debt side of these transactions and draw conclusions for limited partners participating on each side.

Second, our paper contributes to the literature exploring close ties between affiliated parties in PE and other financial intermediaries. There are two related studies in this area. Fang, Ivashina, and Lerner (2013) study sponsorship with bank-affiliated PE funds. In their paper, relatedness occurs when the bank has a lending relationship before or during the investment made by an affiliated PE fund. The authors argue that the tie could lead to privileged access to proprietary information about the target, but they find no difference in terms between their related and

unrealted PE deals. However, they point to the possibility that this relationship may offer cross-selling opportunities for the bank, such as M&A advising and underwriting of securities. Outside of the field of PE, La Porta, Lopez-de-Silanes, and Zamarripa (2003) study related lending in banking in a set up that shares some similarities with ours. They find support for the conflict of interest view as the controlling shareholders of the bank expropriate minorities, depositors and the government offering better loan terms for the firms they own, and defaulting more often than non-related firms during an economic crises.

Finally, we contribute to the PE literature with an indepth analysis of transactions involving debt and equity, and providing a complementary explanation for the persistently higher returns of the most established PE firms. Existing studies typically attribute this persistence to better skills and more experience of PE managers (e.g., Kaplan and Schoar, 2005; Korteweg and Sorensen, 2017). Our paper illustrates *how* established PE firms use their experience to generate the persistently higher returns: these firms carry out related transactions which enhance the incentives of their debt and equity funds and generate higher overall performance.

The rest of the paper is organized as follows. In section 2, we present the sample of related and unrelated transactions. We describe the main differences in terms of the transaction structure and the type of PE funds that carry them out. Section 3 presents the results establishing the over-performance of equity funds and the underperformance of debt funds in related transactions relative to unrelated transactions. We also document the net gain obtained by the PE firm in related deals. In Section 4, we analyse the series of hypotheses that could help explain the transfer from debt funds to equity funds in related transactions. We show evidence that PE-affiliated debt funds end up being compensated with other unrelated better performing transactions, and that the terms of related transactions in these funds have lower downside risk. In section 5, we explore the question of why we observe related transactions in the market by looking for the potential sources of value added in these deals. Finally, section 6 concludes acknowledging the limits of our paper and pointing to valuable areas for future work.

2. DATA AND SAMPLE DESCRIPTION

The question of why PE firms have diversified into debt funds remains unexplored, and is beyond the scope of our study. However, Cumming and Fleming (2015) offer an insightful historical view on its origin going back to the US distressed asset investment industry in the 1980s. This market grew over time as a result of subsequent rounds of deregulation allowing large asset management firms (including PE firms) to set up dedicated funds to acquire debt and equity of distressed firms. A complementary reason for the expansion of PE firms into debt funds may be the increasing demand since the 1980s from institutional investors to allocate more capital into alternative asset classes. In response to increased investor demand and the search for investors facing restrictions to enter the equity side (such as insurance companies and wealth management firms), established PE firms have set up other type of funds, including debt funds. One could argue that these expansions would seem natural as PE firms may have some competitive advantage in distressed debt funds, since they require active involvement and the restructuring of target companies. However, as our data will show that a significant portion of today's investments by PE-affiliated debt funds are not in distressed deals, but in a broader range of transactions. In the rest of this section, we take a first look at PE-affiliated debt funds and provide a description of their activities.

Our sample is constructed from the detailed transaction-level data from the CEPRES database. This dataset has been used in the past to examine the determinants of investment returns and different forms of risk in PE (e.g., Buchner et al., 2016, 2017, Cumming et al., 2010, Cumming and Walz, 2010, Franzoni et al., 2012, Krohmer et al., 2009, and Lerner and Baker, 2017). The database contains detailed information on the participating funds and their management firms, as well as information of contractual features and the performance of each transaction. Performance is based on the entire cash flow history from origination until full exit enabling us to calculate several performance proxies including IRR, a cash multiple and the private market equivalent (PME).

CEPRES is a private equity data analytics platform that offers proprietary data and analytics to its clients. which include all kinds of players in private markets. Its data collection is done very differently than that of ThomsonReuters, for example. According to CEPRES's website, its data includes 6,000 LPs and GPs, out of 11,250 managed funds active in private markets (not only PE). Since the platform is specialized in calculating benchmarks

and evaluating portfolios in which LPs have invested, they obtain the entire sequence of cash flows of each portfolio company from the GPs. This means that are able to compute performance measures for all of our observations.

Unlike previous studies based on a subset of private equity transactions in the database, we also have access to the private debt transactions of the entire dataset. This unique feature allows us to simultaneously analyse both the equity and debt side of PE deals and the interplay of both transactions. We have cash flow data for each transaction during the entire period for both equity and debt funds separately (i.e., payments of dividends, interest, and repayment of loan principal). A second unique element of our data is that the available information on debt transactions includes detailed figures on debt terms such as interest rates, equity kickers, and debt tranches. The granularity of the information is useful to study differences in the debt terms of related and unrelated transactions. A final advantage of our dataset is that it contains data to calculate operating performance measures for a large fraction of the target companies in our sample. These operating measures include sales, enterprise value, and enterprise multiples. In Section 5, we use this data to analyse whether the performance differences between the equity and debt funds of related and unrelated transactions that we document in Section 3, are linked to differences in the operating performance of the underlying portfolio companies. Although the data is fully anonymized and thus we do not know the name of the PE management firms and their associated funds, we can however track them with unique identifiers over time and across transactions and deals.

Table 1 presents the details of the construction of our final deal sample. The full CEPRES database contains information for a total of 43,084 individual transactions. The first transaction in the database was initiated in November 1971 and the last one in May 2017. We apply several filters to construct our sample of analysis. First, we only consider buyout deals and exclude other types of transactions such as venture capital, real estate and infrastructure. This reduces the sample to 13,741 equity and 7,493 debt transactions. Second, to build the correct sample to test our hypotheses, we only keep companies that have at least one private equity and one private debt transaction in the deal. All other deals are not appropriate for testing our hypotheses. This reduces our sample to 2,201 equity and 1,917 debt transactions. Finally, we keep the portfolio companies for which the private equity and the private debt transactions are carried out within a two-year period, trying to ensure that we properly bundle the

transactions into a singe deal.[4] This set of filters gives us a final sample of 2,147 equity transactions and 1,835 debt transactions.

We split our sample into transactions where a PE firm is involved in the equity and the debt transactions at the same time (i.e., related deals) and those deals where the PE firms that made the equity and the debt transactions are different (i.e., unrelated deals). In practice, more than one fund can participate in the financing of a deal. If this is the case, we classify the deal as "related" as long as the same PE firm provides some debt and equity through its own funds, irrespective of the number of additional funds involved in the deal. Our final sample includes 373 equity and 276 debt related transactions and 1,774 equity and 1,559 debt unrelated transactions.

Table 1 also presents some descriptive statistics for the full CEPRES sample of transactions and the remaining observations after each filter is applied. The table shows the median of the natural logarithm of the investment size and several performance measures (i.e., IRR, multiple, and PME). With the exception of the investment multiple, the filters leave performance and investment size virtually unaffected. Our final sample of private equity (debt) transactions has a median gross-of-fees IRR of 17% (18%), a multiple of 1.73 (1.41), and a PME of 1.12 (1.17). These aggregate performance figures are generally consistent with the returns documented in the literature.

Tables 2 to 5 provide a series of statistics about our sample at different levels of aggregation. We analyse the data at three different levels: portfolio companies, transactions, PE funds, and PE management firms. We call companies the targets of the equity or debt transactions carried out by PE funds. There can be multiple equity and debt transactions that correspond to a particular company.[5] Since several equity (debt) funds can invest in the same

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[4] For robustness, we have carried out the analysis of the paper using as alternatives twelve and eighteen months periods to bundle the transactions.

[5] Equity transactions are transactions in which a certain number of shares of the given company are bought, entitling the owner to be compensated according to his ownership percentage. In a debt transaction the lender receives a fixed income in return and they typically also include a so-called equity kicker. Equity kickers are equity incentives where the lender gets an additional equity position or a warrant in the company. This equity kicker is structured as a conditional reward, where the lender gets equity ownership that will be paid at a future date when the company attains specific performance goals.

company, the number of transactions and the number of companies is different. Overall, the most frequent combination of number of funds involved in these transactions is one equity and one debt fund. This combination represents 70.52% of related transactions and 52.98% of unrelated transactions.

Table 2 provides some details of the funds and management firms behind the equity and debt transactions in our sample. Appendix A provides a set of detailed definitions of all terms and variables used in the paper. There are a total of 1,109 funds in our sample of which 793 are equity funds and 316 are debt funds. These funds are run by 281 different management firms. Interestingly, all related transactions were carried out by only 22 management firms, while the unrelated transactions were done by 259 management firms. Table 2 also reveals that 46 management firms, equivalent to 16.37% of the management firms in our sample, are running equity funds and debt funds simultaneously. As we said above, 22 of these firms are behind the related transactions, while the other 24 firms never engage in such deals. The large majority of management firms (i.e., 82.91%) are only running equity funds, while less than 1% of management firms are exclusively running debt funds. Finally, 85% of management firms never engaged in related deals during our sample period.

[Table 2 About Here]

Table 3 provides details of the funds in our sample and compare the characteristics of the equity and debt funds carrying out related and unrelated transactions. The table shows that about 10% (16%) of the equity (debt) funds in our sample carried out related transactions. Related transactions are made by more experienced PE firms, as measured by fund sequence. The median fund sequence number of equity (debt) funds engaged in related transactions is 8 (6), while this number is only 3 (2) for equity (debt) funds doing unrelated transactions. In contrast, equity and debt funds involved in related and unrelated transactions do not differ in terms of the number of portfolio companies they hold or the total fund size, with the exception of related equity funds which are about a quarter larger than equity funds that only do unrelated transactions. One of the most interesting facts in Table 3 is that when funds engage in related transactions, they do it very frequently. Related transactions represent 30% of the number of transactions, and 33% of committed capital of equity funds that engage in related deals. These values are even larger for debt funds

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doing related transactions: related transactions represent 44% of all their transactions and 51% of the capital of these funds.

[Table 3 About Here]

Finally, in Table 4 we provide basic statistics of the transactions in our sample and compare the characteristics of related and unrelated equity and debt transactions. Five facts emerge from this table. First, there is no clear pattern in terms of investment size. Related equity transactions seem to be a bit smaller than unrelated transactions, but there is virtually no difference between related and unrelated debt transactions. In contrast, related d transactions do involve fewer investors: the median related debt transaction has only one fund as opposed to two funds in unrelated debt transactions. Second, PE funds take a substantially larger equity stake in related transactions (57%) than in unrelated transactions (43%). Third, syndication frequency is over four (two) times lower in related equity (debt) transactions than in unrelated transactions. Fourth, PE funds carrying out related equity or debt transactions get seats on the board of the target companies virtually all the time, while board seats in unrelated transactions are only given in 80% (62%) of unrelated equity (debt) transactions. Finally, and closely related to the syndication and board-seat results, funds in related transactions act as the lead investor much more often: related equity (debt) funds are the lead investor 96% (80%) of the time, whole unrelated equity (debt) funds lead the transaction only 76% (61%) of the time. In the following section, we will take into account all of these differences when analysing the performance of related and unrelated transactions.

[Table 4 About Here]

3. RELATIVE PERFORMANCE AND GAIN DISTRIBUTION

In this section we present our first set of results. We start by investigating the impact of related transactions on the performance of equity and debt funds to try to disentangle the two opposing hypotheses about the potential motivation for these transactions on the basis of the performance patterns observed. At the end of the section, we

address the question of the transfer between debt and equity limited partners by computing the overall gain of related transactions to the PE firm.

3.1 The effect of relatedness on performance: Conflict of interest versus informational advantage

To analyse the potential impact of relatedness on the performance of PE transactions, we run separate sets of regressions of the samples of 2,147 equity and 1,835 debt transactions. Table 5 presents the analysis of equity transactions, while Table 6 studies debt transactions. We have three dependent variables to measure transaction performance: IRR, cash multiple, and PME. To measure the effect of relatedness, we compute a *related dummy* which takes the value of one if the transaction involves a PE equity fund and a PE debt fund of the same PE management firm, and zero otherwise. Since we are measuring performance over time, all regressions include as a control the *holding period* for each transaction. In addition, all specifications control for a set of portfolio company characteristics and transaction controls which take into account the investment year, the industry and country location of the portfolio company, and a set of "transaction-type" dummies to capture potential cross-sectional variation among different types of portfolio companies. Importantly, the various sets of fixed effects help control for differences in risk between transactions. For robustness we run different specifications including additional fund and transaction controls. Our fund-level variables are the log of the fund size and the fund sequence number (measured separately for the debt or equity funds) as a proxy for fund experience. Finally, our additional transactions controls, include the number of investors and the log of the transaction size.

Table 5 presents three different specifications for our three performance measures of equity transactions. All regressions find a sizeable positive and statistically significant effect of relatedness on equity performance. Related equity transactions have a 6.4% to 7.9% higher annual IRR than unrelated transactions, depending on the specification considered.[6] This effect is not only statistically significant, but also economically meaningful. Given an average holding period of 5 years, the performance impact is economically very large. In terms of the cash Multiple and the PME, the difference between related and unrelated equity transactions ranges from 0.431 to 0.476 for the

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[6] In order to take account of differences in holding period that may affect IRR results, we also compute all our results creating a MIRR measure. Results are available upon request.

Multiple and from 0.281 to 0.317 for the PME over the holding period. The results for the PME mean that, compared to a public market equivalent, related equity transactions yield a return about 30% higher than unrelated transactions. Fund and transaction level variables do not seem to have much explanatory power once we add the *related* dummy, but we should not forget that these variables are also correlated.[7]

[Table 5 About Here]

Table 6 is structured exactly as Table 5 but for the sample of debt transactions. In contrast to related equity transactions, related debt transactions sharply underperform unrelated debt transactions. The results in Table 6 show a negative and significant effect of relatedness on debt performance across all specifications for our three measures of performance. The annual IRR of related debt transactions is between 2.3%-2.7% lower than for unrelated transactions, depending on the specification considered. For PME, the impact is between -0.07 and 0.10 over the holding period of 5 years, which is also economically important. Unlike the case of equity transactions, some of our fund-level controls are statistically significant. The size of the fund and its sequence negatively affect IRR, but the sequence of the fund has a positive effect on the Multiple and PME. Finally, the number of debt investors in the transaction has a negative effect on all three performance measures.

Although our regressions control for a series of dummies that may be correlated to risk differences, we also investigated the possibility that related and unrelated investments may have different risk profiles and may therefore be different in some unobservable way. A first way to look at this differences is by looking at the distribution of returns of related and unrelated deals. When looking at the relative frequency of related and unrelated deals in post-return quartiles ore deciles, we did not detect any significant difrences though. Finally, we also carried out matching exercise matching transactions accoding to the size of the investment, the period, the country and the type of transaction. Our results hold in matching regressions.

[Table 6 About Here]

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[7] Table B5 (B6) in Appendix B provide correlations among all regressors and other variables for equity (debt) transaction. Table B5 corroborates that indeed the fund-level variables are significantly correlated with each other.

To corroborate the sharp return differences between equity and debt in related transactions, we run a series of robustness checks using alternative control samples. In Table 7, we provide three different robustness tests. First, as Table 3 shows, PE firms carrying out related transactions seem to be more established or experienced. One could argue that although we try to control for fund experience Tables 5 and 6 use all transactions in all PE firms. Therefore, the performance differences we find could be partially explained by the differences between PE firms carrying out related transactions and those that do not or do not have a debt fund. To address this concern, we carry out two tests. First, to come as close as possible to the ideal test of comparing related to unrelated transactions of a same PE firm, we run Models (7)-(9) of Tables 5 and 6 only for the transactions done by all the funds of the 22 PE firms that engaged in related transactions. Second, under the view that PE firms that do not have a private debt could not have carried out a related transaction to begin with, we run the same specifications but exclude all transactions made by such PE firms (by construction, this test is only applicable for equity transactions). This second filter is different from the first one because we retain transactions by PE firms with affiliated debt funds but who did not use these funds in related transactions.

Results of these robustness checks are provided in Table 7 in the same order as discussed above. The results of these robustness tests confirm equity and debt performance differences between related and unrelated transactions. Importantly however, the economic effects turn out to be about twice as large as those reported in previous tables. Compared to unrelated transactions, related equity (debt) transactions have a higher (lower) IRR of close to 13% (6%), a higher (lower) Multiple of close to 0.65 (0.24), and a higher (lower) PME to the tune of 0.44 (0.10). These are substantial differences.

[Table 7 About Here]

Table 7 runs a third robustness test to ensure that PE-firm differences are not responsible for the performance differences we document. Although all previous regressions control for the country of the portfolio company, since close to 50% of our equity and debt transactions are located in North America (i.e., Canada and the United States), we exclude from the regressions all transactions from other regions of the world. The effect of relatedness is still statistically significant and one-and-a-half to two times larger for this subsample.

The thrust of the evidence provided in Tables 5, 6 and 7 points to large performance differences of related and unrelated transactions. These results are also supportive of the conflict of interest hypothesis pointing to a potential transfer of value from debt funds to equity funds in related transactions. It also seems difficult to find a version of the informational advantage hypothesis that would be consistent with this pattern of gain distribution.

An additional set of tests that we perform is to explore "pure" versus "impure" related transactions. By "pure", we understand deals that are fully internally funded, without any other fund of another PE firm. "Impure" refers to syndicated deals. Our expectation is that extraction is highest (or even only) for pure related transactions which are made without the participation of other external funds. We test this hypothesis in Table 8. There, we split the variable *related dummy* into *pure* and *impure dummies*. On the equity side (Panel A), we find that over-performance only occurs in pure transactions. For impure related transactions, the coefficient is statistically insignificant. Moreover the difference in coefficients between pure and impure is statistically significant at below 5% level most of the time (see tests shown below the regressions, denoted F-statistics). For debt transactions (Panel B), we obtain similar results in that under-performance is only observed for pure deals. The difference between pure and impure is again statistically significant most of the time below the 5% level. These additional findings are consistent with the view that rent extraction is easier in pure deals that do not involve any other fund, and that PE firms have no incentive to invite any other PE firm in a transaction where value transfer is made.

[Table 8 About Here]

3.2 The Overall financial gain of relatedness

Tables 5 to 8 establish clear differences between related and unrelated transactions. Equity funds involved in related transactions gain while debt funds loose relative to those involved in unrelated transactions. These findings raise the question of whether there is an overall gain from related deals, or if this is simply a zero-sum game involving a transfer from debt funds to equity funds managed by the same PE firm.

[HERE, WE NEED TO RECALCULATE. Let's disucss which numbers we want to report? Median?] To complete the picture and get an idea of the magnitude of these differences, we can calculate the overall financial gain

of related transactions for PE firms. We can use the numbers from the last specifications of Tables 5 and 6 to get a simple back-of-the-envelope calculation. These estimates imply that for the average related transaction, the equity fund's profits are 7.9% higher and the debt fund's profits are 2.3% lower than for unrelated transactions. Taking into account the mean transaction size of related transactions from Table 2, this yields an overall, additional annual gain for the PE firm of USD 4.1 million (i.e., 7.9% x USD 58.63 million=4.63 million *minus* 2.3% x USD 23.56 million=0.54 million) for the average related transaction, as compared to a similar, unrelated transaction. If we now consider that the average related transaction holding period in our sample is 5 years (Table 1), and that the average equity fund that engages in related transactions carries out five such transactions, the overall gain of engaging in related transactions amounts to over USD 100 million over the lifetime of the equity fund. This number is significant considering the average fund size is USD 1.2 billion dollars (Table 3).

These numbers also imply a substantial gain for PE firm managers (general partners). Assuming a carried interest of 20% for both equity and debt funds, the PE firm managers get USD 820,000 extra per related transaction per holding year. If we use the same numbers as in the previous calculation, we get to a benefit of over USD 20 million. These simple back-of-the-envelope calculations are almost twice as high if we use the estimates of the regressions in the robustness Table 7. The magnitude of the gains raises the question of the possible sources of value added behind these deals, which we explore in Section 5 of the paper. Understanding its ultimate source helps explaining whether they are justified.

4. MECHANISMS BEHIND THE RELATIVE LOSS OF DEBT FUNDS IN RELATED TRANSACTIONS

Before investigating the potential sources of value added behind the sizeable overall gain of related transactions, we would like to further investigate the mechanisms or reasons behind the relatively lower performance of related debt transactions. We can think of two broad explanations. First, PE managers use their affiliated debt funds to finance their relatively worse deals for which they could not find outside financing. But this explanation seems at odds with sizeable overall gains documented in the previous section. Second, the terms offered to PE debt funds in related debt transactions are simply worse than those offered by PE funds of unrelated transactions. In order

to ensure that in equilibrium limited partners in debt funds continue to fund follow-up debt funds, they need however to break even at the fund level. Thus, this second rationale requires that affiliated debt funds are somehow compensated by the PE managers so that they end up not losing out overall.

Providing insights into the channels through which the performance differential is generated may not only help us understand how the rent extraction takes place, but may also help explain the ultimate sources of the overall value-added of related transactions documented. It will further offer indication whether these gains are economically justified for PE managers. Our data allows to explore these issues.

4.1 Do affiliated debt funds receive different contractual terms for related transactions?

To understand the seemingly lower relative performance of debt funds in related transactions, we start by analysing the contractual provisions of related and unrelated debt transactions. In other words, is it the case that debt funds in related transactions get worse contractual terms, which ultimately explain such a performance gap? Results are presented in Tables 9 to 12.

Table 9 shows statistics on the structure, remuneration, and other terms of debt transactions. Panel A provides data on the composition and remuneration terms of debt transactions, typically consisting of a fixed portion (i.e., interest rate and PIK)[8] and a variable portion (i.e., equity ownership and warrants). In Panel B, we provide additional debt terms and features relating to whether the private debt fund sits on the board or acts as the lead investor, as well as to characteristics relating to the sourcing, syndication, tranching and holding period of the transactions.

The results of the comparison of composition and remuneration of related and unrelated debt transactions in Panel A can be organized in three groups. First, relative to unrelated transactions, related transactions involve a significantly smaller fixed component. Indeed, the average and median total nominal interest rates and interest rate spreads over the benchmark risk-free rate are statistically smaller for related debt transactions. The same applies to PIK notes. Second, and in contrast, related transactions include a higher variable component as warrants are more

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[8] In terms of compensation, a PIK (i.e., payment in kind) note is similar to a zero-coupon bond as the interest is capitalized until maturity and the only payment to the debt fund is at maturity. The payment is the sum of the principal and all the capitalized accrued interests.

frequent than for unrelated transactions. Finally, the presence of equity and preferred shares or the use of bullet payments are not statistically significantly different between related and unrelated transactions.

In terms of additional debt structure features, Panel B shows that debt funds involved in related transactions hold board seats in the portfolio company practically all the time, and have "observer" board seats and act as the lead investor much more frequently than debt funds of unrelated transactions. It is also the case that related debt transactions are more often tranched, allowing better risk allocation (Cumming et al., 2020) and have a larger number of tranches. These differences suggest that the debt funds receive more power in related transactions.

On the other hand, Panel B also shows that affiliated debt funds doing related transactions recur more often to "internal" syndication with debt funds of the same PE firm/family (*cross investment dummy*) and less often to syndication with other debt funds outside (*syndication dummy*). We can also observe that the source of the transaction is exclusive and comes from the PE funds of the same PE firm much more often in related than unrelated debt transactions. Finally, debt funds carrying out related transactions hold their investments much longer than debt funds doing unrelated transactions. These structural differences suggest related transactions are more closely-held which could facilitate the expropriation of debt fund's limited partners. Here again, our multivariate regressions will support this view of additional power.

[Table 9 About Here]

The multivariate analysis in Tables 10 and 11 echoes the summary statistics of Table 9, and allows us to talk about the magnitudes of the differences controlling for fund, portfolio company, and transaction characteristics. Tables 10 and 11 are each split in three panels following the structure of the regression analysis on performance measures in the previous section: Panel A reports our baseline specification, Panel B adds fund characteristics, and Panel C adds transaction characteristics.

Table 10 corroborates that related debt transactions receive lower fixed compensation components than unrelated ones. The estimates from Panel C, which include all our control variables, imply that related debt transactions receive 1.4 (1.6) percentage points lower annual nominal interest rates (interest rate spreads) than

unrelated debt transactions. In contrast, a PIK note is 24.6% less likely to be included and the fraction of total interest payments from the PIK (i.e., PIK fraction) is 12.3% lower in related than in unrelated transactions. In contrast, debt funds of related transactions receive better terms in the variable components of remuneration. Warrants are 22.4% more often used and the proportion of company ownership attributed to warrants is 6.4 percentage points larger for related than for unrelated transactions. Finally, equity ownership is slightly lower but not statistically significantly different in most specifications. In summary, Table 10 shows that debt funds involved in related transactions receive lower interest rates and less PIK notes, but hold higher upside potential than those of unrelated transactions.

[Table 10 About Here]

The multivariate regressions of Table 11 also confirm the two sets of univariate differences of Panel B of Table 9. Debt funds receive more "power" when the transaction is related. Based on estimates of the full specifications in Panel C, and we find that debt funds are 35.7% more likely to hold a board seat, 10.6% more likely to have observer rights in the board, and 6.8% more likely to be the lead investor. On the other hand, regressions corroborate the potentially troubling "internal" or "exclusive" nature of related debt transactions. Related debt transactions are 19.1% more likely to be sourced by the PE firm itself, 27.6% less often externally syndicated, and 51.5% more often internally syndicated with another debt fund of the same PE firm. It is possible that the fact that debt funds are more likely to hold a board seat and be lead investor in related debt transactions is the result of less syndication. Indeed, it is important to note that different measures of debt structure and terms are not independent, and may be set together based on target company, PE fund and firm characteristics.[9]

[Table 11 About Here]

To conclude the analysis of the terms and structure of related and unrelated transactions, we run a series of robustness checks similar to those carried out in Table 7 of Section 3. Table 12 reports these robustness tests using alternative control samples running the specifications of Panel C of the previous tables. The first set of regressions in Panel A redo the analysis using only the sub-sample of debt investments done by the 22 PE firms that carry out

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[9] The results presented in Tables 9 to 11 are robust to reducing the sample to the close to 500 transactions for which we have most of the data on terms and structure of debt deals.

related transactions. Meanwhile, the second set of regressions of Panel B uses the transactions of PE firms that have debt funds under management. Although we lose significance in a couple of terms, most notably the warrants, the results of the table give qualitatively the same picture as in Tables 9 to 11: compensation is less based on fixed components, more power is given to the debt fund, and the nature of the transaction is more exclusive in related than in unrelated debt transactions.[10] In contrast, we do not find robust results for the increased variable compensation.

[Table 12 About Here]

4.2 Do limited partners of PE-affiliated debt funds ultimately lose out?

So far, the results in this section suggest that the fixed remuneration terms of related debt transactions are lower than those of unrelated debt transactions, but related debt transactions get more upside potential and monitoring power. However, as the performance results of Section 3 show, it seems that the lower risk and higher upside potential do not end up materializing, leaving debt funds involved in related transactions with a lower average performance relative to those of unrelated transactions.

If we stopped the analysis at the transaction level, our results would imply that the limited partners of debt funds carrying out related transactions end up losing money relative to limited partners of debt funds that do not engage in such transactions. This raises the immediate question of why these limited partners would continue to give money to affiliated PE debt funds that engage in related transactions. To address this question, we investigate further the lower performance of related debt transactions. The evidence presented below suggests that affiliated PE debt funds are somehow compensated or made hole at the end of the day.

Do private debt funds engaging in related transactions lose out overall? To answer this question we propose two complementary tests. First, we analyse performance at the fund level comparing fund performance of funds that engage in related transactions with those that do not. Second, we go back to transaction-level data and look at the relative performance of unrelated debt transactions done by PE firms that do and do *not* engage in related debt

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[10] In Table 12, we did not include the robustness test for the subsample of U.S. transactions as we did in Table 7. Since the results of this subsample are very similar to those for the full sample. They are nevertheless available from the authors upon request.

transactions. If the first test shows that limited partners break even on average (which is what we will obtain), then we should obtain from the second test that debt funds engaged in related transactions outperform in their unrelated transactions, since this would be the only reason to break even on average at the fund level.

Table 13 provides fund-level performance summary statistics for equity and debt funds. Fund-level performance measures are computed taking into account all the cash flows generated by all transactions made by the fund during its lifetime in our sample period. The difference in means and median tests suggest that equity funds engaged in related transactions outperform equity funds solely carrying out unrelated transactions. More importantly, they also suggest that the overall performance of private debt funds that have done related transactions is not statistically significantly different from that of private debt funds that have not. Indeed, while equity funds that engage in related transactions earn an additional annual return of 4% (measured in terms of IRR), we do not find any significant difference at the fund level for private debt funds. We obtain the same conclusions with the two other performance measures (i.e., multiple and PME).

[Table 13 About Here]

The results of the multivariate analysis in Table 14 support the conclusions from Table 13. Models (1)-(3) presents results for equity funds, while Models (4)-(6) for debt funds. All specifications include a dummy variable labelled *Affiliated Fund* equal to one if the fund has done at least one related transaction during its lifetime, and zero otherwise, and a series of fund-level fixed effects (i.e., vintage year, country focus of the fund, and industry focus of the fund). In Panel A, the coefficient of the dummy varia*ble Affiliated Fund* indicates that equity funds engaged in related transactions earn an annual IRR 4.1 percentage points higher than that of equity funds doing unrelated transactions only. Similarly, the former funds have a 0.268 (0.115) higher Multiple (PME) than the latter. Meanwhile there are no statistically significant differences between debt funds involved in related and unrelated transactions for any of the three fund performance measures.

Panels B and C show robustness checks to our previous findings. In Panel B, we exclude first funds, under the theory that PE firms may not be experienced enough. This may affect the coefficient and offer better estimates. Panel C goes a step further by reducing the sample of funds to only include the most experienced funds (i.e., those

above the mean number of funds per PE firm). The magnitude of the performance differences between related and unrelated equity funds increases somewhat, while the differences between debt funds remains statistically insignificant. Overall these two panels suggest that, despite the fact that some of the debt funds' capital goes into related transactions, debt fund's limited partners do not lose out as a whole.

[Table 14 About Here]

An underlying implication of these results is that debt funds that engage in related transactions earn above average returns in the rest of the transactions in their portfolio (i.e., in their unrelated transactions). This above-average performance is the likely reason why they do not underperform other debt funds at the fund level. To provide empirical evidence on this implication, we re-run a similar analysis of performance differences as before (i.e., Table 7) at the transaction level but only using the subsample of unrelated debt transactions. All specifications include the dummy *Affiliated Fund*, equals one if the transaction was carried out by a PE firm that carried out related transactions during its life time (i.e., the 22 PE firms involved in related transactions), and zero otherwise. This variable captures the performance difference in unrelated transactions between funds that have and have not engaged in related transactions. The results of Table 15 show that indeed debt funds that engage in related transactions obtain higher performance on average in their unrelated transactions, consistent with the results that overall they break even. In Model (7), which is the specification with the most control variables, we find that this difference is equivalent to 2.5 percentage points in terms of annual IRR, and over 0.08 for the Multiple and PME.

[Table 15 About Here]

To summarize, at the fund level, limited partners of debt funds that do related transactions do not lose out when compared to limited partners of debt funds only investing in unrelated transactions precisely due to the relative outperformance of their unrelated transactions. This finding may seem puzzling at first, since PE funds of other PE management firms seem to offer them better terms than the PE funds of their own PE family.

Although it is difficult to provide conclusive evidence on the mechanisms at play that may explain this pattern, we conducted additional tests that provide support for a plausible explanation. More specifically, the pattern

of performance could make sense if, in the search for increased leverage, PE firms that do not have their own private debt funds need to offer more attractive terms to be able to raise debt. In order to test this hypothesis, we investigate with which PE firms these transactions were made. In support of this possibility, we find that none of the unrelated transactions used in Table 15 are with any of the 22 PE firms that do related transactions, but rather they are all done with less established PE firms. Therefore, the relatively better terms of unrelated transactions could be explained if less experienced PE management firms that do not have any debt fund of their own find it more difficult to raise debt to close their deals. This explanation is consistent with both, the documented fund-level result showing that affiliated debt funds do not lose out overall (Table 14) and the over-performance of unrelated transactions of these same debt funds (Table 15).

Overall, the results of this section provide us with empirical support to justify why institutional investors would continue to invest in follow-up debt funds of these PE firms with affiliated debt funds, despite its relative loss in related transactions.

5. WHAT IS THE SOURCE OF ADDITIONAL VALUE OF RELATED TRANSACTIONS?

In this final section, we analyse some of the potential sources behind the overall outperformance of realted transactions compared to unrelated transactions. In support of the conflict of interest hypothesis, our results showed that there is a value transfer from debt funds to equity funds in related transactions, but that these transactions also lead to a value increase. This last finding is of particular interest since in the classic agency models where one party extracts a rent from another party, the design of the mechanism of extraction wastes resource that may reduce the overall value to be distributed (La Porta et al., 2002). Instead, our back-of-the-envelope calculation indicates a large value added as the financial gains made on the equity side more than outweigh the loss on the debt side. So, what could explain the financial value added of related transactions?

Our data allows us to explore two possible, non-mutually exclusive sources of value. First, it is possible that PE firms carrying out related transactions are better at identifying higher quality target companies, so the target firms

are simply better prospects from the start. In this case, the source of the gain of related transactions would be an informational advantage unequally shared by the equity and debt funds involved. The documented exclusivity and the closely-held nature of related deals suggest this theory is a possibility.

A second possibility is that related transactions lead to internalization of gains due to the fact that the value generated through the transactions is not shared with anyone else. The structure of related transactions therefore creates additional incentives for PE firms to add value, either through more intensive involvement or monitoring of the target company, which ultimately leads to higher value added than in unrelated transactions. In this case, the terms and structure of related transactions would be the trigger of value creation and therefore, the overall gain. Several of the differences in terms and structure between related and unrelated transactions, such as higher ownership from equity funds and higher upside potential and monitoring power of debt funds support this possibility (Tables 9 to 12). It is important to note that the results presented in Section 3 imply that, irrespective of the origin or source of the overall gains, such gains are not shared with affiliated debt funds and there is a rent extraction from the debt side of related transactions.

To empirically investigate these two non-mutually exclusive possibilities, we collect additional data on the targets' operating performance at the onset of the transaction and in the following years. While these numbers are not available for all our transactions, we were able to obtain information for a sufficiently large portion of the sample amounting to 40-50% of the target firms involved in related and unrelated transactions, depending on the variable considered (see Appendix Table B4). If related transaction target companies show better operating performance at initiation (i.e., entry), that would suggest these transactions were better from the beginning. Instead, if related transaction target companies are no different from unrelated ones at the onset, but they do show improved operating performance between the time of entry and exit, this pattern would suggest that higher value was generated during the PE funds' involvement providing support for the increased incentives hypothesis as a source of the overall gain.

Table 16 provides summary statistics of all operating performance measures that we can compute for the full sample of target companies and for the subset of related and unrelated transactions. The first three measures (i.e., *log(Enterprise Value)*, *log(Sales)*, and *EBITDA*) are proxies for size, while the other three (i.e., *EBITDA Margin*,

Sales Margin, and *Enterprise Margin*) proxy for performance. The last measure in the table, (i.e., *Net Debt to Total Assets*) intends to analyse the initial capital structure and to measure the impact on debt reduction as PE funds enter the target company. The table is split in two panels: Panel A shows measures at time of deal initiation (entry), while Panel B calculates changes over the lifetime of the deal.

In Panel A, we observe that, based on all available size measures, related transaction targets tend to be smaller than the targets of unrelated transaction. If anything, this would suggest that related transaction targets are riskier. However, this difference disappears in the multivariate analyses we carry out below. The remaining measures on operating performance are not statistically significantly different among the two target groups, suggesting that realted transaction target companies do not seem to be performing better at the time of entry. In contrast, most of the indicators of changes in performance show higher improvements for related transactions, and a third of them are statistically significantly different.

[Table 16 About Here]

Tables 17 and 18 test for the validity of these results in a multivariate setting controlling for target company, fund and transaction characteristics.[11] Table 17 presents regressions using as dependent variables the target numbers at the time of entry, while Table 18 shows regressions on target results changes from intuition to exit of the transaction.

Our multivariate regressions provide some insightful views about the potential sources behind the overall gain of related transactions when compared to unrelated transactions. First, once controlling for target company, fund and transaction characteristics, not a single initial performance ratio is significantly different between related and unrelated transactions. Similarly, only one of the three measures of size (i.e., *log(Enterprise Value)*) is different between these two types of transaction. These results suggests that, at least in the dimensions that we can measure, related transactions are very similar to unrelated transactions at time of entry.

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[11] Following the format of previous tables, in addition to the control variables shown, all regressions include dummies for year of investment, portfolio-company's country and industry, and transaction type. The number of observations in these tables is different from that of previous tables, because the unit of observation is the target company of the transaction.

In contrast, the regressions in Table 18 show statistically significantly higher improvements in four out of the six target company growth performance ratios over the lifetime of related transactions relative to unrelated transactions. The picture emerging from the increase in target size is mixed, since size *Growth Enterprise Value* is not significant and *Growth Sales* is weakly significant. In contrast, the *Growth EBITDA* is significantly higher for the targets of related transactions: such targets grow their EBITDA close to 7 percentage points more than the targets of unrelated transactions. Along these lines, two out of the three performance growth ratios are significantly higher for targets of related transactions: the *Growth EBITDA Margin* and the *Growth Enterprise Multiple* are 3.4 and 3.8 percentage points higher over the life time of related transaction target companies than for unrelated transaction target companies.

[Tables 17 and 18 About Here]

Of course, we can only assess these differences based on the set of observable variables at our disposal. Our data does not allow us to reject the hypothesis that PE funds of related transactions are better at picking initially better targets based on qualitative data or other form of unobservable information that is not correlated to the observable characteristics at our disposal. But, within the limited scope of our data, we can conclude that related transactions have higher value added than unrelated transaction during their lifetime.

If we put together these results with those of the previous section, one could argue that the higher value added may be linked to the improved incentives of related transactions as equity funds own a larger fraction of the target company (sicne they tend not ot be syndicated), and debt funds have a higher upside potential and more monitoring power. The closed structures of related deals may also mean that affiliated debt funds are more readily available to provide cash throughout the lifetime of the transaction when needed by the target and more willing to hold their investments for longer time, as our data on holding period indicates. Given the limits of our data, the evidence suggests that this gain is most likely due to the better ex-post incentives inherent to these structures.

6. CONCLUDING REMARKS

We put together a unique data set containing private equity and private debt transactions of PE and other management firms. This data allows us to provide the first complete analysis of the structure, performance and gain distribution of PE related and unrelated transactions. The analysis of the structure and performance of PE-affiliated debt funds may not only increase the transparency of this market, but may also help us draw conclusions applicable to other instances where financial intermediaries play different roles or sit on both sides of a transaction.

We have two main findings in terms of the relative performance of related transactions and funds. First, PE equity funds extract from their affiliated debt funds in related transactions by giving them worse terms and thus lower performance; and second, the additional value that related transactions generate is not shared with them either. Our evidence is overall supportive of a nuanced version of the conflict of interest hypothesis. Although we document a transfer of value from debt to equity funds in related transactions relative to unrelated transactions, we also find that limitred partners in PE-affiliated debt funds do not loose overall when looking at their full portfolio holdings. PE firms seem to find a way to compensate debt funds since the limited partners of these debt funds do not end up being hurt overall. PE firms could be providing their affiliated debt funds with the visibility to find and attract highly profitable unrelated transactions into their portfolio. This point is consistent with the fact that debt funds engaging in related transactions are mostly launched by well-established PE firms that may be better equipped to be more effective monitors helping to control performance. These results may help explain why the existence of such transactions is an equilibrium.

Under this perspective, PE debt funds do benefit because the reason why PE debt funds are able to obtain better terms from other, unrelated transactionsis that they benefit from the high reputation of the PE management firm. Therefore, PE firms indirectly contribute to make their debt funds perform to the same level as other debt funds that do not engage in related transactions. As for the rest of the gains/value created in realted deals, they need not be shared with the debt fund because, as some of our data shows, it is generated by the PE fund managers through higher incentives in realted transactions. Affiliated debt funds act simply as passive investors that are made whole through the PE firm reputation and do not deserve anything more.

Our findings offer some implications for policymakers, limited partners, and trade associations. It seems clear that more transparency and disclosure of the terms, reasons and rationale of related deals is called for. Such deals lead to conflicts of interest and ultimately value transfer. Such concerns have been raised by the British Private Equity & Venture Capital Association, for example. They point towards the risk of "cherry-picking" by equity funds. Still, although clarity is needed, our findings suggest that debt funds are able capitalize in the reputation of the PE management firm to secure sufficient value elsewhere so that limited partners do not lose out. However, in as much as the compensation of the affiliated debt funds comes from the reputation of the PE firm, this calls into question the viability of the affiliated debt model for less experienced or lower reputation PE firms if they engage in related transactions. Indeed, the latter may not enable to offer the needed reputation to their debt funds to compensate for the value transfer.

The existence of related transactions raises a host of other interesting questions that our current data does not allow us to answer. First, how do PE funds decide/pick which transactions will be related or not? In this study we explored the performance implications of such transactions, but we did not examine which ones are related and why. One possible reason consistent with the last part of our analysis is that related transactions must be target companies for which the PE equity fund can add significant value. But this rationale, while plausible, may not be the only explanation. Second, an unexplored research question at the PE firm level is what drives the creation of affiliated debt funds? Are there market conditions that push them to engage in related transactions? What else explains the launching of affiliated debt funds? According to some preliminary inspection, affiliated debt funds do not seem to be driven by the business cycle or the lack of debt in the market alone. And third, our data does not allow us to go deep into the analysis of the capital structure of deals because we do not have data on the participation of debt and equity in the deals from investors other than PE and debt funds (e.g., through issuance of corporate bonds or syndicated loans from banks). Several interesting questions would emerge from such an analysis. Do PE firms increase the participation of their debt fund in the transaction so that it reduces the equity participation? What is the optimal debt-to-equity mix that maximizes value transfer from debt of equity fund in related deals? We need more data on other debt and equity participants beyond PE and private debt to address such questions.

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Table 1: Construction of the sample

The table shows details for the construction of the sample of private equity and private debt transactions. The sample labelled (3) represents the final sample. The table reports median values for the Log(Size), IRR, Multiple, and PME). The bottom three rows report the results of z-tests for the differences in median values between subsamples. a, b, and c indicate significance at 1%, 5%, and 10%, respectively. Appendix A provides detailed definitions of all variables. 'N' represents the number of observations.

	Private equity (N)	Private debt (N)	Private equity				Private debt			
			Log (Size)	IRR	Multiple	PME	Log (Size)	IRR	Multiple	PME
CEPRES full data on equity and debt transactions (43,084)										
• (1) Keep buyout equity and debt transactions	13,741	7,493	1.24	0.15	1.48	1.05	1.01	0.16	1.32	1.14
• (2) Keep transactions in companies that have at least one equity and one debt transaction	2,201	1,917	1.28	0.17	1.74	1.15	1.12	0.18	1.41	1.17
• (3) Keep transactions done within a two-year span of time	2,147	1,835	1.28	0.17	1.73	1.15	1.12	0.18	1.41	1.17
o Related	373	276	1.29	0.16	1.58	1.15	1.07	0.16	1.42	1.13
o Unrelated	1,774	1,559	1.28	0.18	1.75	1.15	1.13	0.19	1.41	1.18
Difference in medians (z-tests)										
• (1)-(2)			-0.04	-0.02	-0.26[b]	-0.10	-0.11	-0.02	-0.09[b]	-0.03
• (1)-(3)			-0.04	-0.02	-0.25	-0.10	-0.11	-0.02	-0.09[b]	-0.03
• (2)-(3)			0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00

Table 2: Details of the sample

The table also provides statistics about the involvement of management firms in related and unrelated transactionsFor each of these (sub-)samples, it shows the number of equity and debt transactions, the number of different portfolio companies included, the number of different funds involved, and the number of different management firms involved. Appendix A provides detailed definitions of all variables.

	Full sample	Related	Unrelated
Number of equity transactions	2,147	373	1,774
Number of debt transactions	1,835	276	1,559
Number of funds investing	1,109	116	993
Number of equity funds investing	793	72	721
Number of debt funds investing	316	44	272
Number of management firms investing	281	22	259
Percentage (number) of management firms running both equity and debt funds	16.37% (46)	100.00% (22)	9.27% (24)
Percentage (number) of management firms running only equity funds	82.91% (233)	n.a.	89.96% (233)
Percentage (number) of management firms running only debt funds	0.71% (2)	n.a.	0.77% (2)
Percentage (number) of management firms that never invested simultaneously in equity and debt of the same deal	85.41% (240)	n.a.	92.66% (240)

Table 3: Fund characteristics

This table shows fund-level statistics (N, mean, median) of fund characteristics for the full sample of funds, for the subsample of funds that have done at least one related transaction, and for the subsample of funds that have only done unrelated transactions. Statistics of variables are shown separately for equity and debt funds. t-tests and z-tests report p-values when comparing the mean (median) of both subsamples to determine whether there is a statistically significant difference between the two means (medians). ***, **, and * indicate significance at 1%, 5%, and 10%, respectively. Appendix A provides detailed definitions of all variables.

	Full sample		Funds with at least one related transaction		Funds with no related transactions		Diff.	t-test z-test	
	N	Mean Median	N	Mean Median	N	Mean Median			
Equity funds									
Number of portfolio companies	793	22.89	72	21.56	721	23.03	-1.48	0.47	
		17.00		17.50		17.00	0.50	0.79	
Number of related companies	793	0.50	72	5.18	721	0.00	5.18	0.00	***
		0.00		2.00		0.00	2.00	0.00	***
Fraction of related companies	793	0.03	72	0.30	721	0.00	0.30	0.00	***
		0.00		0.25		0.00	0.25	0.00	***
Fund size	793	967.19	72	1,225.40	721	939.61	285.79	0.24	
		280.71		525.41		268.09	257.32	0.00	***
Capital invested in related companies	793	29.32	72	303.75	721	0.00	303.75	0.00	***
		0.00		88.09		0.00	88.09	0.00	***
Fraction capital invested in related companies	793	0.03	72	0.33	721	0.00	0.33	0.00	***
		0.00		0.25		0.00	0.25	0.00	***
Fund sequence number (equity and debt funds)	793	6.54	72	12.94	721	5.86	7.09	0.00	***
		4.00		8.00		3.00	5.00	3.00	***
Fund sequence number (only equity funds)	793	4.12	72	5.57	721	3.96	1.61	0.00	***
		3.00		5.00		3.00	2.00	0.00	***
Debt funds									
Number of portfolio companies	316	21.37	44	17.44	272	22.07	-4.63	0.09	*
		17.00		16.00		18.31	-2.31	0.05	**
Number of related companies	316	0.97	44	6.42	272	0.00	6.42	0.00	***
		0.00		3.00		0.00	0.00	0.00	***
Fraction of related companies	316	0.07	44	0.44	272	0.00	0.44	0.00	***
		0.00		0.36		0.00	0.36	0.00	***
Fund size	316	338.29	44	321.61	272	341.24	-19.63	0.77	
		205.61		212.31		205.61	6.70	0.95	
Capital invested in related companies	316	22.73	44	151.20	272	0.00	151.20	0.00	***
		0.00		55.49		0.00	55.49	0.00	***
Fraction capital invested in related companies	316	0.08	44	0.51	272	0.00	0.51	0.00	***
		0.00		0.44		0.00	0.44	0.00	***

Fund sequence number (equity and debt funds)	316	5.15	44	11.74	272	3.99	7.76	0.00	***
		3.00		6.00		2.00	1.00	0.00	***
Fund sequence number (only debt funds)	316	2.26	44	2.07	272	2.30	-0.23	0.43	
		2.00		2.00		2.00	0.00	0.48	

Table 4: Transaction characteristics and performance, by fund type

This table shows characteristics and performance of the equity and debt transactions of the full sample, the subsample of related transactions and the subsample of unrelated characteristics where the fund manager is lead investor. t-tests and z-tests report p-values when comparing the mean (median) of both subsamples to determine whether there is a statistically significant difference between the two means (medians). ***, **, and * indicate significance at 1%, 5%, and 10%, respectively. Appendix A provides detailed definitions of all variables.

	Full sample		Related		Unrelated				
	N	Mean Median	N	Mean Median	N	Mean Median	Diff.	t-test z-test	
Equity characteristics									
Transaction size	2,087	71.32	313	58.63	1,774	73.56	-14.93	0.02	**
		18.97		19.29		19.02	0.27	0.01	***
Equity ownership at entry	992	0.45	166	0.57	826	0.43	0.14	0.00	***
		0.45		0.59		0.42	0.18	0.00	***
Number of equity investors	2,147	2.75	373	2.24	1,774	2.86	-0.62	0.00	***
		2.00		2.00		2.00	0.00	0.72	
Syndication Dummy	1,254	0.60	126	0.13	1,128	0.65	-0.51	0.00	***
		1.00		0.00		1.00	-1.00	0.00	***
Board seat Dummy	1,305	0.83	265	0.98	1,040	0.80	0.18	0.00	***
		1.00		1.00		1.00	0.00	0.00	***
Lead Investor Dummy	1,551	0.80	341	0.96	1,210	0.76	0.21	0.00	***
		1.00		1.00		1.00	0.00	0.00	***
Debt characteristics									
Transaction size	1,830	21.90	276	23.56	1,554	21.60	1.95	0.49	
		13.26		11.81		13.55	-1.75	0.02	**
Number of debt investors	1,833	2.15	276	1.32	1,557	2.30	-0.98	0.00	***
		2.00		1.00		2.00	-1.00	0.00	***
Syndication Dummy	980	0.60	164	0.27	816	0.67	-0.40	0.00	***
		1.00		0.00		1.00	-1.00	0.53	
Board seat Dummy	1,211	0.67	209	0.90	1,002	0.62	0.28	0.00	***
		1.00		1.00		0.00	1.00	0.00	***
Lead investor Dummy	1,549	0.64	260	0.80	1,289	0.61	0.19	0.00	***
		1.00		1.00		1.00	0.00	0.00	***

Table 5: Regressions on equity performance

The table shows the OLS regression results for the performance of related and unrelated equity transactions in our sample. The dependent variables measuring transaction performance are the IRR, the (Cash) Multiple and the PME. All regression models contain portfolio company-level dummies (transaction year, country, industry, and deal type dummies). Models 1, 2, and 3 show the base regressions, controlling for the *Related dummy* and the *Holding period* as independent variables. Models 4, 5, and 6 add several fund characteristics as regressors. Models 7, 8, and 9 extend the regressions adding transaction characteristics as regressors. Numbers in parenthesis are t-values. ***, **, and * indicate significance of coefficients at 1%, 5%, and 10%, respectively. Appendix A provides detailed definitions of all variables.

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
	IRR	Multiple	PME	IRR	Multiple	PME	IRR	Multiple	PME
Related dummy	0.0663**	0.431***	0.281**	0.0641**	0.455***	0.296**	0.0793***	0.476***	0.317***
	(2.30)	(2.75)	(2.47)	(2.20)	(2.89)	(2.58)	(2.67)	(2.96)	(2.71)
Holding period	-0.0535***	0.0478**	-0.0245*	-0.0535***	0.0508***	-0.0214	-0.0525***	0.0471**	-0.0238*
	(-15.13)	(2.50)	(-1.77)	(-15.02)	(2.65)	(0.54)	(-14.75)	(2.44)	(-1.69)
Log(Fund Size)				0.000965	-0.0266	-0.0350	0.000290	-0.0294	-0.0766*
				(0.28)	(-1.41)	(-1.10)	(0.08)	(-1.54)	(-1.88)
Fund Sequence Number				-0.00516	-0.0105	-0.0136	-0.0124	-0.0593	-0.0173
				(-0.64)	(-0.24)	(-0.99)	(-1.22)	(-1.06)	(-1.24)
Number of Debt Investors							0.0121	0.0734	0.0645
							(1.23)	(1.36)	(1.64)
Log(Transaction Size)							0.00976**	-0.00479	0.00467
							(2.01)	(-0.18)	(0.25)
Portfolio company dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	2,147	2,147	2,147	2,147	2,147	2,147	2,147	2,147	2,147
Adjusted R^2	0.251	0.099	0.100	0.263	0.101	0.099	0.252	0.101	0.100

Table 6: Regressions on debt performance

The table shows the OLS regression results for the performance of related and unrelated debt transactions in our sample. The dependent variables measuring transaction performance are the IRR, the (Cash) Multiple and the PME. All regression models contain portfolio company-level dummies (transaction year, country, industry, and deal type dummies). Models 1, 2, and 3 show the base regressions, controlling for the *Related dummy* and the *Holding period* as independent variables. Models 4, 5, and 6 add several fund characteristics as regressors. Models 7, 8, and 9 extend the regressions adding transaction characteristics as regressors. Numbers in parenthesis are t-values. ***, **, and * indicate significance of coefficients at 1%, 5%, and 10%, respectively. Appendix A provides detailed definitions of all variables.

	1	2	3	4	5	6	7	8	9
	IRR	Multiple	PME	IRR	Multiple	PME	IRR	Multiple	PME
Related dummy	-0.0234**	-0.115**	-0.0962***	-0.0273***	-0.102**	-0.0798**	-0.0229**	-0.100**	-0.0739**
	(-2.09)	(-2.52)	(-2.77)	(-2.84)	(-2.21)	(-2.26)	(-2.27)	(-2.16)	(-2.08)
Holding period	-0.00957***	0.0719***	-0.00517	-0.0133***	0.0689***	-0.00710	-0.0146***	0.0696***	-0.00650
	(-6.41)	(11.83)	(-1.11)	(-10.33)	(11.08)	(-1.49)	(-10.90)	(11.30)	(-1.37)
Log(Fund Size)				-0.0143***	-0.00914	-0.000979	-0.0127***	0.0144	0.0135
				(-4.85)	(-0.64)	(-0.09)	(-3.58)	(0.88)	(1.07)
Fund Sequence Number				-0.00784***	0.0274***	0.0211***	-0.00564**	0.0337***	0.0260***
				(-3.69)	(2.65)	(2.67)	(-2.47)	(3.19)	(3.20)
Number of Debt Investors							-0.00835**	-0.0466***	-0.0279**
							(-2.23)	(-2.69)	(-2.10)
Log(Transaction Size)							-0.00281	-0.0167*	-0.0115
							(-1.33)	(-1.71)	(-1.53)
Portfolio company dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	1,835	1,835	1,835	1,835	1,835	1,835	1,835	1,835	1,835
Adjusted R^2	0.290	0.269	0.170	0.451	0.277	0.173	0.423	0.289	0.152

Table 7: Robustness of performance regressions

This table shows robustness checks for the OLS regressions of Models 7, 8, and 9 of Tables 6 and 7. We only report the coefficient of the *Related dummy* in each regression. Numbers in parenthesis are t-values. ***, **, and * indicate significance of coefficients at 1%, 5%, and 10%, respectively. Appendix A provides detailed definitions of all variables.

	Dependent variable	Related dummy	Control variables	Adjusted R^2	Number of observations
Equity performance regressions					
1. Keep only transactions done by the 22 PE firms that carried out related transactions					
	IRR	0.129*** (3.19)	Yes	0.656	582
	Multiple	0.573** (2.27)	Yes	0.215	582
	PME	0.475*** (2.78)	Yes	0.173	582
2. Exclude all transactions from PE firms that never had a private debt fund					
	IRR	0.141*** (3.34)	Yes	0.544	781
	Multiple	0.678*** (3.20)	Yes	0.084	781
	PME	0.474*** (3.38)	Yes	0.121	781
3. Keep only transactions from Northern America					
	IRR	0.171*** (3.79)	Yes	0.344	644
	Multiple	0.642*** (2.73)	Yes	0.115	644
	PME	0.385*** (2.55)	Yes	0.075	644
Debt performance regressions					
1. Keep only transactions done by the 22 PE firms that carried out related transactions					
	IRR	-0.0530*** (-5.26)	Yes	0.837	614
	Multiple	-0.239*** (-3.34)	Yes	0.466	614
	PME	-0.0991*** (-3.18)	Yes	0.663	614
2. Keep only transactions from Northern America					
	IRR	-0.0636*** (-4.92)	Yes	0.720	416
	Multiple	-0.155** (-1.72)	Yes	0.192	416
	PME	-0.151** (-2.40)	Yes	0.150	416

The table shows the OLS regression results for the performance of related and unrelated equity (Panel A) and debt (Panel B) transactions. The dependent variables are the IRR, the (Cash) Multiple and the PME. All regression contain portfolio company-level dummies (transaction year, country, industry, and deal type). We split the variable *Related dummy* into *Pure dummy* and *Impure dummy*, representing two different types of related deals. The first represents entirely internally funded related deals; i.e., they do not involve funds from another PE firm. The second type does involve at least one extra fund from another PE firm. Numbers in parenthesis are t-values. ***, **, and * indicate significance of coefficients at 1%, 5%, and 10%, respectively. Appendix A provides definitions of all variables.

Panel A: Regressions on Equity Performance

	1	2	3	4	5	6	7	8	9
	IRR	Multiple	PME	IRR	Multiple	PME	IRR	Multiple	PME
Pure dummy (1)	0.203***	0.551***	0.409***	0.197***	0.436**	0.406***	0.221***	0.464**	0.443***
	(3.26)	(2.76)	(2.85)	(3.18)	(2.09)	(2.83)	(3.48)	(2.07)	(3.09)
Impure dummy (2)	-0.0549	0.0801	-0.0477	-0.0302	-0.0456	-0.0102	0.0175	-0.171	-0.0719
	(-0.84)	(0.38)	(-0.32)	(-0.45)	(-0.20)	(-0.07)	(0.26)	(-0.70)	(-0.46)
Holding period	-0.00971*	0.0442**	-0.0219	-0.00835	0.0447**	-0.0194	-0.00718	0.0512**	-0.0207
	(-1.65)	(2.34)	(-1.61)	(-1.42)	(2.25)	(-1.42)	(-1.20)	(2.42)	(-1.53)
Log(Fund Size)				-0.00899	-0.0264	-0.0106	-0.0111*	-0.0273	-0.0165
				(-1.52)	(-1.32)	(-0.77)	(-1.84)	(-1.28)	(-1.20)
Fund Sequence Number				-0.00344	0.00691	-0.0310	-0.0237	-0.0148	-0.0699*
				(-0.26)	(0.15)	(-0.99)	(-1.38)	(-0.24)	(-1.78)
Number of Equity Investors							0.0317*	0.0462	0.0743*
							(1.90)	(0.77)	(1.94)
Log(Transaction Size)							0.0133	0.0440	0.0122
							(1.63)	(1.54)	(0.67)
Probability (1) = (2)	3.09	9.54	5.62	2.81	7.15	4.45	3.31	5.57	6.92
F-Statistic	0.079	0.002	0.018	0.094	0.008	0.035	0.038	0.019	0.009
Portfolio company dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	2147	2147	2147	2147	2147	2147	2147	2147	2147
Adjusted R^2	0.101	0.117	0.102	0.103	0.118	0.102	0.098	0.119	0.105

Panel B: Regressions on Debt Performance

	1	2	3	4	5	6	7	8	9
	IRR	Multiple	PME	IRR	Multiple	PME	IRR	Multiple	PME
Pure dummy (1)	-0.0299**	-0.158***	-0.118***	-0.0352***	-0.137***	-0.101***	-0.0451***	-0.147***	-0.111***
	(-2.15)	(-2.99)	(-2.76)	(-2.91)	(-2.70)	(-2.61)	(-4.03)	(-2.74)	(-2.66)
Impure dummy (2)	0.0415*	0.0309	0.0197	-0.00282	0.0372	0.00444	0.0122	0.0418	0.0163
	(1.85)	(0.37)	(0.29)	(-0.15)	(0.46)	(0.07)	(0.70)	(0.51)	(0.25)
Holding period	-0.0122***	0.0694***	-0.0186***	-0.0112***	0.0707***	-0.00437	-0.0129***	0.0672***	-0.0131***
	(-7.38)	(11.09)	(-3.70)	(-7.72)	(11.60)	(-0.94)	(-9.82)	(10.68)	(-2.68)
Log(Fund Size)				-0.0133***	-0.00862	-0.00163	-0.00653*	0.0126	0.0125
				(-4.00)	(-0.61)	(-0.15)	(-1.88)	(0.75)	(0.96)
Fund Sequence Number				-0.00729***	0.0274***	0.0208***	-0.00570**	0.0348***	0.0263***
				(-3.04)	(2.70)	(2.70)	(-2.54)	(3.22)	(3.13)
Number of Debt Investors							-0.00919**	-0.0432**	-0.0255*
							(-2.48)	(-2.43)	(-1.84)
Log(Transaction Size)							-0.00294	-0.0191*	-0.0148*
							(-1.41)	(-1.91)	(-1.90)
Probability (1) = (2)	8.09	4.01	3.27	6.47	3.90	3.13	8.50	4.10	3.08
F-Statistic	0.005	0.046	0.071	0.011	0.049	0.077	0.004	0.043	0.080
Portfolio company dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	1835	1835	1835	1835	1835	1835	1835	1835	1835
Adjusted R^2	0.182	0.262	0.164	0.344	0.292	0.186	0.393	0.285	0.172

Table 9: Debt composition and structure

This table provides statistics of the characteristics of all the private debt transactions in our sample and the subsamples of related and unrelated debt transactions. Panel A shows details of the debt composition and Panel B shows details of the debt structure. The last colum of the table provides t-tests and z-tests report p-values when comparing differences in mean and medians between related and unrelated debt transactions. ***, **, and * indicate significance at 1%, 5%, and 10%, respectively. Appendix A provides detailed definitions of all variables.

Panel A: Debt Composition

	Full sample		Related		Unrelated				
	N	Mean Median	N	Mean Median	N	Mean Median	Difference	t-test z-test	
Total Nominal Interest Rate	1,004	0.12	160	0.11	844	0.12	-0.01	0.00	***
		0.12		0.12		0.12	0.00	0.00	***
Interest Rate Spread	1,004	0.08	160	0.06	844	0.08	-0.02	0.00	***
		0.08		0.07		0.08	-0.01	0.00	***
PIK Dummy	842	0.59	59	0.39	783	0.61	-0.22	0.00	***
		1.00		0.00		1.00	-1.00	0.00	***
PIK Fraction	842	0.30	59	0.18	783	0.31	-0.12	0.00	***
		0.25		0.00		0.30	-0.30	0.00	***
Warrant Ownership Dummy	483	0.64	62	0.82	421	0.62	0.24	0.00	***
		1.00		1.00		1.00	0.00	0.00	***
Warrant Ownership Fraction	483	0.04	62	0.10	421	0.03	0.07	0.00	***
		0.01		0.04		0.01	0.03	0.00	***
Equity Ownership Dummy	913	0.31	94	0.31	819	0.31	0.00	0.99	
		0.00		0.00		0.00	0.00	0.99	
Equity Ownership Fraction	378	0.03	40	0.02	338	0.04	-0.02	0.46	
		0.00		0.00		0.00	0.00	0.15	
Transaction Equity Fraction	921	0.05	124	0.07	824	0.05	0.02	0.18	
		0.00		0.00		0.00	0.00	0.33	
Transaction Preferred Fraction	921	0.02	97	0.03	824	0.02	0.01	0.65	
		0.00		0.00		0.00	0.00	0.71	
Bullet Payment Dummy	1,004	0.70	160	0.68	844	0.71	0.03	0.44	
		0.00		1.00		1.00	0.00	0.43	

Panel B: Debt Structure

	Full sample		Related		Unrelated				
	N	Mean Median	N	Mean Median	N	Mean Median	Difference	t-test z-test	
Board Seat Dummy	649	0.68	127	0.98	522	0.61	0.37	0.00	***
		1.00		1.00		1.00	0.00	0.00	***
Board Seat Observer Rights Number	715	0.77	154	0.85	561	0.75	0.10	0.02	**
		1.00		1.00		1.00	0.00	0.02	**
Board Seat or Observer Right Dummy	764	0.72	154	0.82	610	0.70	0.12	0.00	***
		1.00		1.00		1.00	0.00	0.00	***
Lead Investor Dummy	863	0.69	155	0.81	708	0.66	0.15	0.00	***
		1.00		1.00		1.00	0.00	0.00	***
Cross Investor Dummy	742	0.32	146	0.76	596	0.21	0.55	0.00	***
		0.00		1.00		1.00	0.00	0.00	***
Syndication Dummy	448	0.61	97	0.26	351	0.71	-0.45	0.00	***
		1.00		0.00		1.00	-1.00	0.00	***
Tranches number	1,004	1.46	160	1.54	844	1.45	0.09	0.07	*
		1.00		1.00		1.00	0.00	0.00	***
Tranching Dummy	1,004	0.39	160	0.49	844	0.37	0.12	0.01	**
		0.00		0.00		0.00	0.00	0.00	***
Exclusive Deal Source Dummy	683	0.43	143	0.64	540	0.37	0.27	0.00	***
		0.00		1.00		0.00	1.00	0.00	***
Holding Period	661	4.15	105	5.41	556	3.91	1.50	0.00	***
		3.67		5.25		3.50	1.75	0.00	***

Table 10: Regressions on debt composition

This table shows the transaction-level regression results for the debt composition. Panel A shows the base regressions which only includes *related dummy* and a set of portfolio-company dummies. Panel B extends the base regressions by adding several fund characteristics as independent variables. Panel C extends the regressions from Panel B by adding several transaction characteristics as independent variables. All regression models contain portfolio-company dummies (transaction year, country, industry, and deal type dummies). Models 1 and 2 use OLS regressions, Models 3, 5, and 7 use Probit regressions, and Models 4, 6, 8, and 9 use Tobit regressions. ***, **, and * indicate significance at 1%, 5%, and 10%, respectively. Appendix A provides detailed definitions of all variables.

Panel A: Base Regression

Model	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Dep. Variable ➔	Nominal Interest Rate	Interest Rate Spread	PIK Dummy	PIK Fraction	Warrent Ownership Dummy	Warrent Ownership Fraction	Equity Ownership Dummy	Equity Ownership Fraction	Transaction Preferred Fraction
Related dummy	-0.014***	-0.016***	-0.266***	-0.144***	0.260***	0.067***	-0.086*	-0.012	0.002
	(-5.96)	(6.29)	(-5.39)	(-4.32)	(3.85)	(7.31)	(-1.90)	(-0.59)	(0.11)
Portfolio-company dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	1,004	1,004	842	842	483	483	913	378	921
adj. R-sq	0.215	0.278							
pseudo R-sq			0.317	1.124	0.107	-0.095	0.154	-0.034	-0.019

Panel B: Base Regression + Fund Characteristics

Model	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Dep. Variable ➔	Nominal Interest Rate	Interest Rate Spread	PIK Dummy	PIK Fraction	Warrent Ownership Dummy	Warrent Ownership Fraction	Equity Ownership Dummy	Equity Ownership Fraction	Transaction Preferred Fraction
Related dummy	-0.014***	-0.016***	-0.254***	-0.125***	0.237***	0.067***	-0.066	-0.028	0.000
	(-5.94)	(-6.29)	(-5.22)	(-3.81)	(3.81)	(7.22)	(-1.43)	(-1.35)	(0.03)
Log(Fund Size)	-0.008***	0.004*	0.153***	0.146***	-0.219***	-0.004	-0.012	-0.063***	-0.018
	(-3.49)	(1.78)	(3.98)	(6.41)	(-3.75)	(-0.45)	(0.31)	(-3.58)	(-1.47)
Fund Sequence Number	-0.001	-0.001	-0.007	0.007	0.088***	0.006***	0.062***	0.006	-0.004
	(-1.35)	(-1.17)	(-0.77)	(1.25)	(6.67)	(2.78)	(6.61)	(1.37)	(-1.27)
Portfolio-company dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
N	1,004	1,004	842	842	483	483	913	378	921
adj. R-sq	0.230	0.282							
pseudo R-sq			0.334	1.249	0.188	-0.102	0191	-0.061	-0.024

Panel C: Base Regression + Fund Characteristics + Transaction Characteristics

Model	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Dep. Variable ➔	Nominal Interest Rate	Interest Rate Spread	PIK Dummy	PIK Fraction	Warrent Ownership Dummy	Warrent Ownership Fraction	Equity Ownership Dummy	Equity Ownership Fraction	Transaction Preferred Fraction
Related dummy	-0.014***	-0.016***	-0.246***	-0.123***	0.224***	0.064***	-0.071	-0.040*	-0.002
	(-5.92)	(-6.26)	(-5.10)	(-3.75)	(3.50)	(6.67)	(-1.61)	(-1.88)	(-0.14)
Log(Fund Size)	-0.011***	0.008***	0.142***	0.151***	-0.192***	0.001	0.084*	-0.039*	-0.008
	(-4.21)	(2.88)	(3.33)	(6.10)	(-3.10)	(0.08)	(1.83)	(-1.90)	(-0.56)
Fund Sequence Number	-0.001	-0.001	-0.008	0.006	0.088***	0.006***	0.0064***	0.006	-0.005
	(-1.54)	(-1.51)	(-0.89)	(1.04)	(6.78)	(2.86)	(6.84)	(1.32)	(-1.28)
Number of debt Investors	0.001	0.001*	0.012	0.008	-0.009*	-0.002	0.005	-0.001	0.000
	(1.49)	(1.92)	(1.46)	(1.62)	(-0.74)	(-0.94)	(0.62)	(-0.26)	(0.00)
Log(Transaction Size)	-0.005**	-0.006***	0.021	-0.012	-0.052	-0.009	-0.127***	-0.043**	-0.019*
	(-2.32)	(-2.81)	(0.60)	(-0.059)	(-1.13)	(-1.21)	(-3.50)	(-2.17)	(-1.65)
Portfolio-company dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	1,004	1,004	842	842	483	483	913	378	921
adj. R-sq	0.230	0.285							
pseudo R-sq			0.336	1.257	0.191	-0.104	0.201	-0.070	-0.027

Table 11: Regressions on debt structure

This table shows the transaction-level regression results for the debt terms and characteristics. Panel A shows the base regressions which only includes *related dummy* and a set of portfolio-company dummies. Panel B extends the base regressions by adding several fund characteristics as independent variables. Panel C extends the regressions from Panel B by adding several transaction characteristics as independent variables. All regression models contain portfolio-company dummies (transaction year, country, industry, and deal type dummies). Models 1 to 8 use Probit regressions and Model 9 uses Tobit regression. ***, **, and * indicate significance at 1%, 5%, and 10%, respectively. Appendix A provides detailed definitions of all variables.

Panel A: Base Regression

Model	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Dep. Variable ➔	Board Seat Dummy	Board Seat Observer Right Dummy	Board Seat or Observer Right Dummy	Lead Investor Dummy	Deal Source Dummy	Syndication Dummy	Internal Syndication Dummy	Tranching Dummy	Holding Period
Related dummy	0.488***	0.152***	0.116**	0.091**	0.204***	-0.316***	0.508***	-0.013	1.582***
	(5.77)	(3.15)	(2.49)	(2.01)	(4.52)	(-7.36)	(18.18)	(-0.31)	(5.64)
Portfolio-company dummies	*Yes*	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	649	715	764	863	683	448	742	1,004	661
pseudo R-sq	0.203	0.108	0.091	0.064	0.074	0.236	0.224	0.140	0.019

Panel B: Base Regression + Fund Characteristics

Model	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Dep. Variable ➔	Board Seat Dummy	Board Seat Observer Right Dummy	Board Seat or Observer Right Dummy	Lead Investor Dummy	Deal Source Dummy	Syndication Dummy	Internal Syndication Dummy	Tranching Dummy	Holding Period
Related dummy	0.472***	0.137***	0.105***	0.114***	0.200***	-0.310***	0.511***	-0.006	1.607***
	(5.61)	(2.91)	(2.33)	(2.57)	(4.43)	(-7.56)	(18.16)	(-0.14)	(5.85)
Log(Fund Size)	-0.105**	-0.200***	-0.192***	0.246***	0.058	0.191***	-0.005	0.094**	-0.217
	(-2.26)	(-4.67)	(-4.79)	(6.01)	(1.17)	(3.39)	(-0.13)	(2.40)	(-0.82)
Fund Sequence Number	0.052***	0.061	0.064***	0.020	-0.021	-0.095***	0.041***	0.055	0.401***
	(4.89)	(4.89)	(5.76)	(1.72)	(-1.45)	(-6.40)	(3.26)	(5.35)	(5.32)
Portfolio-company dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

N	649	715	764	863	683	448	742	1,004	661
pseudo R-sq	0.234	0.150	0.142	0.101	0.077	0.315	0.235	0.169	0.028

Panel C: Base Regression + Fund Characteristics + Transaction Characteristics

Model	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Dep. Variable ➔	Board Seat Dummy	Board Seat Observer Right Dummy	Board Seat or Observer Right Dummy	Lead Investor Dummy	Deal Source Exclusive Dummy	Syndication Dummy	Internal Syndication Dummy	Tranching Dummy	Holding Period
Related dummy	0.357***	0.106**	0.081*	0.068*	0.191***	-0.276***	0.515****	-0.008	1.545***
	(4.60)	(2.27)	(1.78)	(1.69)	(4.18)	(-6.78)	(22.37)	(-0.19)	(5.57)
Log(Fund Size)	0.081	-0.101**	-0.111**	0.291***	0.089	0.043	-0.059	0.184***	0.116
	(1.52)	(-2.14)	(-2.51)	(6.18)	(1.51)	(0.66)	(-1.45)	(4.09)	(0.38)
Fund Sequence Number	0.060***	0.067***	0.070	0.027**	-0.020	-0.098***	0.038***	0.055***	0.409***
	(5.95)	(5.58)	(6.46)	(2.41)	(-1.33)	(-6.63)	(3.27)	(5.38)	(5.35)
Number of debt Investors	-0.034***	-0.034***	-0.029***	-0.061***	-0.012	-0.002	0.069***	0.013	-0.013
	(-4.03)	(-3.79)	(-3.55)	(-6.95)	(-0.96)	(-0.20)	(8.42)	(1.43)	(-0.21)
Log(Transaction Size)	-0.291***	-0.156***	-0.128***	-0.075**	-0.049	0.261***	0.096***	-0.162***	-0.529**
	(-6.14)	(-3.98)	(-3.43)	(-1.98)	(0.90)	(4.22)	(2.92)	(-4.08)	(-2.17)
Portfolio-company dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	649	715	764	863	683	448	742	1,004	661
pseudo R-sq	0.298	0.187	0.171	0.143	0.080	0.344	0.313	0.183	0.029

Table 12: Robustness debt composition and structure

This table shows robustness checks for the transaction-level regressions of Panel C from Tables 10 and 11. The only coefficient shown is for *related dummy*. ***, **, and * indicate significance at 1%, 5%, and 10%, respectively. Appendix A provides detailed definitions of all variables.

Dependent variable	Method	Related dummy	Control variables	Adjusted R^2 (Pseudo R^2)	Number of transactions
Debt composition regressions					
1. Keep only transactions done by the 22 Affiliated PEFs.					
Nominal interest rate	OLS	-0.018*** (-4.78)	Yes	0.244	360
Interest rate spread	OLS	-0.019 (-4.94)	Yes	0.279	360
PIK Dummy	Probit	-0.359*** (-4.74)	Yes	(0.346)	224
PIK Fraction	Tobit	-0.162*** (3.58)	Yes	(1.271)	249
Warrant Ownership Dummy	Probit	-0.130 (-1.57)	Yes	(0.234)	139
Warrant Ownership Fraction	Tobit	0.021 (1.08)	Yes	-0.198	176
Boardseat dummy	Probit	0.569 (1.18)	Yes	(0.433)	142
Equity Ownership Dummy	Probit	-0.047 (-0.89)	Yes	(0.339)	232
Equity Ownership Fraction	Tobit	0.004 (0.19)	Yes	(-0.090)	83
Transaction Preferred Fraction	Tobit	-0.000 (-0.02)	Yes	(-0.181)	298
Debt structure regressions					
1. Keep only transactions done by the 22 Affiliated PEFs.					
Board Seat Dummy	Probit	0.488*** (5.77)	Yes	0.449	185
Board Seat Observer Right Dummy	Probit	0.085 (1.35)	Yes	(0.272)	277
Board Seat or Observer Right	Probit	0.057 (0.91)	Yes	(0.243)	286
Lead Investor Dummy	Probit	0.161** (3.58)	Yes	(0.227)	271
Cross Transaction Dummy	Probit	0.603*** (11.76)	Yes	(0.469)	279
Deal Source Dummy	Probit	0.283*** (3.96)	Yes	(0.173)	264
Syndication Dummy	Probit	-0-273*** (-3.68)	Yes	(0.391)	324
Tranching Dumy	Probit	0.046 (0.84)	Yes	(0.328)	324
Holding Period	Tobit	2.243*** (5.38)	Yes	(0.047)	243

Table 13: Fund characteristics and performance

This table shows the fund-level performance (i.e., IRR, multiple, PME) of the equity and debt funds for the full sample, the subsample of funds with at least one related transaction, and the subsample of funds without any related transaction. t-tests (z-tests) compare the mean (median) of both subsamples to determine whether there is a statistically significant difference between the two means (medians). ***, **, and * indicate significance at 1%, 5%, and 10%, respectively. Appendix A provides detailed definitions of all variables.

	Full sample		Funds with at least one related transaction		Funds with no related transactions		Diff.	t-test z-test	
	N	Mean Median	N	Mean Median	N	Mean Median			
Equity funds									
Fund IRR	793	0.23	72	0.28	721	0.22	0.06	0.04	**
		0.22		0.22		0.22	0.00	0.34	
Fund Multiple	793	2.11	72	2.63	721	2.05	0.58	0.05	**
		1.89		2.06		1.89	0.17	0.15	
Fund PME	793	1.10	72	1.25	721	1.08	0.17	0.04	**
		0.98		1.04		0.97	0.07	0.02	**
Debt funds									
Fund IRR	316	0.25	44	0.21	272	0.25	-0.04	0.54	
		0.18		0.17		0.18	0.00	0.78	
Fund Multiple	316	1.70	44	1.65	272	1.71	-0.06	0.56	
		1.55		1.52		1.56	-0.04	0.74	
Fund PME	316	1.09	44	1.06	272	1.10	-0.04	0.42	
		1.05		1.05		1.05	0.00	0.75	

Table 14: Regressions on fund-level performance

This table shows the fund-level regression results for the performance of the equity and debt funds. Models 1,2, and 3 show regression results for the equity funds and Models 3, 4, and 5 for the debt funds. *Affiliated fund dummy* is a dummy variable that equals 1 in case the equity or debt fund has made at least one related transaction, and 0 otherwise. The dependent variable in Models 1 and 4 is the IRR of the fund. The dependent variable in Models 2 and 5 is the cash multiple of the fund, and in Models 3 and 6 is the PME. All models use OLS regressions. All regression models contain fund-level dummies (vintage year, country focus, industry focus dummies). ***, **, and * indicate significance at 1%, 5%, and 10%, respectively. Appendix A provides detailed definitions of all variables.

Panel A: Base Regressions

	Equity funds			Debt funds		
	1	2	3	4	5	6
	Fund IRR	Fund Multiple	Fund PME	Fund IRR	Fund Multiple	Fund PME
Affiliated fund dummy	0.041**	0.268**	0.115**	0.002	-0.002	-0.034
	(2.02)	(2.19)	(2.05)	(0.15)	(-0.03)	(-0.74)
Fund-level dummies	Y	Y	Y	Y	Y	Y
N	793	793	793	316	316	316
adj. R-sq	0.233	0.361	0.367	0.249	0.435	0.218

Panel B: Only Funds with Sequence Number > 1

	Equity funds			Debt funds		
	1	2	3	4	5	6
	Fund IRR	Fund Multiple	Fund PME	Fund IRR	Fund Multiple	Fund PME
Affiliated fund dummy	0.0453**	0.425***	0.158**	0.008	-0.020	-0.057
	(2.24)	(3.51)	(2.32)	(0.42)	(-0.27)	(-1.14)
Fund-level dummies	Y	Y	Y	Y	Y	Y
N	484	484	484	160	160	160
adj. R-sq	0.213	0.362	0.357	0.233	0.373	0.259

Panel C: Only Funds with Sequence Number > Median(Sequence Number)

	Equity funds			Debt funds		
	1	2	3	4	5	6
	Fund IRR	Fund Multiple	Fund PME	Fund IRR	Fund Multiple	Fund PME
Affiliatted fund dummy	0.045*	0.324**	0.187**	0.030	0.125	0.034
	(1.70)	(2.46)	(2.52)	(1.54)	(1.24)	(0.93)
Fund-level dummies	Y	Y	Y	Y	Y	Y
N	275	275	275	95	95	95
adj. R-sq	0.192	0.359	0.322	0.735	0.504	0.758

Table 15: Regressions of unrelated debt transaction performance

This table shows the transction-level regression results for the performance of debt transactions. The table considers all transactions *except* the related transactions. *Affiliated fund dummy* is a dummy variable that equals 1 in case the debt transaction is from a fund that has done at least one related transaction, and 0 otherwise. The dependent variable in Models 1, 4, and 7 is the IRR of the debt transaction. The dependent variable in Models 2, 5, and 8 is the cash multiple of the debt transaction, and in Models 3, 6, and 9 is the PME. All regression models contain portfolio-company dummies (transaction year, country, industry, and deal type dummies). All models use OLS regressions. ***, **, and * indicate significance at 1%, 5%, and 10%, respectively. Appendix A provides detailed definitions of all variables.

	1	2	3	4	5	6	7	8	9
	IRR	Multiple	PME	IRR	Multiple	PME	IRR	Multiple	PME
Affiliated Fund Dummy	0.0193*	0.101**	0.0946***	0.0294***	0.0901*	0.0799**	0.0252**	0.0896*	0.0806**
	(1.69)	(2.01)	(2.64)	(2.73)	(1.75)	(2.17)	(2.17)	(1.73)	(2.19)
Holding Period	-0.00974***	0.0650***	-0.0112**	-0.00914***	0.0609***	-0.0142***	-0.00868***	0.0609***	-0.0123**
	(-6.40)	(9.67)	(-2.32)	(-6.32)	(8.81)	(-2.86)	(-5.62)	(8.85)	(-2.52)
Log(Fund Size)				-0.0101***	-0.0117	-0.000744	-0.00678*	0.00912	0.0128
				(-3.05)	(-0.74)	(-0.07)	(-1.66)	(0.50)	(0.99)
Fund Sequence Number				-0.00670***	0.0269**	0.0207**	-0.00796***	0.0323***	0.0255***
				(-2.81)	(2.34)	(2.52)	(-3.02)	(2.73)	(3.05)
Number of Debt Investors							-0.00493	-0.0434**	-0.0276**
							(-1.14)	(-2.24)	(-2.02)
Log(Transaction Size)							0.00153	-0.0151	-0.0130*
							(0.63)	(-1.38)	(-1.69)
Portfolio-company dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	2,079	2,079	2,079	2,079	2,079	2,079	2,079	2,079	2,079
adj. R-sq	0.285	0.232	0.160	0.356	0.235	0.162	0.314	0.241	0.144

Table 16: Descriptive statistics of targets at entry and changes over the lifetime of the transaction

This table reports characteristics and performance measures for all target companies of the transactions in our sample and for the subsamples of related and unrelated transactions. The unit of observation is a target company. The last two columns show t-tests (z-tests) comparing the differences in means (medians) of both subsamples and their statistical significance. Panel A shows target characteristics at the time of the transaction (i.e., entry), while Panel B computes the changes over the lifetime of the transaction (i.e., from entry to exit).***, **, and * indicate significance at 1%, 5%, and 10%, respectively. Appendix A provides detailed definitions of all variables.

Panel A: Operating performance at entry

	Full sample N	Mean Median	Related N	Mean Median	Unrelated N	Mean Median	Difference	t-test z-test	
Log(Enterprise Value)	550	19.64	90	18.43	460	19.88	-1.45	0.00	***
		19.94		18.67		20.14	-1.47	0.00	***
Log(Sales)	480	19.05	89	17.52	391	19.40	-1.88	0.00	***
		19.60		17.92		19.86	-1.94	0.00	***
EBITDA (in Mio.)	481	128.00	89	35.83	392	149.00	-113.17	0.00	***
		52.57		56.62		66.07	-9.45	0.00	***
EBITDA Margin	457	0.23	86	0.25	371	0.23	0.02	0.26	
		0.19		0.20		0.18	0.02	0.14	
Sales Multiple	455	2.33	85	2.36	370	2.33	0.03	0.91	
		1.41		1.92		1.38	0.54	0.08	*
Enterprise Multiple	450	9.18	87	9.87	363	9.02	0.85	0.20	
		8.61		8.13		8.62	-0.49	0.74	
Net Debt to Total Assets	548	0.37	89	0.45	459	0.35	0.10	0.03	**
		0.46		0.47		0.44	0.03	0.16	

Panel B: Operating performance over the lifetime of the transaction

	Full sample N	Mean Median	Related N	Mean Median	Unrelated N	Mean Median	Difference	t-test z-test	
Growth Enterprise Value	414	0.10	80	0.13	334	0.09	0.04	0.36	
		0.09		0.08		0.09	-0.01	0.83	
Growth Sales	399	0.10	74	0.12	325	0.09	0.03	0.32	
		0.06		0.08		0.06	0.02	0.04	**
Growth EBITDA	425	0.07	79	0.12	346	0.06	0.06	0.05	**
		0.07		0.07		0.06	0.01	0.17	
Growth EBITDA Margin	428	0.00	81	0.03	347	-0.01	0.04	0.02	**
		0.00		0.03		0.00	0.03	0.01	**
Growth Revenue Multiple	397	0.01	77	0.01	320	0.01	0.00	0.97	
		0.02		0.01		0.03	-0.02	0.33	
Growth Enterprise Multiple	392	0.05	76	0.04	316	0.06	-0.02	0.65	
		0.02		0.03		0.02	0.01	0.51	
Growth Net Debt to Total Assets	296	1693.29	67	-0.04	229	2188.72	-2188.76	0.32	
				-0.05		-0.06	-0.11	0.32	

Table 17: Regressions on operating performance at entry

This table shows the company-level regression results for the performance at entry of the debt transactions. All regression models contain portfolio-company dummies (transaction year, country, industry, and deal type dummies). All models use OLS regressions. ***, **, and * indicate significance at 1%, 5%, and 10%, respectively. Appendix A provides detailed definitions of all variables.

Model Variable	(1) Log(Enterprise Value)	(2) Log(Sales)	(3) EBITDA x 10^7	(4) EBITDA Margin	(5) Sales Multiple	(6) Enterprise Multiple	(7) Net Debt to Total Assets
Related dummy	-0.758***	-0.146	-0.222	0.024	0.183	-0.462	0.036
	(-5.39)	(-0.98)	(-0.39)	(1.10)	(1.05)	(-1.20)	(0.74)
Log(Fund Size Equity)	-0.059	0.159**	-0.067	0.008	-0.012	-0.344*	0.046**
	(-1.01)	(2.23)	(-0.24)	(0.70)	(-0.15)	(-1.79)	(2.25)
Log(Fund Size Debt)	0.162***	0.094	0.565**	-0.009	0.037	0.263	-0.020
	(2.77)	(1.45)	(2.30)	(-0.94)	(0.50)	(1.61)	(-0.97)
Fund Sequence Number Equity	0.044***	0.032**	0.129**	0.001	0.012	-0.002	-0.024***
	(3.78)	(2.02)	(2.10)	(0.33)	(0.68)	(-0.05)	(-5.94)
Fund Sequence Number Debt	-0.075**	-0.064*	-0.185	0.000	-0.022	0.007	0.007
	(-2.32)	(-1.81)	(-1.36)	(0.01)	(-0.53)	(0.08)	(0.59)
Log(Deal Size Equity)	0.416***	0.459***	1.502***	0.007	0.159**	0.918***	0.864***
	(8.86)	(8.00)	(6.78)	(0.76)	(2.43)	(5.61)	(4.55)
Log(Deal Size Debt)	0.314***	0.012	-0.093	0.015	0.065	0.036	-0.096
	(5.27)	(0.18)	(-0.37)	(1.57)	(0.84)	(0.21)	(-0.44)
Number of Equity Investors	0.093***	0.022	0.986***	0.000	0.005	-0.018	-0.024**
	(2.74)	(0.56)	(7.14)	(0.08)	(0.12)	(-0.20)	(-2.05)
Number of Debt Investors	0.158***	0.095***	0.083	0.009***	0.067**	0.068	-0.007
	(7.44)	(3.98)	(0.92)	(2.78)	(2.48)	(1.15)	(-0.97)
Portfolio-company Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	521	464	465	443	441	439	519
adj. R-sq	0.672	0.643	0.916	0.361	0.869	0.411	0.281

Table 18: Regressions on operating performance over deal lifetime

This table shows the company-level regression results for the deal lifetime performance of the target company. All regression models contain portfolio-company dummies (transaction year, country, industry, and deal type dummies). All models use OLS regressions. ***, **, and * indicate significance at 1%, 5%, and 10%, respectively. Appendix A provides detailed definitions of all variables.

Model	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Variable	Growth Enterprise Value (EV)	Growth Sales	Growth EBITDA	Growth EBITDA Margin	Growth Sales Multiple	Growth Enterprise Multiple	Growth Net Debt to Total Assets
Related dummy	-0.003	0.014*	0.069***	0.035***	-0.015	0.026***	0.041*
	(-0.19)	(1.86)	(5.87)	(4.07)	(-1.26)	(4.26)	(1.80)
Log(Fund Size Equity)	-0.015**	-0.019***	-0.011**	0.018***	-0.011*	0.007**	0.005
	(-2.41)	(-5.15)	(-1.97)	(4.37)	(-1.96)	(2.41)	(0.43)
Log(Fund Size Debt)	-0.005	0.001	0.003	-0.025***	0.007	-0.009***	-0.016
	(-0.81)	(0.19)	(0.67)	(-6.65)	(1.42)	(-3.74)	(-1.61)
Fund Sequence Number Equity	0.005***	0.001	-0.003***	-0.002**	-0.001	-0.000	0.005*
Equity	(3.20)	(1.17)	(-2.80)	(-1.97)	(-0.46)	(-0.13)	(1.93)
Fund Sequence Number	0.001	0.025***	-0.001	-0.000	-0.003	0.001	0.003
Debt	(0.25)	(13.83)	(-0.19)	(-0.15)	(-0.93)	(0.49)	(0.52)
Log(Deal Size Equity)	-0.002	0.012***	0.011**	0.000	0.005	-0.002	0.013
	(-0.31)	(4.23)	(2.25)	(0.15)	(1.19)	(-0.82)	(1.28)
Log(Deal Size Debt)	-0.001	-0.005	0.001	-0.001	-0.006	0.005*	0.003
	(-0.17)	(-1.35)	(0.24)	(-0.17)	(-1.11)	(1.67)	(0.25)
Number of Equity	0.004	-0.008***	0.004	0.001	-0.000	-0.001	-0.005
Investors	(1.22)	(-4.00)	(1.42)	(0.26)	(-0.07)	(-0.73)	(-0.67)
Number of Debt	-0.004*	-0.007***	-0.007***	0.005***	-0.003	-0.002**	0.002
Investors	(-1.82)	(-5.79)	(-3.85)	(3.52)	(-1.55)	(-2.54)	(0.51)
Portfolio-company dummies	*Yes*	Yes	Yes	Yes	Yes	Yes	Yes
N	401	388	411	412	386	382	289
adj. R-sq	0.695	0.731	0.651	0.480	0.445	0.694	0.137

Appendix A: Variable Description

This table provides the detailed description of all the variables used in the paper and appendices.

Variable	Description
Transaction Performance Measures	
IRR	The annual internal rate of return of the equity or debt transaction. It is computed using the cash flows of a transaction.
Multiple	The cash multiple of the (equity or debt) transaction. It is the amount of cash received divided by the amount of cash paid in. It is computed using the cash flows of a transaction.
PME	The public market equivalent of the (equity or debt) transaction. It is computed using the cash flows of a transaction.
Equity Transaction Level Variables	
Related dummy	A dummy variable equal to one if an equity and debt fund from the same PE management firm invest in the portfolio company, and zero otherwise.
Holding period	The holding period (in years) of the equity fund. This is measured from the date of first entry to the final exit. The holding period is calculated using the number of months between entry and exit.
Transaction size	The transaction size is the amount of money that the equity fund invested in the portfolio company. It is reported in millions of U.S. dollars.
Log(Transaction Size)	The natural logarithm of the size of the investment made by the equity fund in the portfolio company. The size is measured in millions of U.S. dollars.
Equity ownership	The fraction of equity ownership purchased by the equity fund in the portfolio company at the time of entry by the fund.
Number of equity investors	The number of private equity funds investing in the portfolio company within a two-year timeframe from the start of the equity transaction in the company.
Syndication Dummy	A dummy variable equal to one if the equity transaction is syndicated, and zero otherwise.
Board Seat Dummy	A dummy variable equal to one if the equity fund holds a board seat in the portfolio company, and zero otherwise.
Lead Investor Dummy	A dummy variable equal to one if the fund investor is the lead investor in the portfolio company, and zero otherwise.
Debt Transactionl Level Variables	
Related dummy	A dummy variable equal to one if an equity and a debt fund from the same management company invest simultaneously in the portfolio company, and zero otherwise
Holding period	The holding period (in years) of the deb fund. This is measured from the date of first entry to the final exit. The holding period is calculated using the number of months between entry and exit.

Transaction size	The natural logarithm of the size of the investment made by the debt fund in the portfolio company. The size is measured in millions of U.S. dollars.
Log(Transaction Size)	The natural logarithm transaction of the debt fund into the portfolio company in U.S. dollar million.
Number of debt investors	The number of private debt funds investing in the portfolio company within a two-year timeframe from the start of the debt transaction in the company.
Syndication Dummy	A dummy variable equal to one if the debt transaction is syndicated, and zero otherwise.
Board seat Dummy	A dummy variable equal to one if the equity fund holds a board seat in the portfolio company, and zero otherwise.
Lead Investor Dummy	A dummy variable equal to one if the fund investor is the lead investor in the portfolio company, and zero otherwise.
Equity Fund Level Variables	
Fund size	The size of equity fund measured in millions of US dollars.
Log(Fund Size)	The natural logarithm of the size of equity fund measured in millions of US dollars.
Fund sequence number (equity and debt funds)	Fund sequence number of all equity and debt funds of the fund management company.
Fund sequence number (equity funds)	Fund sequence number of all equity funds managed by the fund management company.
Number of portfolio companies	Number of portfolio companies managed by an equity fund.
Number of related companies	Number of portfolio companies managed by an equity fund that are related companies.
Fraction of related companies	Fraction of portfolio companies managed by an equity fund that are related companies.
Capital invested in related companies	Capital invested into related companies of a fund in USD million.
Fraction capital invested in related companies	Fraction of the size of the fund invested into related companies
Fund Performance Measures	
Fund IRR	The annual internal rate of return of the equity or debt fund. It is computed using the cash flows of a fund.
Fund Multiple	The cash multiple of the equity or debt fund. It is the amount of cash received divided by the amount of cash paid in during the entire lifetime of the fund.
Fund PME	The public market equivalent of the equity or debt fund. It is computed using the cash flows of a fund.
Debt Fund Level Variables	
Fund size	The size of debt fund measured in millions of US dollars.
Log(Fund Size)	The natural logarithm of the size of debt fund measured in millions of US dollars.
Fund sequence number (equity and debt funds)	The fund sequence number of a specific fund considering all equity and debt funds of the fund management company.

Fund sequence number (debt funds)	The fund sequence number considering only debt funds managed by the fund management company .
Number of portfolio companies	The number of portfolio companies managed by a debt fund.
Number of related companies	The number of portfolio companies managed by a debt fund that are related companies.
Fraction of related companies	Te fraction of portfolio companies managed by a debt fund that are related companies.
Capital invested in related companies	The amount of capital of a fund that is invested in related companies, measured in millions of U.S. Dollars.
Fraction capital invested in related companies	The fraction of the size of the fund that is invested in related companies
Debt Composition Variables	
Total Nominal Interest Rate	Blended nominal interest rate of the debt transaction.
Interest Rate Spread	The blended interest rate spread of the debt transaction above the benchmark risk-free security rate.
PIK Dummy	A dummy variable equal to one if the debt tranche pays PIK interest, and zero otherwise. PIK interest is not paid on a periodic basis, but deferred and paid in a lump sum upon repayment of the principal. While PIK interest is a contractually fixed return component, it is riskier than current interest from an investor's point of view, as the accrued but not transferred interest claim might be lost if a company runs into trouble before repayment of the whole financing.
PIK Fraction	The fraction of the total interest payments that is paid out as PIK interest.
Warrent Ownership Dummy	A dummy variable which equal to one if the debt investor holds warrants, and zero otherwise.
Warrent Ownership Fraction	.A warrant does not give actual ownership of a stocks but rather the right to purchase company shares at a particular price in the future.The variable gives the (fully diluted) percentage of equity the debt investor can purchase in the future.
Equity Ownership Dummy	A dummy variable equal to one if the debt investor also holds an equity position, and zero otherwise.
Equity Ownership Fraction	The fraction of equity ownership in the portfolio company held by the debt investor.
Transaction Equity Fraction	The fraction of the total transaction the fund invests in Equity of the company.
Transaction Prefered Fraction	The fraction of the total transaction the fund invests in Preferred Equity of the company.
Bullet Payment Dummy	A dummy variable equal to one if the debt pay PIK interest, has warrants attached, or pays a large cashflow at the end, and zero otherwise.
Debt Structure Variables	
Board Seat Dummy	A dummy variable equal to one if debt fund holds a board seat in the portfolio company, and zero otherwise
Board Seat Observer Rights Number	The number of board seats with observer rights that the debt fund holds in the portfolio company.

Board Seat or Observer Right Dummy	A dummy variable equal to one if the debt fund holds a board seat or has board seat with observer rights in the portfolio company, and zero otherwise
Lead Investor Dummy	A dummy variable equal to one if the fund investor is lead investor in the portfolio company, and zero otherwise
Cross Transaction Dummy	A dummy variable equal to one if the fund manager invests into the company with several debt funds, and zero otherwise
Deal Source Dummy	A dummy variable equal to one if the deal source of the debt deal is exclusive, and zero otherwise
Syndication Dummy	A dummy variable equal to one if the debt transaction is syndicated, and zero otherwise
Tranching Dummy	A dummy variable equal to one if the debt transaction is tranched, and zero otherwise
Holding Period	The holding period (in years) of the transaction.
Target Company Variables at Entry	
Log(Enterprise Value)	The natural logarithm of enterprise value of the company measured in U.S. dollars.
Log(Sales)	The natural logarithm of the sales of the company measured in U.S. dollars.
EBITDA (in Mio.)	The EBITDA (i.e., Earnings Before Interest Taxes Depreceiation and Amortization)of the company imeasured n U.S. dollar.
EBITDA Margin	The EBITDA marg is computed as the EBITDA divided by the total revenue of the company.
Sales Multiple	A measure of the value of a company calculated ad the the company's enterprise value divided by its sales.
Enterprise Multiple	The enterprise multiple is the ratio used to determine the value of a company. It is computed by dividing the enterprise value by the EBITDA of the company.
Net Debt to Total Assets	The net debt of the company divided by the total assets of the company.
Growth Enterprise Value	The continuously compounded annual growth rate of the enterprise value of a company over the lifetime of the deal.
Growth Sales	The continuously compounded annual growth rate of the sales of a company over the lifetime of the deal lifetime.
Growth EBITDA	The continuously compounded annual growth rate of the EBITDA of a company over the lifetime of the deal.
Growth EBITDA Margin	The continuously compounded annual growth rate of the EBITDA margin of a company over the lifetime of the deal.
Growth Sales Multiple	The continuously compounded annual growth rate of the sales multiple of a company over the lifetime of the deal.
Growth Enterprise Multiple	The continuously compounded annual growth rate of the enterprise multiple of a company over the lifetime of the deal.
Growth Net Debt to Total Assets	The continuously compounded annual growth rate of the ratio of net debt to total assets of a company over the lifetime of the deal.

Debt Tranche Variables	
Number of tranches per debt transaction	The number of tranches used in a debt transaction
Senior Secured	The debt tranche invested into senior secured. The different debt tranches are explained in Appendix C.
2nd Lien	The debt tranche invested in second lien loans. The different debt tranches are explained in Appendix C.
Subdebt	The debt tranche invested in subdebt. The different debt tranches are explained in Appendix C.
PIK Note	The debt tranche invested in PIK notes. The different debt tranches are explained in Appendix C.
Loan Stock	The debt tranche invested in loan stocks. The different debt tranches are explained in Appendix C.
Preferred Stock	The debt tranche invested in preferred stock. The different debt tranches are explained in Appendix C.
Common Equity	The debt tranche invested in common equity. The different debt tranches are explained in Appendix C.
Portfolio Company Dummies	
Investment Year Dummies	Dummy variables for the investment year of the transaction.
Stage Dummies	Dummy variables for the stages of the transaction. The stages considered for equity transactions are: MBO/MBI, Recapitalisation, LBO, Public to Private, Acquisition Financing, Growth, Spin Off, Unspecified Buyout. The stages considered for debt transactions are: MBO/MBI (Debt), Growth (Debt), Acquisition Financing (Debt), Recapitalisation (Debt), LBO (Debt), Unspecified Private Debt Turnaround (Debt), Public to Private (Debt), Secondary Trading (Debt), Spin Off (Debt) Special Situations (Debt).
Country Dummies	Dummy variables for the country of the transaction. Countries considered are: Argentina, Armenia, Australia, Austria, Bangladesh, Barbados, Belgium, Bolivia, Brazil, British Virgin Islands, Bulgaria, Canada, Cayman Islands, Channel Islands, Chile, China, Colombia, Cote d'Ivoire, Cyprus, Czech Republic, Denmark, Dominica, Dominican Republic, Egypt, El Salvador, Estonia, Finland, France, Germany, Ghana, Greece, Guam, Guatemala, Guyana, Hong Kong, Hungary, Iceland, India, Indonesia, Ireland, Isle of Man, Israel, Italy, Jamaica, Japan, Jordan, Kenya, Korea, Republic of, Latin, Latvia, Liechtenstein, Lithuania, Luxembourg, Macedonia, Malaysia, Malta, Mauritius, Mexico, Republic of Moldova, Monaco, Myanmar, Namibia Netherlands, Netherlands Antilles, New Zealand, Nicaragua, Nigeria, Norway, Oceania, Oman, Pakistan Panama, Peru, Philippines, Poland, Portugal, Puerto Rico, Qatar. Romania, Russian Federation, Saint Lucia, Saudi Arabia, Serbia, Singapore, Slovakia, Slovenia, South Africa, Spain, Sri Lanka, Sweden, Switzerland, Taiwan, United Republic of Tanzania, Thailand, Turkey, Uganda, Ukraine, United Arab Emirates, United Kingdom, United States of America

	Vietnam, Other
Industry Dummies	Dummy variables for the industry of the transaction. Industries considered are: Computer/Technology, Consumer Industry, Financials, Healthcare/LS, Industrials, Infrastructure Economic, Infrastructure Social, Others/Unspecified, Real Estate Commercial Real Estate Diversified, Real Estate Residential, Telecommunications
Fund Level Dummies	
Vintage Year Dummies	A set of dummy variables for the vintage year of the fund.
Stage Dummies	A set of dummy variables for the stage focus of the fund. Stages considered for equity funds are: Acquisition Financing, Balaced, Growth, LBO, MBO/MBI, Public to Private, Recapitalisation, Unspecified Buyout. Stages considered for debt funds are: Subordinated/Mezzanine, Mixed/Unitranche, Senior, Unspecified Debt.
Country Dummies	A set of dummy variables for the country focus of the fund. Countries considered are: Australia, Brazil, Canada, Channel Islands, China, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, India, Ireland, Israel, Italy, Japan, Netherlands, Norway, Poland, Russian Federation, South Africa, Spain, Sweden, Switzerland, Taiwan, Ukraine, United Kingdom, United States of America, Other/Unspecified.
Industry Dummies	A set of dummy variables for the industry focus of the fund. Industries considered are: Computer/Technology, Consumer Industry, Financials, Healthcare/LS, Industrials, Infrastructure Economic, Infrastructure Social, Real Estate Commercial, Real Estate Diversified, Real Estate Residential, Telecommunications, Others/Unspecified.

Table B1: Comparing characteristics of our sample to the initial sample of Cepres

This table illustrates whether the sample of all buyout and debt deals is different from the sample of transactions in companies that have at least 1 equity and 1 debt transaction. Appendix A provides detailed definitions of all variables.

	Private Equity	Private Debt
Panel A: All buyout and debt transactions		
Number of transactions	13,741	7,493
Split by decade		
1980s	2.72%	1.43%
1990s	30.78%	19.54%
2000s	41.67%	53.33%
2010s	24.83%	25.70%
Ln Size Median		
1980s	0.52	0.75
1990s	0.93	0.86
2000s	1.42	1.03
2010s	1.40	1.11
Total	1.24	1.01
Panel B: Transactions in companies that have at least 1 equity and 1 debt transaction		
Number of transactions	2,201	1,917
Split by decade		
1980s	2.51%	1.13%
1990s	36.05%	25.11%
2000s	50.85%	62.25%
2010s	10.58%	11.51%
Ln Size Median		
1980s	0.53	0.85
1990s	0.97	0.93
2000s	1.48	1.17
2010s	1.75	1.29
Total	1.28	1.12

Table B2: Full sample by transaction year and region

This table illustrates the sample composition for the full sample by transaction year and region. Appendix A provides detailed definitions of all variables.

	Full sample		Related		Unrelated	
	N	%	N	%	N	%
Debt by decade						
1980s	23	1.25%	5	1.81%	18	1.15%
1990s	465	25.34%	79	28.62%	386	24.76%
2000s	1,136	61.91%	147	53.26%	989	63.44%
2010s	211	11.50%	45	16.30%	166	10.65%
Total	1,835	100.00%	276	100.00%	1,559	100.00%
Debt by Regions						
Asia	53	2.89%	0	0.00%	53	3.40%
Europe	814	44.36%	63	22.83%	751	48.17%
Northern America	860	46.87%	213	77.17%	647	41.50%
Rest of World	108	5.89%	0	0.00%	108	6.93%
Total	1,835	100.00%	276	100.00%	1,559	100.00%
Equity by decade						
1980s	55	2.56%	3	0.80%	52	2.93%
1990s	764	35.58%	116	31.10%	648	36.53%
2000s	1,098	51.14%	194	52.01%	904	50.96%
2010s	230	10.71%	60	16.09%	170	9.58%
Total	2,147	100.00%	373	100.00%	1,774	100.00%
Equity by Regions						
Asia	47	2.19%	0	0.00%	47	2.65%
Europe	943	43.92%	85	22.79%	858	48.37%
Northern America	1,081	50.35%	288	77.21%	793	44.70%
Rest of World	76	3.54%	0	0.00%	76	4.28%
Total	2,147	100.00%	373	100.00%	1,774	100.00%

Table B3: Are deals/funds with tranche level information different from the overall sample?

This table compares our overall sample of related deals to the subset of related deals with additional tranche level information. Panel A compares the debt deal characteristics while Panel B compares the debt fund characteristics. t-test (z-test) compares the mean (median) of both samples to determine whether there is a statistically significant difference between the two means (medians). ***, **, and * indicate significance at 1%, 5%, and 10%, respectively. Appendix A provides detailed definitions of all variables.

Panel A: Debt Deal Characteristics

	Full sample		Reduced sample				
	N	Mean Median	N	Mean Median	Difference	t-test z-test	
Transaction size debt fund (In USD million)	276	23.56	199	19.18	4.38	0.18	
		11.81		9.87	1.94	0.17	
Number of debt investors	276	1.48	199	1.44	0.04	0.49	
		1.00		1.00	0.00	0.34	
Dummy syndicated debt transaction	164	0.27	112	0.28	-0.01	0.88	
		0.00		0.00	0.00	0.30	
Dummy board seat observer rights	209	0.90	146	0.97	-0.07	0.01	**
		1.00		1.00	0.00	0.65	
Dummy lead investor	260	0.80	192	0.83	-0.02	0.51	
		1.00		1.00	0.00	0.00	***

Panel B: Debt Fund Characteristics

	Full sample		Reduced sample				
	N	Mean Median	N	Mean Median	Difference	t-test z-test	
Fund size (in USD million)	271	457.25	198	365.95	91.30	0.09	*
		330.00		330.00	0.00	0.24	
Fund sequence number (equity and debt funds)	276	7.51	199	6.33	1.18	0.00	***
		7.00		6.00	1.00	0.84	
Fund sequence number (debt funds)	276	1.99	199	1.94	0.05	0.59	
		2.00		0.00	2.00	0.24	
Number of portfolio companies	276	20.21	199	21.25	-1.04	0.17	
		21.00		22.00	-1.00	0.00	***

Table B4: Details of the samples used

This table shows details of the coverage of the main dependent variables used in the regressions. Appendix A provides detailed definitions of all variables.

	Related		Unrelated		Full sample	
	Equity	Debt	Equity	Debt	Equity	Debt
A: Base sample						
# deals	373	276	1,774	1559	2,147	1835
# deals with performance metrics (IRR, Multiple, PME)	373	276	1,774	1559	2,147	1835
# companies	116		993		1109	
# companies with operating performance at entry						
Log(Enterprise Value)	90		460		550	
Log(Revenue)	89		391		480	
EBITDA (in Mio.)	89		392		481	
EBITDA Margin	87		383		470	
EV to Revenue Multiple	85		370		455	
EV to EBITDA Multiple	87		363		450	
Equity to EBITDA Multiple	87		372		459	
# companies with operating performance over deal lifetime						
Growth Enterprise Value	80		334		414	
Growth Revenue	74		325		399	
Growth EBITDA	79		346		425	
Growth EBITDA Margin	81		347		428	
Growth EV to Revenue Multiple	77		320		397	
Growth EV to EBITDA Multiple	76		316		392	
Growth Equity to EBITDA Multiple	71		305		376	

B: Reduced sample

# deals	264	199	1,290	1,183	1,554	1,382
# deals with performance metrics (IRR, Multiple, PME)	264	199	1,290	1,183	1,554	1,382
# deals with debt composition details						
Total Nominal Interest Rate	n.a	160	n.a	844	n.a.	1,004
Interest Rate Spread	n.a.	160	n.a.	844	n.a.	1,004
PIK Dummy	n.a.	59	n.a.	783	n.a.	842
PIK Fraction	n.a	59	n.a	783	n.a	842
Warrent Ownership Dummy	n.a.	62	n.a.	421	n.a.	483
Warrent Ownership Fraction	n.a.	62	n.a.	421	n.a.	483
Equity Ownership Dummy	n.a	94	n.a	819	n.a	913
Equity Ownership Fraction	n.a.	40	n.a.	338	n.a.	378
Transaction Equity Fraction	n.a.	97	n.a.	824	n.a.	921
Transaction Prefered Fraction	n.a	97	n.a	824	n.a	921
Bullet Payment Dummy	n.a.	160	n.a.	844	n.a.	1,004
# deals with debt structure details						
Board Seat Dummy	n.a.	127	n.a.	522	n.a.	649
Board Seat Observer Rights Number	n.a.	154	n.a.	561	n.a.	715
Board Seat or Observer Right Dummy	n.a.	154	n.a.	610	n.a.	764
Lead Investor Dummy	n.a.	155	n.a.	708	n.a.	863
Cross Transaction Dummy	n.a.	146	n.a.	596	n.a.	742
Deal Source Dummy	n.a.	143	n.a.	540	n.a.	683
Syndication Dummy	n.a.	97	n.a.	351	n.a.	448
Tranched Dummy	n.a.	160	n.a.	844	n.a.	1,004
Holding Period	n.a.	105	n.a.	556	n.a.	661

Table B5: Correlation of equity fund and deal variables

This table shows the pairwise correlations the equity fund and deals variables of the sample. The top numbers show correlation coefficients and bottom number shows the significance levels of each correlation coefficient. Appendix A provides detailed definitions of all variables.

	Holding period	Log(Fund Size)	Sequence Number (only equity funds)	Sequence Number (all equity and debt funds)	Number of portfolio companies	Log(Transaction size)	Equity Ownership	Number of equity investors	Board seat Dummy	Lead Investor Dummy	Syndication Dummy
Holding period	1.0000										
Log(Fund Size)	0.0314	1.0000									
	0.2562										
Fund Sequence Number (only equity funds)	0.0335	0.3702	1.0000								
	0.2264	0.0000									
Fund Sequence Number (all equity and debt funds)	0.0309	0.3777	0.9823	1.0000							
	0.2634	0.0000	0.0000								
Number of portfolio companies	0.0011	0.7333	-0.0061	-0.0057	1.0000						
	0.9733	0.0000	0.8083	0.8192							
Log(Transaction size)	0.0796	0.3113	0.3268	0.3273	-0.1844	1.0000					
	0.0040	0.0000	0.0000	0.0000	0.0000						
Equity Ownership	0.1020	0.1718	0.0417	0.0782	-0.1375	0.2548	1.0000				
	0.0136	0.0000	0.1915	0.0142	0.0002	0.0000					
Number of equity investors	-0.0269	0.0245	0.1074	0.0848	0.0849	0.0069	-0.2429	1.0000			
	0.3304	0.2602	0.0000	0.0001	0.0007	0.7531	0.0000				
Board seat Dummy	0.0728	0.0553	0.0056	0.0278	-0.1549	0.1815	0.3386	-0.1959	1.0000		
	0.0393	0.0475	0.8408	0.3195	0.0000	0.0000	0.0000	0.0000			
Lead Investor Dummy	0.1044	0.1148	0.0355	0.0662	-0.1714	0.1962	0.4752	-0.2723	0.4664	1.0000	
	0.0012	0.0000	0.1665	0.0097	0.0000	0.0000	0.0000	0.0000	0.0000		
Syndication Dummy	-0.1009	-0.1567	-0.1962	-0.2112	0.1190	-0.1829	-0.3766	0.1380	-0.2182	-0.3221	1.0000
	0.0054	0.0000	0.0000	0.0000	0.0003	0.0000	0.0000	0.0000	0.0000	0.0000	

Table B6: Correlation of debt fund and deal variables

This table shows the pairwise correlations the debt fund and deals variables of the sample. The top numbers show correlation coefficients and bottom number shows the significance levels of each correlation coefficient. Appendix A provides detailed definitions of all variables.

	Holding period	Log(Fund Size)	Sequence Number (only equity funds)	Sequence Number (all equity and debt funds)	Number of portfolio companies	Log(Transaction size)	Number of equity investors	Board seat Dummy	Lead Investor Dummy	Syndication Dummy
Holding period	1.0000									
Log(Fund Size)	-0.1127	1.0000								
	0.0003									
Fund Sequence Number (only equity funds)	0.1616	0.0972	1.0000							
	0.0000	0.0000								
Fund Sequence Number (all equity and debt funds)	0.2234	-0.0017	0.7569	1.0000						
	0.0000	0.9446	0.0000							
Number of portfolio companies	-0.0281	0.6252	-0.1559	-0.2607	1.0000					
	0.3639	0.0000	0.0000	0.0000						
Log(Transaction size)	-0.0123	0.3542	0.2037	0.1953	0.0225	1.0000				
	0.6906	0.0000	0.0000	0.0000	0.3433					
Number of equity investors	-0.0068	0.1249	0.2487	-0.0055	0.0913	0.1088	1.0000			
	0.8260	0.0000	0.0000	0.8155	0.0001	0.0000				
Board seat Dummy	0.2462	-0.3342	0.1185	0.2334	-0.3902	-0.1017	-0.1436	1.0000		
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0005	0.0000			
Lead Investor Dummy	0.1375	-0.0081	0.0643	0.1763	-0.0877	0.1768	-0.1944	0.3505	1.0000	
	0.0000	0.7562	0.0131	0.0000	0.0007	0.0000	0.0000	0.0000		
Syndication Dummy	-0.1857	0.2895	-0.0592	-0.2882	0.2483	0.1127	0.0718	-0.2689	-0.2962	1.0000
	0.0000	0.0000	0.0693	0.0000	0.0000	0.0005	0.0275	0.0000	0.0000	

Table B7: Regressions on equity performance (reduced sample)

The table shows OLS regression results for the performance of the equity transactions. The sample includes all transactions for which we have tranche level information for the debt transactions. Models 1, 2, and 3 show the base regression only including the Related Dummy, Holding period, and a set of portfolio company dummies as independent variables. Related Dummy is a dummy variable that equals one if the debt transaction has the debt and equity fund of the same PE firm, and zero otherwise. Models 4, 5, and 6 extend the regression adding fund characteristics as independent variables. Models 7, 8, and 9 extend the regression adding deal characteristics as independent variables. The dependent variable in Models 1, 4, and 7 is the IRR of the equity deal. The dependent variable in Models 2, 5, and 8 is the cash multiple of the equity transaction. The depenent variable in Models 3, 6, and 9 is the PME. All regression models contain portfolio company dummies (transaction year, country, industry, and deal dummies). ***, **, and * indicate significance at 1%, 5%, and 10%, respectively. Appendix A provides detailed definitions of all variables.

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
	IRR	Multiple	PME	IRR	Multiple	PME	IRR	Multiple	PME
Related Dummy	0.0740**	0.504***	0.280**	0.0860**	0.526***	0.291**	0.0916**	0.517***	0.302**
	(2.18)	(2.91)	(2.25)	(2.50)	(3.01)	(2.32)	(2.58)	(2.89)	(2.35)
Holding period	-0.0604***	0.0370*	-0.0290*	-0.0563***	0.0404*	-0.0258*	-0.0588***	0.0370*	-0.0278*
	(-14.38)	(1.73)	(-1.89)	(-13.21)	(1.88)	(-1.67)	(-13.64)	(1.71)	(-1.78)
Log(Fund Size)				-0.00277	-0.0242	-0.0160	-0.00319	-0.0258	-0.0191
				(-0.62)	(-1.07)	(-0.99)	(-0.70)	(-1.13)	(-1.17)
Fund Sequence Number				-0.00807	-0.0150	-0.0267	-0.0157	-0.0440	-0.0545
				(-0.80)	(-0.30)	(-0.73)	(-1.27)	(-0.70)	(-1.20)
Number of debt Investors							0.0103	0.0468	0.0460
							(0.87)	(0.77)	(1.06)
Log(Transaction Size)							0.0122**	-0.0150	0.0000864
							(2.09)	(-0.52)	(0.00)
Portfolio company dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	1.554	1,554	1;554	1.554	1,554	1;554	1.554	1,554	1;554
adj. R-sq	0.355	0.108	0.118	0.313	0.106	0.120	0.342	0.108	0.118

Table B8: Regressions on debt performance (reduced sample)

This table shows OLS regression results for the performance of the debt transactions. The sample includes all transactions for which we have tranche level information for the debt transactions. Models 1, 2, and 3 show the base regression only including the Related Dummy, Holding period, and a set of portfolio company dummies as independent variables. he sample includes all transactions for which we have tranche level information for the debt transactions. Models 1, 2, and 3 show the base regression only including the Related Dummy, Holding period, and a set of portfolio company dummies as independent variables. All regression models contain portfolio company dummies (transaction year, country, industry, and deal dummies). ***, **, and * indicate significance at 1%, 5%, and 10%, respectively. Appendix A provides detailed definitions of all variables.

	1 IRR	2 Multiple	3 PME	4 IRR	5 Multiple	6 PME	7 IRR	8 Multiple	9 PME
Related Dummy	-0.0336***	-0.143***	-0.117****	-0.0381***	-0.130***	-0.103***	-0.0258***	-0.134***	-0.103***
	(-3.54)	(-3.03)	(-3.20)	(-3.42)	(-2.66)	(-2.76)	(-2.64)	(-2.68)	(-2.71)
Holding period	-0.00776***	0.0822***	-0.00167	-0.00835***	0.0747***	-0.00744	-0.0102***	0.0737***	0.00767
	(-6.15)	(13.08)	(-0.34)	(-5.54)	(11.29)	(-1.48)	(-7.79)	(11.06)	(-1.52)
Log(Fund Size)				-0.00551	-0.0181	-0.0107	-0.00909**	0.000316	-0.00243
				(-1.55)	(-1.15)	(-0.89)	(-2.56)	(0.02)	(-0.18)
Fund Sequence Number				-0.00863***	0.0317***	0.0263***	-0.00964***	0.0378***	0.0319***
				(-3.13)	(2.60)	(2.84)	(-3.94)	(3.01)	(3.35)
Number of debt Investors							0.00909**	-0.0362*	-0.0165
							(2.41)	(-1.87)	(-1.13)
Log(Transaction Size)							0.00702***	-0.0174*	-0.0129*
							(3.52)	(-1.70)	(-1.66)
Portfolio company dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	1,382	1,382	1,382	1,382	1,382	1,382	1,382	1,382	1,382
adj. R-sq	0.486	0.299	0.193	0.427	0.292	0.208	0.516	0.29	0.211

Table B9: Robustness performance regressions (reduced sample)

This table shows robustness checks for the regressions of Models 7, 8, and 9 of Tables 5 and 6. The only coefficient shown is for the *related dummy*. ***, **, and * indicate significance at 1%, 5%, and 10%, respectively. Appendix A provides detailed definitions of all variables.

	Dependent variable	Method	Related dummy	Control variables	Adjusted R^2 (Pseudo R^2)	Number of transactions
Equity performance regressions						
1. Keep only transactions done by the 22 related PEFs						
Reduced Sample	IRR	OLS	0.188*** (4.03)	Yes	0.766	404
Reduced Sample	Multiple	OLS	0.782*** (2.32)	Yes	0.115	404
Reduced Sample	PME	OLS	0.419** (2.78)	Yes	0.215	404
2. Exclude all transactions from PE firms that have never had a private debt fund						
Reduced Sample	IRR	OLS	0.159*** (3.55)	Yes	0.626	550
Reduced Sample	Multiple	OLS	0.527** (2.07)	Yes	0.110	550
Reduced Sample	PME	OLS	0.367** (2.31)	Yes	0.168	550
3. Keep only transactions from Northern America						
Full Sample	IRR	OLS	0.168*** (2.02)	Yes	0.295	525
Full Sample	Multiple	OLS	0.631*** (2.33)	Yes	0.132	525
Full Sample	PME	OLS	0.358*** (2.14)	Yes	0.100	525
Debt performance regressions						
1. Keep only transactions done by the 22 related PEFs						
Reduced Sample	IRR	OLS	-0.0524*** (-4.91)	Yes	0.859	494
Reduced Sample	Multiple	OLS	-0.116*** (-3.20)	Yes	0.511	494
Reduced Sample	PME	OLS	-0.135*** (-4.06)	Yes	0.705	494
2. Keep only transactions from Northern America						
Full Sample	IRR	OLS	-0.0912*** (-7.10)	Yes	0.701	350
Full Sample	Multiple	OLS	-0.122 (-1.17)	Yes	0.164	350
Full Sample	PME	OLS	-0.155** (-2.15)	Yes	0.119	350

Table B10: Debt tranches

This table shows details of the debt tranches of the sample with "Related" and for the sample with "Unrelated". t-test (z-test) compares the mean (median) of both samples to determine whether there is a statistically significant difference between the two means (medians). ***, **, and * indicate significance at 1%, 5%, and 10%, respectively. Appendix A provides detailed definitions of all variables. The different debt tranches are explained in Appendix C.

	Full sample		Related		Unrelated				
	N	Mean Median	N	Mean Median	N	Mean Median	Difference	t-test z-test	
Fraction of total transaction into tranche ...									
Senior secured	1,176	1.10%	194	1.97%	982	0.93%	1.04%	0.37	
		0.00%		0.00%		0.00%	0.00%	0.05	**
2nd lien	1,176	0.80%	194	1.32%	982	0.70%	0.63%	0.52	
		0.00%		0.00%		0.00%	0.00%	0.25	
Subdebt	1,176	86.79%	194	87.55%	982	86.64%	0.91%	0.72	
		100.00%		100.00%		100.00%	0.00%	0.00	***
PIK note	1,176	0.24%	194	0.32%	982	0.23%	0.09%	0.80	
		0.00%		0.00%		0.00%	0.00%	0.99	
Loan stock	1,176	0.20%	194	0.00%	982	0.24%	-0.24%	0.00	***
		0.00%		0.00%		0.00%	0.00%	0.00	***
Preferred stock	1,176	2.78%	194	3.82%	982	2.57%	1.25%	0.47	
		0.00%		0.00%		0.00%	0.00%	0.03	**
Common equity	1,176	8.09%	194	5.01%	982	8.70%	-3.69%	0.00	***
		0.00%		0.00%		0.00%	0.00%	0.28	

Appendix C: Definition of Debt Tranches:

- **Senior secured:** Senior debt is a company's first level of liabilities, typically secured by a lien against some type of collateral. This makes the debt less risky and provides less return for lenders. Senior secured debt is backed by an asset that was pledged as collateral. For example, lenders may place liens against equipment, vehicles or homes when issuing loans. If the loan is defaulted on, the asset may be sold to cover the debt. If a company files for bankruptcy, senior debt claims are paid first. All other debt is subordinated. Collateral from asset-backed debts may be sold to pay off senior secured debt. Senior unsecured debt is then paid using other company assets.

- **Subordinated debt (Subdebt):** The difference between subordinated debt and senior debt is the priority in which the debt claims are paid by a firm in bankruptcy or liquidation. If a company has both subordinated debt and senior debt and has to file for bankruptcy or faces liquidation, the senior debt is paid back first before the subordinated debt. Once the senior debt is completely paid back, the company then repays the subordinated debt. In fact, there are also levels of subordinated debt, with senior subordinated debt having a higher claim to repayment than junior subordinated debt.

- **Second lien:** Second lien loans differ from both senior debt and subordinated debt. Second lien debt refers to loans that are reimbursed only after senior debts are repaid in full following a default. Due to the subordinated claim on assets, if a borrower defaults on a secured loan, the senior lien holder may receive 100% on the loan balance from the sale of the underlying collateral, while the second lien holder receives only a fraction of the loan amount on the subordinated debt. In the event of a bankruptcy or liquidation, the assets used by the company as security would first be provided to the first lien secured lenders as repayment of their borrowings. To the extent that the value of the assets is sufficient to satisfy the company's obligations to the first lien secured lenders, any additional proceeds from the sale of the pledged assets would then be made available to the second lien lenders as repayment of the second lien loan. Although the second lien loan's security interest is subordinated to senior debt, the ranking of senior debt and second lien loans are the same in the event the pledged assets are not sufficient to satisfy the outstanding borrowings. In the event of a liquidation of a company, both the senior debtholders and second lien loans would likely be repaid in full before the subordinated debtholders receive any repayment of their obligations.

- **PIK note:** A "payment-in-kind" (PIK) note (or loan) is a way for companies to borrow money. When issuing a bond, a company typically borrows a fixed amount of money, for a fixed period of time, and pays a fixed amount of interest every year. With a PIK note, rather than pay interest each year, the interest is rolled up (capitalised) and added to the principal. Clearly, PIK loans are riskier than traditional debt, because the lender receives no cash back until the end of the loan period. They are also usually unsecured, and low in the pecking order in terms of repayment if the company goes into bankruptcy.

- **Loan stock:** Loan stock are shares of common or preferred stock that are used as collateral to secure a loan from another party. The loan stock earns a fixed interest rate, much like a standard loan, and can be secured or unsecured. A secured loan stock may also be called a convertible loan stock if the loan stock can be directly converted to common shares under specified conditions and with a predetermined conversion rate.

- **Preferred stock:** Preferred stock is a type of stock which may have any combination of features not possessed by common stock including properties of both an equity and a debt instrument, and is generally considered a hybrid instrument. Preferred stocks are senior (i.e., higher ranking) to common stock, but subordinate to bonds in terms of claim (or rights to their share

of the assets of the company) and may have priority over common stock in the payment of dividends and upon liquidation.

- **Common stock:** Common stock is a security that represents ownership in a corporation. Holders of common stock exercise control by electing a board of directors and voting on corporate policy. Common stockholders are on the bottom of the priority ladder for ownership structure; in the event of liquidation, common shareholders have rights to a company's assets only after bondholders, preferred shareholders and other debtholders are paid in full.