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Private Debt and the Role of Venture Capital & Private Equity Sponsors

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Abstract

This is the first study examining the key role played by venture capital & private equity (VCPE) firms in the private debt market. Private-debt funds invest in companies owned ('sponsored') by VCPEs and in other companies without VCPE sponsors. Using novel data, we find that private debt without VCPE sponsors generates a premium. Further analysis shows that this sponsor-less premium compensates for higher risk and costs of risk mitigation as sponsor-less lenders adopt a more hands-on approach emulating VCPE sponsors' roles. Our results are robust and provide important lessons for investors and investee firms in private debt, venture lending and VCPE.

JEL classification: G24, G32, G33, G34

Keywords: private debt, direct lending, venture capital & private equity (VCPE), funds, internal rate of return (IRR), sponsor.

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1. Introduction

Much is known about the role of venture capital and private equity (VCPE) providers in channelling *equity* to companies. By contrast, little is known about private (non-bank) *debt* and its link with VCPE providers. Private-debt funds play an important role in financing later-stage investments including buyouts and growth. Some private debt funds lend to companies owned or controlled by VCPE 'sponsors', while 'sponsor-less' private-debt deals involve lending to companies without VCPE backer. This paper examines the roles and interactions between private-debt funds and VCPE 'sponsors' in the provision of private debt.

Ivashina and Kovner (2011) show that the strength of the sponsor's banking relationships affects the cost of debt financing. Unlike Ivashina and Kovner (2011), who focus on bank loans to companies backed by private-equity sponsors, we present the first analysis of *non-bank* private lending in the presence *as well as in the absence* of VCPE sponsors with a particular focus on understanding the latter. Our key insight is that in the absence of a VCPE sponsor, lenders adapt their lending decisions and processes to replicate some of the roles otherwise undertaken by sponsors. The contribution of our study does not depend on the distinction between bank and non-bank lenders as sponsor-less investing has not been previously examined for either banks or non-banks. Both banks and non-bank lenders may in principle adopt and adapt to sponsor-less lending. Ivashina and Kovner (2011) suggest that bank lenders may be unwilling to finance transactions in the absence of a sponsor with whom they have had repeated interactions. Focusing on *non-bank* private debt rather than *bank* loans, we are able to observe both sponsored and sponsor-less deals that are broadly comparable. This suggests that private-debt funds have been able to adopt and adapt to the sponsor-less business model more quickly than banks, possibly because they are more flexible in their strategic and operational decisions than banks.

Private debt is the main source of financing for private companies around the world (Cumming, Fleming and Liu 2019a). Traditionally banks have been key sources of private debt to companies. The recent global financial crisis has led to a significant shift from bank- to non-bank lending (e.g., Ivashina and Scharfstein 2010, Martynova and Perotti 2018). A substantial amount of non-bank debt is now provided by private-debt funds, and these funds have been growing at such a rate that it has been compared to the rapid growth of hedge funds during the boom in the 1990s (Wigglesworth 2017). Private debt is a relatively new asset class but it is attracting great attention from asset

managers and institutional investors (Cumming et al. 2019a, Ivashina and Sun 2011). It is now the third largest capital asset class in private capital, according to the Preqin 2020 Global Private Debt Report. Assets under the management of private-debt fund managers have increased fourfold over the past decade, to nearly US$812bn in 2019 (Preqin 2020). A recent consultancy report shows that more than half of all institutional investors are investing in private debt and a further 13% are considering such investments (Rajan 2015). Private-debt funds raise capital from wealthy and institutional investors (including pension funds, insurance firms and sovereign wealth funds). Private debt provides investors with exposure to more bond-like returns and facilitates portfolio diversification.

As a crucial source of finance and an important asset class, private debt plays a key role in promoting economic growth and employment. The recovery following Covid-19 is likely to increase the already substantial demand for private debt. While both sponsored and sponsor-less lending are important, sponsor-less lending is of particularly great economic significance. Sponsor-less companies vastly outnumber sponsored ones (i.e., VCPE owned or controlled companies), and are likely to have even greater, and often unmet, demand for finance (Kindert 2019). Sponsored deals are by definition restricted to the small subset of private companies that are VCPE owned or controlled. Hence, the volume of sponsored lending is limited by the willingness of entrepreneurs to surrender ownership and control to VCPEs, and by the availability of funding in the VCPE industry, which fluctuates over time and between markets. A better understanding of private debt and particularly sponsor-less lending is therefore important to a wide audience of academics, practitioners and policy makers.

Despite the growth and economic significance of private lending and the regulatory concerns the shift from bank to non-bank debt financing is raising, there is little academic literature on non-bank private debt (Denis and Mihov 2003, Rauh and Sufi 2010, Kale and Meneghetti 2011). This is largely due to the lack of publicly available data, as the few studies in this area rely on proprietary or hand-collected data. Cumming and Fleming (2013) use proprietary data provided by institutional investors on 311 deals across 25 countries and document the types and performance of private-debt securities. Cumming et al. (2019a) use hand-collected data on private direct loans to companies in Asia-Pacific countries during 2001-2015 and find that private debt generates a premium relative to public debt.

Our analysis is facilitated by access to proprietary deal data of private-debt funds from the *Centre for Private Equity Research* (CEPRES), which is recognized as a provider of high-quality data. CEPRES data have been used in studies published in top academic journals (e.g., Cumming, Schmidt and Walz 2010, Krohmer, Lauterbach and Calanog 2009, Franzoni, Nowak and Phalippou 2012). We use CEPRES data on individual private debt deals between 1982 and 2015. The debt deals in our sample provide later-stage finance, including finance for buyouts, growth, acquisitions and recapitalisations, to portfolio companies in the U.S., Canada, UK and Europe.[1]

Practitioners claim that sponsor-less lending generates higher returns arguably to compensate for the higher risk of investing without a VCPE sponsor (Nesbitt 2019). However, the sources and reasons for the 'sponsor-less premium', including the risk-return trade-off and the mechanisms and costs of risk mitigation in sponsor-less lending, remain unexplored among practitioners and academics. Ours is the first comprehensive analysis of the determinants of the sponsor-less premium. We link the premium to risk and to the costs of risk mitigation borne by sponsor-less lenders. Our data allow us to investigate the risk-return trade-off of sponsored and sponsor-less private debt deals.

Our initial analysis finds that sponsor-less deals generate a significant premium of around 5-6 percentage points over comparable sponsored deals. We address possible endogeneity and selection bias resulting from VCPEs' superior ability to identify profitable portfolio companies. The performance of private debt fluctuates over the three decades we study, but the sponsor-less premium stays positive except during the Global Financial Crisis of 2007-2009. Sponsor-less deals are associated with higher default risk. Lenders appear to be compensated for the higher risk of sponsor-less investing through higher interest rates and less risky interest-rate arrangements. After examining risk compensation, we investigate how the risks and costs of sponsor-less investing may be mitigated. In sponsored deals, VCPE sponsors may reduce information and agency costs, e.g., screening and certifying portfolio companies, and take equity stakes and board seats to gain control and align their incentives with the owners of portfolio companies. By contrast, in the absence of

[1] Our sample does not include early-stage VC deals but does include growth finance which has been previously labelled VC or PE. The definitions of VC and PE and the delineations between them differ across countries and over time. In the UK, the term VC is commonly used to describe buyouts of mature companies. In Europe, the term 'buyout' is used to denote a variety of deals including growth finance and other later-stage deals that would not be labelled buyouts in US/UK terminology. To avoid confusion, we use the inclusive term VCPE to reflect the broad range of the deals included in our sample.

VCPE sponsors, sponsor-less investors are exposed to the extra risks and costs due to unresolved information and agency problems. We hypothesise that sponsor-less investors mitigate this extra risk through closer screening and monitoring of portfolio companies, thereby emulating the roles of VCPE sponsors. Empirically, we find that sponsor-less investors indeed adopt a more hands-on investment approach involving higher equity stakes, greater use of warrants and representation on company boards.

We re-examine the sponsor-less premium taking into account risk compensation and the costs of risk mitigation and show that the premium compensates investors for the higher risk and risk-mitigation costs borne by sponsor-less lenders. We also examine the sponsor-less premium from the perspective of well-diversified investors that are limited partners of private debt funds (pension funds and other institutional investors). We find no difference in systematic risk between sponsored and sponsor-less deals. This suggests that the extra risk of sponsor-less investing is diversifiable, and well-diversified debt investors should not expect a premium for bearing it.

Finally, we explore an alternative explanation for the sponsor-less premium focusing on potential agency conflicts between VCPE sponsors and debt funds in sponsored deals, as suggested by the findings of Fang, Ivashina and Lerner (2015). We find that private-debt funds investing with an affiliated firm acting as VCPE sponsor earn a small premium of 1.5 percentage points. However, the reputation of VCPE sponsors and the level of experience of debt funds have little impact on return. We argue that any potential agency conflicts between VCPE sponsors and debt-fund investors and sponsors do not drive our earlier results on the sponsor-less premium.

Our paper makes several important contributions to multiple strands of the academic literature on investments, VCPE and company finance. We extend the limited literature on private debt (Cumming and Fleming 2013, Nesbitt 2019, Cumming et al. 2019a, 2019b) by providing insights into asset classes and sources of finance–sponsored and sponsor-less private debt–that remain largely unexplored despite their substantial economic size and impact. To the best of our knowledge, this is the first study to shed light on the key role that VCPE providers play as sponsors in private debt markets. Using a novel dataset, we examine the development and performance of sponsored and sponsor-less private debt. Our study of the structure and performance of direct lending by private-debt funds provides important lessons relevant to other forms of lending, including bank lending, peer-to-peer lending and ‘venture lending’ (Hochberg, Serrano, Ziedonis 2018, Ibrahim 2010,

Ivashina and Kovner 2011, de Rassenfosse and Fischer 2016). Venture lending is lending to start-up companies. It is similar to the private-debt fund lending that is the focus of our study, but it operates on a considerably smaller scale.[2] Existing academic studies of venture lending have focused on private-debt deals that are instigated by the venture-equity backer; that is, they have examined *sponsored* venture lending. By contrast, our analysis extends to *sponsor-less* lending and indicates how sponsor-less venture lending may be facilitated.

Our study is of interest to fund managers and other practitioners, owners and managers of portfolio companies, and policy makers. Our analysis focuses on risk compensation and mitigation at the level of individual deals which is of importance to the managers and general partners of private debt funds and portfolio companies. Our results are also relevant to the managers of private companies who need to understand and accommodate lenders' approaches to risk compensation and mitigation in sponsor-less deals. Recognising the higher risk of sponsor-less investing and understanding the ways in which this risk can be mitigated through deal design and monitoring mechanisms is of importance to the managers and owners of both private-debt funds and portfolio companies. To the extent that our insights can help private-debt funds improve their performance, this may help increase the supply of private debt in the economy, which in turn is of interest to policy makers. Our results that neither type of debt outperforms the other and sponsor-less risk is diversifiable are important to the managers of debt funds and institutional investors in determining their investment strategies.

The remainder of this paper is structured as follows. In the next section, we outline the conceptual framework of our study and motivate our testable hypotheses. In the accompanying Online Appendix, in Section OA1, we outline the institutional setting of the private debt market. Section 3 describes our data. Section 4 outlines our analysis and discusses our results, and Section 5 concludes the paper.

2. Conceptual Framework and Hypotheses

The role of the VCPE sponsor includes certifying the portfolio company based on the VCPE's prior screening and due diligence. VCPEs take large equity stakes, with a view to controlling portfolio-company decisions, particularly in the event of poor performance. Private-equity backers with large

[2] Venture lending involves considerably smaller deals (averaging around US$2-3 million) and aggregate amounts (U$2bn in 2006); see Ibrahim (2010).

equity stakes have objectives that are closely aligned with those of the portfolio company. Hence, (existing) VCPEs may have incentives to share their private information about portfolio companies with simultaneous or subsequent private-debt investors, because both the company and its equity backers will benefit from the resulting access to lower-cost debt finance. Consistent with these expectations, Ivashina and Kovner's (2011) study of bank loans to sponsored companies suggests that stronger relationships between sponsors and banks reduces the cost of bank loans for leveraged buyouts. While the insights of Ivashina and Kovner (2011) are relevant to sponsored deals, we extend their analysis to sponsor-less deals. We expect that in sponsor-less private-debt deals, the private-debt funds need to replicate the functions of the sponsor, including more staffing to accommodate the screening, monitoring and nurturing of portfolio companies. Without a VCPE backer, the private-debt provider is expected to take on a more hands on approach with their portfolio company.

Theoretically, the role of VCPE sponsoring can be rationalised as a means to reduce adverse selection and moral hazard (Jensen and Meckling 1976, Myers and Majluf 1984, Myers 1984). VCPE sponsors may be able to overcome information asymmetries between debt investors and investee companies, through either screening, certification or signalling. For example, Tykvova (2017) develops a theoretical framework of early-stage VCPE-sponsored debt ('venture lending'). In this model, venture capitalists (VCs) invest equity in a company, and subsequently observe company quality; if the information is favourable, the VC invites venture lenders to signal high company quality. Tykvova finds empirical evidence to support the predictions of her model. Our study deals with later stage deals, where information asymmetries are typically lower than in earlier stages. Still, given the similarities of the investment approach between early and later-stage lending, Tykvova's results suggest that VCPE backers in sponsored companies may act as vanguards, scouting out the company and subsequently inviting debt funds. Hence, we expect lenders of sponsored companies to benefit from private information revealed by informed VCPE backers. By contrast, due to the lack of valuable VCPE screening, we expect sponsor-less deals to involve higher information costs and adverse selection, and lower average quality of borrowers than sponsored deals. For lenders, lower quality implies higher risk of the company defaulting on payments promised to its debt holders. To compensate for their higher default risk, we expect sponsor-less deals to generate higher returns.

VCPE sponsors may also help to limit incentive conflicts between debt investors and investee companies, and due to reduced agency costs of equity and debt investors in sponsored deals may require lower returns. Much of the existing literature examines the role of VCPE backers in dealing with the agency costs of equity caused by conflicts of interests between founder-owners and equity investors (e.g., Thompson and Wright 1991). If companies use both debt and equity finance, there is a trade-off between the agency cost of equity and the agency costs of *debt* (Jensen and Meckling 1976). While relatively concentrated equity ownership helps to align the interests of VCPEs and owner-managers and limit the agency costs of equity, they may also exacerbate the conflicts of interests between equity holders and debt holders and raise the agency costs of debt. Existing studies support this prediction (e.g., Bagnani, Milonas, Saunders and Travlos 1994, Anderson, Mansi and Reeb 2003, Aslan and Kumar 2012). In companies funded by sponsored private debt, debt investors may expect reputable VCPE sponsors to reduce the conflicts of interests between shareholders and debt holders. Practitioners point out that sponsored private-debt investors are likely to expect VCPE sponsors to act in the interests of debt holders by monitoring portfolio companies and even intervening in corporate decision making. Some VCPE sponsors may choose to internalise the conflict of interest between debt and equity by taking both equity and debt positions in their portfolio companies. Compared to sponsored deals, debt investors in sponsor-less deals may bear more (agency) costs, e.g., through greater monitoring, and therefore require compensation through a higher return.

While the explanations so far highlight the beneficial roles of sponsors, an alternative explanation focuses on potential conflicts of interest between VCPE sponsors and co-investing debt funds. Sponsored debt may underperform sponsor-less debt if better-informed VCPE sponsors exploit less-informed lenders. Fang, Ivashina and Lerner (2015) find that direct private-equity investments by institutional investors outperform the same institutional investors' co-investments with private-equity firms. Their findings suggest that private-equity firms are more likely to invite institutional investors to co-invest in larger and riskier deals that tend to have lower performance. In the context of sponsored private-debt investments, similar agency conflicts may arise between informed VCPE sponsors and uninformed private-debt investors. Informed sponsors may have an incentive to involve more private-debt investment in larger and lower-quality deals resulting in lower returns for private-

debt investors in sponsored deals relative to sponsor-less deals that are not affected by this conflict of interest.[3]

In conclusion, we predict that sponsor-less deals will generate higher returns for investors. Stating our hypothesis in alternative form, we expect the following:

Hypothesis 1: *Sponsor-less deals generate higher returns than equivalent sponsored deals.*

Asymmetric-information arguments predict that screening and signalling by VCPE sponsors will reduce adverse selection. Therefore, VCPE backing is associated with a higher average quality of deals, and the relatively higher-quality sponsored deals are expected to have lower chances of default than equivalent sponsor-less deals. Similarly, agency theory predicts that monitoring and intervention by VCPE backers acting on behalf of debt holders improve loan performance and reduce the likelihood of the company defaulting on its payments to debt holders.

Moreover, the trade-off theory of capital structure suggests that the risk of default and bankruptcy increases with the level of debt. Sponsor-less portfolio companies may end up with higher debt levels and risk of default because they only obtain debt funding while sponsored companies receive private equity from sponsors in addition to private debt. If sponsor-less companies have higher risk of default as a result, their investors will require a higher risk premium.[4]

In our empirical analysis, we define defaults as deals where the money returned to debt investors falls short of the amounts invested or no money is returned at all.[5] This reasoning leads to our second hypothesis (stated in alternative form):

Hypothesis 2: *Controlling for deal and company characteristics (including leverage), sponsored deals have a lower probability of default than equivalent sponsor-less deals.*

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[3]We thank the editor and reviewers for drawing our attention to the agency conflicts between sponsors and lending private-debt funds. Our baseline analysis does not discriminate between the different theoretical rationales for the sponsor-less premium, and the associated discussions of our results mostly emphasize the positive roles of sponsors. However, we explicitly focus on agency conflicts between sponsors and lenders in Section 4.6. We find little evidence to suggest that these conflicts explain much of the sponsor-less premium that we observe in our baseline analysis.

[4] We thank an anonymous reviewer for noting this argument.

[5] This is equivalent to the outcome termed a 'write-off' in the context of VCPE investments in equity (rather than debt).

Due to information asymmetries and agency problems in sponsor-less investments, we would expect the sponsored and sponsor-less deals to be structured in systematically different ways. While Hypothesis 1 predicts that sponsor-less deals have a higher return *level*, our next hypothesis deals with differences between sponsor-less and sponsored deals in the *sources* of returns. Section OA1 of the Online Appendix outlines the various sources of returns. Current interest is the least risky return component of private-debt financing. It contributes to the relatively stable character of private debt as an asset class by providing regular cash flows to lenders during the life of the loan. By contrast, payment-in-kind (PIK) is equivalent to a zero-coupon loan, which makes it more susceptible to interest-rate and default risk. Compared to current interest, PIK is expected to lead to lower recovery rates in companies that default on payments. Due to the higher risk of sponsor-less investing, we expect sponsor-less investors to require more of their return in the form of the relatively safer form of return, namely current interest. And we expect investors to be less likely to accept PIK in the comparatively riskier sponsor-less deals than in equivalent sponsored deals. Further, we expect investors in sponsor-less deals that pay PIK to require higher returns to compensate investors for the additional risks (Hypothesis 1). All else equal, (including holding the returns from non-interest sources equal), we expect that the *rates of interest* should be higher for sponsor-less than sponsored deals.[6] We expect this to hold for both the rates of current interest and PIK. We test the following hypotheses:

Hypothesis 3(a): *All else being equal, sponsor-less deals are (i) more likely to include current interest and (ii) less likely to include PIK than equivalent sponsored deals.*

Hypothesis 3(b): *All else being equal, sponsor-less deals require a higher rate of interest than equivalent sponsored deals.*

In sponsored investments, debt funds may rely on the VCPE sponsor to effect internal changes and make improvements when the company underperforms. In sponsor-less investments, debt funds are likely to take equity stakes or warrants (options on the company's equity, priced mostly at a nominal price), or both, to increase the fund's control over the portfolio company and to participate in the

[6] The test of Hypothesis 3(b) is clearly closely related to our test of Hypothesis 1. The key difference is that Hypothesis 3(b) focuses on only one source of return, namely interest payments (either as current interest or PIK). By contrast, Hypothesis 1 involves a broader measurement of returns including other non-interest sources of return (e.g., returns from warrants and other equity components of a deal).

company's upside risk. Economic theory suggests that warrants mitigate the moral hazard typically associated with loan contracts (Jensen and Meckling 1976, Green 1984, Brennan and Kraus 1987). The provision of warrants rewards lenders for the risky behaviour of entrepreneurs, thereby better aligning the objectives of the two and reducing agency costs. Hence, the levels of equity and warrants are likely to be higher for sponsor-less deals than sponsored deals. We test the following hypotheses:

Hypothesis 4(a): *All else being equal, sponsor-less deals are more likely than equivalent sponsored deals to involve participation by debt investors in company control and decision making through equity stakes.*

Hypothesis 4(b): *All else being equal, sponsor-less deals are more likely than equivalent sponsored deals to involve participation by debt investors in upside risk through warrants.*

For an average lender, there are two possible investments available, sponsored and sponsor-less. If the lender chooses to invest in a sponsor-less investment, they have a choice of either to take action to mitigate the extra risk associated with sponsor-less investments or to bear the risk. Equity stakes, warrants and contractual features such as the choice of interest rate are all mechanisms for risk mitigation. Additional mechanisms include lenders taking board seats in portfolio companies or being the lead investor in a deal. However, there are costs of risk mitigation for which lenders need to be compensated and which reduce the differential performance between sponsor-less investments and comparable sponsored deals with a comparable amount of risk mitigation. Hence, *after adjusting for risk and costs of risk mitigation*, we expect to no longer observe any difference in returns between sponsored and comparable sponsor-less deals. We test the following hypothesis:

Hypothesis 5: *Controlling for risk and the costs of risk mitigation, there is no difference in returns between sponsor-less and equivalent sponsored deals.*

3. Data

We study the performance and risk of sponsored versus sponsor-less private debt investments. We collect data on individual private-debt deals invested between 1982 and 2015 in companies based in

the U.S., Canada, U.K and Europe.[7] The debt deals in our sample provide later-stage finance, including finance for buyouts, growth, acquisitions and recapitalisations. Our sample excludes deals that are not realized or 'exited' (i.e., where the debt has not reached maturity) by September 2017.[8] Table OA2 in the Online Appendix shows detailed definitions of all our variables.

All our data are proprietary and obtained from a private consulting company, *Centre for Private Equity Research* (CEPRES). The overall CEPRES database includes over 40,000 worldwide investments covering private debt, venture capital, later stages including buyout, growth finance, and real-estate investments. CEPRES gathers data from private capital (equity and debt) firms that participate in a general-partner network. Firms that participate in this network report monthly cash flows and investment details (e.g., industry, investment stage, etc.) for each deal they have made in the past. In return, they receive statistics such as risk-adjusted performance measures for their own investments and for the aggregate private equity and debt market. It is important to stress that CEPRES anonymises all information so that third parties are unable to identify individual funds or managers. This is to meet the confidentiality requirements of the private capital industry and improves data accuracy and representativeness by limiting self-reporting bias. Specifically, it reduces the incentives of fund managers to misreport performance figures to CEPRES, e.g., by overstating cash flows or cherry-picking past investments. It also limits survivorship bias because it reduces the incentives of poorly performing funds to cease reporting. Harris et al. (2014) provide a detailed discussion of the potential biases in several databases such as Burgiss, Cambridge Associates, Preqin and Venture Economics. Although CEPRES collect their data from fund managers (general partners), the anonymized collection method employed by CEPRES helps to minimize biases.

Previous studies find evidence of misreporting of data by fund managers in some data available from CEPRES. However, we do not use these data in this study. Specifically, Cumming and Walz (2010) find misreporting in unrealized private-equity deals. By contrast, our study focuses on private debt (not private equity) and uses only realized deals.[9] Cumming and Walz (2010) find that misreporting

[7] Our sample covers the U.S., Canada, United Kingdom and the following European countries: Belgium, Denmark, Finland, France, Germany, Ireland, Italy, Netherlands, Norway, Spain, Sweden, Switzerland.

[8] In our sample, all deals invested before 2013 are realized by the end of our study period in September 2017. In our analysis, we conduct robustness checks and find that our results are robust to the exclusion of unrealized deals.

[9] Compared to private-equity, unrealized deals are less prevalent in private debt given the specified time to maturity of debt. Hence, excluding unrealized deals is less of a concern in private-debt studies.

is more likely in countries with poor accounting standards and low-quality legal systems. Their results suggest that misreporting is likely to be limited in our dataset which covers countries with strong accounting and legal environments (North America, UK and Europe). Cumming and Walz find that misreporting is due to information asymmetries between fund managers and institutional investors. There is less scope for misvaluing debt as compared to equity (Myers and Majluf 1984), and given the reputational damage that fund managers will likely sustain from misreporting (Cumming and Walz 2010), we believe that there is less likelihood of misreporting in private debt as compared to private equity.

We address any misreporting and survivorship biases in CEPRES by conducting robustness checks. We also compare our results on private-debt performance with the findings of other studies that source their data in a variety of ways (from data providers such as Burgiss and directly from limited partners). The high quality of CEPRES data is evidenced by previous studies using CEPRES data that are published in leading academic journals. For instance, CEPRES data on venture-capital investments is used by Krohmer, Lauterbach and Calanog (2009), Cumming, Schmidt and Walz (2010), and Buchner, Espenlaub, Khurshed and Mohamed (2018), among others. Franzoni, Nowak and Phalippou (2012) use CEPRES data on liquidated buyout investments for their study on systematic liquidity risk.

4. Results

4.1 Descriptive Statistics

In Table 1, we provide descriptive statistics for the variables in our analysis. We define a deal as sponsor-less if the issuing portfolio company is not (partly or wholly) owned by a private equity group. We observe two measures of deal performance calculated from cash-flow data disclosed by debt funds to the CEPRES database: the internal rate of return (IRR) and the multiple of money earned over money invested in a given deal.

For our full sample comprising both sponsored and sponsor-less debt deals, we find the average IRR to be close to 20%. While an IRR of 20% may seem high, it is in fact in line with several previous results. Cumming and Fleming (2013) use proprietary data obtained from institutional investors on 311 private-loan deals across 25 countries, including the U.S., U.K., and several European and Asian countries during 2001-2010, and find an average IRR of 24.5% (for fully realized deals). Cumming,

Fleming and Liu (2019a) obtain proprietary data for Asia-Pacific markets during 2001-2015. Their data is gathered from private-placement memorandums provided by institutional investors, which they argue represent the audited, complete track record for the private-debt funds in their sample. They report an average IRR of 32% (median 22%). As in Cumming and Fleming (2013) and Cumming et al. (2019a), the IRRs we report in our study are gross returns, which are higher than the returns to investors (limited partners) in private-debt funds as various fees, including management fees and carried interest, are deducted from gross returns. By contrast, Burgiss data is based on returns reported by limited partners net of all fees. Using Burgiss data of direct-lending funds in North America and the rest of the world, Munday, Hu, True and Zhang (2018) report average IRR of 10% during 2004-2016. For robustness, we examine a second performance measure: the investment multiple of money earned over money invested in a deal. In our sample, the average investment multiple is just over 1.5 (before fees). By comparison, Munday et al. (2018) report net-of-fees multiples for direct-lending funds ranging from 1.06-1.46 during 2004-2016. Overall, our results on private-debt performance are broadly in line with previous studies.

Our analysis also measures the incidence of default defined as money earned being less than money invested in a given deal (i.e., a multiple below one). We find that just over 7% of our sample deals result in default. Our definition of default ignores default in cases where lenders nevertheless recover their initial investment. However, our result is in line with the default rates reported in other studies. Cumming and Fleming (2013) show default rates for U.S. and European high-yield bonds that are in line with our results, on average, and particularly low during the mid-2000s. Cumming et al. (2019a) quote Carey (1998) who finds that private loans have lower default and higher recovery rates than risk-equivalent public bonds, and this difference increases with credit risk. Cumming et al. (2019a) argue that the highly structured nature of private direct lending and the close monitoring and due diligence by private lenders reduces the riskiness of private debt relative to public debt.

In addition to IRR and default, we observe a limited range of deal characteristics. Examining current interest and PIK, we find that most deals involve current interest, while PIK is relatively rare (see Table 1 of the manuscript). The level of current interest averages at just under 10%, while the return from PIK is higher at just over 12.8%. In addition to earning interest or PIK, private-debt investors participate in control and upside risk through equity stakes and warrants. We find that the average deal in our sample comprises an equity stake (*Direct Equity*) of almost 7% upon conclusion of the

deal. Through their exercise of warrants included in the deal, debt investors acquire a further equity stake, averaging 4% upon warrant exercise (see the variable *Post-deal Equity*).

Focusing next on deal structure and size, we find that the average private-debt deal in our sample comprises four tranches based on the mean (three based on the median). The most commonly observed type of tranche is subordinated debt (78% of deals include this type of tranche), followed by preferred stock (6%) and senior secured debt (4%).[10] In about 63% of deals, the private-debt fund reports that it acts as lead investor in the given deal (*Lead investor*). And in almost 59% of deals the private-debt fund takes a board seat in the portfolio company (*Board seat*). The size of an individual investment averages at US$11.2 million (with a median of US$8.177 million).[11] By contrast, venture lending involves considerably smaller deals of around US$2-3 million (Ibrahim 2010). In terms of the characteristics of the portfolio company, we observe industry, book value of total assets and annual sales in the investment year. The average book value of total assets is US$138 million (median US$100 million). The average (mean) company in our sample has annual sales of US$97 million (median US$76 million) in the deal year.

(TABLE 1 HERE)

4.2 Univariate Analysis

We define a deal as sponsor-less if the issuing portfolio company is not (partly or wholly) owned by a private equity group. We observe two measures of deal performance calculated from cash-flow data disclosed by debt funds to the CEPRES database: the internal rate of return (IRR) and the multiple of money earned over money invested in a given deal. The Online Appendix provides definitions and descriptive statistics of the variables in our analysis. For our full sample comprising both sponsored and sponsor-less debt deals, we find the average IRR to be close to 20%. The average

[10] Types of debt tranches that are rarely observed in our sample include second lien, PIK notes, convertible bonds and loan stock. The detailed breakdown of tranches by debt type is not reported in Table OA3 but is available from the authors on request.

[11] The figures we observe relate to individual investments by a given private-debt fund. The total amount of capital used to finance a given portfolio company is clearly substantially larger than these individual investments. For comparison, Guo, Hotchkiss and Song (2011) report the average size of a buyout transaction as around US$500 million, but this is measured as the total capital invested in terms of the market values of both equity and debt invested. Note also that our sample includes a range of other later-stage transactions besides buyouts.

investment multiple is just over 1.5 (before fees). As discussed in the Online Appendix, our results on private-debt performance are broadly in line with previous studies.

The univariate analysis in Table 1 shows that, on average, sponsor-less deals have significantly higher returns (IRRs). The mean IRR of the sponsored deals is just under 19% (median 17%) while the sponsor-less deals earn a statistically significantly higher mean IRR of over 23% (median 20%). Sponsor-less deals also have significantly higher average investment multiple. The mean multiple for sponsor-less deals is just under 1.6 (median 1.47) compared to 1.481 (median 1.38) for sponsored deals.

However, while sponsor-less deals appear to offer higher returns and multiples, they are also exposed to higher default risk. An average of 11.4% of the sponsor-less deals result in default, compared to just 5.9% of the sponsored deals. Part, or all, of the higher return may therefore be compensation for higher default risk. Such higher default may be linked to higher levels of leverage (total debt/total assets). We find average leverage to be moderate with a mean of 34% for sponsor-less and 31% for sponsored companies. The difference in leverage between sponsored and sponsor-less companies is statistically significant at 10% but of limited economic significance given that it is small at just 3 percentage points. This shows that even though sponsor-less companies do not obtain external equity from VCPE sponsors, they maintain relatively low levels of leverage similar to sponsored companies suggesting that they have access to internal equity or external equity from sources from non-VCPE investors (e.g., from managers or founder-owners). We investigate the link between the sponsor-less premium and default risk further in our multivariate analysis below.

Examining the deal characteristics, we find that current interest is commonly used in both sponsor-less and sponsored deals, although it is even more likely in sponsor-less deals (over 85%) rather than in sponsored deals (64%). By contrast, PIK is significantly more common in sponsored deals and rare in sponsor-less deals: 36% of sponsored deals involve PIK, compared to only 14% of sponsor-less deals. There is little difference in the levels of current interest between the two types of deals, but the level of PIK is significantly higher in sponsor-less deals (at almost 15%) than in sponsored deals (11%).

The sponsor-less deals involve relatively higher post-deal equity ownership (through direct equity stakes and warrant exercise) than the sponsored investments. The differences in mean and median

are statistically significant at 5% or better. In the sponsor-less deals, the private-debt investors are more likely to act as lead investors (and to hold board seats) in the portfolio companies than in the sponsored deals. Over 81% of the sponsor-less deals have private-debt funds as lead investors, compared to just under 58% of the sponsored deals. Furthermore, in almost 80% of the sponsor-less deals, the private-debt investors take a board seat, while this happens in just under 52% of the sponsored deals. Taking a more hands-on approach through equity stakes, acting as lead investor and sitting on the company board may allow private-debt funds to reduce contracting issues, transaction costs and default risk by being involved in the company's governance and investment decisions.

In terms of deal structure, the sponsor-less deals appear to be more complex in that they involve an average of five tranches compared to the four tranches in the sponsored deals. The higher deal complexity of the sponsor-less deals suggests challenging contracting issues and higher costs in this type of investment. On the other hand, we observe no significant differences in investment size between the sponsored and sponsor-less deals, suggesting that private-debt funds can effectively manage contracting issues and transaction costs even in large deals and without sponsors. Focusing on the characteristics of the portfolio companies, we find that investee companies of sponsor-less deals are smaller than those of sponsored deals in terms of company sales but not in terms of company assets.

Overall, the results of Table 1 show significant differences between sponsor-less and sponsored deals in terms of performance (IRR and multiple), default risk, the levels of current interest or PIK charged, the likelihood of observing PIK, and the investors' equity holdings through direct equity stakes and warrants. In the following section, we examine whether the differences in deal performance, default risk and deal structure between the sponsor-less and sponsored investments persist in a multivariate analysis.

(TABLE 2 HERE)

4.3 Determinants of Deal Performance

First, to test Hypothesis 1 (whether sponsor-less deals outperform sponsored deals), we estimate models of deal performance. The dependent variable is the internal rate of return (IRR) as calculated by CEPRES using cash-flow data provided to CEPRES by private-debt fund managers. The results are shown in Table 2. The univariate results in Table 1 suggest that sponsor-less deals earn a

premium. While the differential in IRR in the univariate analysis was approximately 4.5 percentage points, our initial multivariate analysis using OLS in Model 1 of Table 2 (Panel A) suggests a somewhat higher sponsor-less premium of 6.4 percentage points.[12]

For robustness, we control for the potential impact of outliers by winsorizing IRR at 1% and re-estimating Model 1. The results (unreported for the sake of brevity) are qualitatively unchanged. We also examine an alternative performance measure besides IRR, specifically, the (investment) multiple, which is the ratio of money earned over money invested in a deal. The results are reported in Table OA4 in the Online Appendix. The results of Model 1 in Table OA4 are consistent with our analysis of IRR in Model 1 of Table 2 in that *Sponsor-less* is significantly positively related with the investment multiple. The size of the coefficient of *Sponsor-less* (0.123) in Model 1 of Table OA4 is of a similar magnitude as the differences in the means and medians of the multiple between sponsor-less and sponsored deals in Table 1.

As our sample includes only debt deals that have matured by the end of our study period in September 2017, we address selection bias that may be caused by not including debt that has not reached maturity by the end of our study period. Examining all deals in our sample period, both debt that has matured by September 2017 as well as non-matured debt, we find that the debt in all deals invested before 2013 has reached maturity by the end of our study period. To address the selection bias, we re-estimate the model of deal performance and the sponsor-less premium (Model 1 in Table 2) using the reduced sample consisting only of matured (or realized) deals invested during 1982-2012. The results are reported in Table 2 (Model 2). Comparing Models 1 and 2 in Table 2 shows that our existing results are robust to excluding the deals in the years 2013-2015, which confirms that our results are not driven by sample selection bias due to excluding non-matured debt. Both Models 1 and 2 indicate that sponsor-less deals earn a premium of around 5-6 percentage points relative to sponsored deals.[13] For robustness, we estimate the equivalent of Model 2 in Table 2 using the

[12] Our results for the OLS hold using fund and portfolio companies fixed effects in addition to industry, year and country fixed effects.

[13] As an additional robustness check, we estimate two-stage selection models to address the issue of selection bias due to excluding unrealized deals from our sample. In the first stage, we estimate the probability of the deal being unrealized as a function of the sponsor-less indicator and our control variables. In the second stage, we re-estimate our baseline equations using IRR and investment multiple alternately as dependent variables. We find these results to be in line with

investment multiple as the dependent variable. The results are reported in Table OA4 in the Online Appendix. The results of Model 2 are in line with those of Model 1 in Table OA4 and confirm that our results are not driven by sample-selection bias due to excluding non-matured debt.

Selection bias may also result if VCPE backers are better able to identify profitable portfolio companies than sponsor-less lenders. As a result, sponsored deals and portfolio companies may differ systematically from sponsor-less ones in terms of risk and other characteristics. To address selection bias based on observable characteristics, we use propensity score matching. In the first stage of matching (selection equation), we estimate a Logit model to determine the propensity score.[14] We match each sponsor-less deal with an equivalent sponsored deal based on the propensity score and deal characteristics (sales and assets) as outcome variables to assess the treatment effect on the sponsor-less treatment group. Using 1:1 nearest neighbour (NN) matching with replacement and (0.066) caliper, we classify a sponsored deal as a match for a sponsor-less deal when the propensity scores and the outcome variables of the two deals differ by no more than 6.6% (Rosenbaum and Rubin 1985).[15] To confirm the balancing condition, Panel C of Table 2 reports the univariate results of the matched treatment and control observations and confirms that there are no significant differences in the outcome (matching) variables between the two subsamples. To ensure a good match between the treatment and control groups, there should be a good overlap in the ranges of their propensity scores, i.e., there should be ample 'common support'. We assess common support graphically by comparing the propensity-score distributions for the matched sponsor-less and sponsored deals and find there is substantial overlap.[16]

Panel A of Table 2 reports the PSM results in Model 3. We find that sponsor-less investments still outperform sponsored deals even when we address selection bias and compare sponsor-less and sponsored deals matched based on characteristics linked to risk. However, compared to the earlier

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those of our baseline analysis and conclude that our results are robust. For the sake of brevity, the results are not reported here but are available from the authors on request.

[14] The results of the Logit model (selection equation) are shown in Panel B of Table 2. The selection equation includes a variable *Debt-to-equity* as an additional determinant of *Sponsor-less* besides the variables used in the Stage-II main equation. A detailed motivation for using *Debt-to-equity* is provided in our discussion of Table 3 below.

[15] We choose caliper size based on Rosenbaum and Rubin (1985) who show that a quarter of the sample standard deviation of the estimated propensity score is the optimal caliper size.

[16] The common-support graph is available from the authors on request.

OLS results, the magnitude of the sponsor-less premium is lower in Model 3 at just over 4%, indicating that over a third of the premium in Model 1 may be due to selection bias.

A limitation of the PSM method is that matching reduces our sample by 37% (from 1,924 to 1,514 observations) because of the lack of suitable matches between sponsored and sponsor-less deals. Consequently, we adopt an alternative approach that is similar to PSM but uses our full sample. Following recent papers in leading academic journals (e.g., Chapman, Miller and White 2019, McMullin and Schonberger 2020), we use entropy balancing to examine whether performance differences between sponsor-less and sponsored deals are explained by observable differences in deal characteristics. As with PSM, entropy balancing achieves balanced covariates between sponsor-less (treatment) and sponsored (control) deals along several dimensions. Specifically, we match on portfolio-company industry, sales and assets. Unlike PSM, the entropy-balancing technique preserves our full sample and ensures covariate balance between the treatment and control observations by re-weighting observations such that, after weighting, the means and variances of the deal characteristics are identical for the treatment and control groups.[17] In addition, entropy balancing has higher model efficiency and less first-stage model dependency than PSM (Hainmueller 2012). The results, reported in Model 4 of Table 2 (Panel A), show that sponsor-less deals earn a premium of 4.9 percentage points, consistent with our PSM results (Model 3). Overall, these results suggest that sponsor-less deals generate a premium of around 5-6 percentage points over equivalent sponsored deals after controlling for deal characteristics observable at the time of investment.

Several potentially important limitations remain in this initial multivariate analysis. Our analysis controls for observable deal and company characteristics that are related to risk. However, it is possible that there are additional sources and dimensions of risk that are not observable and yet influence our analysis resulting in endogeneity. Besides selection bias, endogeneity may be due to reverse causality (if the choice between sponsored and sponsor-less investing is driven by investors' expectations of deal performance) or other reasons such as omitted variables. To address this concern

[17] The entropy method works by first determining the distributional properties (i.e. mean and variance) of the treatment observations. These distributional properties become the target distributional properties of the post-weighting control sample (the balance conditions). The algorithm proceeds by first assigning possible weights to control observations and then testing whether the balancing conditions are satisfied (i.e., the distributional properties of the treatment and post-weighting control observations are identical). This process is repeated over multiple iterations until a set of weights is found that satisfies the balance conditions. While the control observations are assigned a positive weight that may be greater or less than one, the treatment observations are not re-weighted and retain their default weighting of one.

empirically, we estimate a two-stage instrumental-variable (IV) model using GMM. The first stage involves estimating a model with the dependent variable *Sponsor-less*. Since *Sponsor-less* is binary, we cannot estimate a standard two-step GMM model. Instead, we use an alternative approach designed to avoid the 'forbidden regression' (e.g., Wooldridge 2000, Cameron and Trivedi 2005). We first use a Logit model to estimate the probability of a deal being sponsor-less. Next, we estimate a two-step GMM model. As in the Logit model, the dependent variable in Stage 1 of the GMM is the binary *Sponsor-less* variable. The key difference between this model and the standard GMM approach is that in this model we include the predicted probability of a deal being sponsor-less (estimated in the initial Logit Model 1) as an instrumental variable in Stage I. The other instrumental variable in this two-step GMM model is the ratio of the aggregate levels of private debt to private equity, *Debt-to-equity*.

The instrument *Debt-to-equity* is defined, for a given year and country, as the ratio of the aggregate amount of capital committed to private-*debt* funds relative to the aggregate amount committed to private-*equity* funds. The amounts of capital are aggregated across all deals in the home country of the portfolio company in the year of investment. In order to use *Debt-to-equity* as an instrument, we assume that *Debt-to-equity* is significantly related with the dependent variable in Stage I, *Sponsor-less*, but not significantly related with deal performance, the dependent variable in Stage II. We expect that *Debt-to-equity* is associated with *Sponsor-less* because a higher aggregate amount of private debt relative to private equity indicates greater numbers and volumes of debt investors relative to private-equity sponsors. With fewer available VCPE players, private-debt deals will be less likely to be sponsored. In fact, private-debt practitioners have attributed the growth in sponsor-less deals over recent years to the lack of available VCPE sponsors. In short, we expect that sponsor-less investing is more likely when *Debt-to-equity* is high. The results of the Logit model in Stage I are presented in Table 3 and show that, as expected, the instrumental variable *Debt-to-equity* is significantly positively related with the probability of a deal being sponsor-less.

In Stage II of our IV model, we examine deal performance with IRR as the dependent variable and the *Sponsor-less* indicator (instrumented based on Stage I) as explanatory variable along with the full range of control variables. Consistent with our earlier results, we find that sponsor-less deals appear to outperform sponsored deals. As discussed earlier, the results in Table 2 suggest that the IRRs of the sponsor-less deals are between 4–6.5 percentage points higher than those of the sponsored deals.

The results of the IV model in Table 3 show a slightly larger sponsor-less premium of 7 percentage points. As before, we find a sponsor-less premium that is economically and statistically significant (at 1%). The results for the control variables are also broadly similar.

Our IV analysis assumes that the instrument *Debt-to-equity* is not significantly related with the Stage-II dependent variable IRR measuring deal performance. However, it is possible that *Debt-to-equity* in a country-year is related to the current and future performance of debt funds. If investors observe that private-debt deals are performing well in a given country-year, they may crowd into private debt and, in the absence of an offsetting increase in private *equity*, this would result in higher *Debt-to-equity* in that country-year (or soon after). Hence, there may be a positive correlation between IRR and *Debt-to-equity*. Large inflows into private-debt funds in a given year may result in 'money chasing deals' and disappointing deal performance in the future as the supply of good investment opportunities is limited (Gompers and Lerner 2000). If the large debt inflows are associated with higher Debt-to-equity (because the private-debt inflows are not matched by similar private-equity inflows), this would result in a negative correlation between IRR and the lagged level of *Debt-to-equity.*[18] We address these concerns in two ways. First, we perform rigorous diagnostic tests whether *Debt-to-equity* is a valid instrumental variable and our IV model is well specified. Next, we conduct a robustness check using a measure of individual deal performance that is adjusted for variations in the aggregate performance of the private-debt industry and hence less correlated with fund inflows and consequently with *Debt-to-Equity* than (unadjusted) IRR. Our results remain robust, and given our broad range of robustness checks and diagnostic tests we are confident that they are not misleading. Nevertheless, we acknowledge that as in most IV analyses, instrument-quality may still be an issue in our analysis, and hence our results need to be interpreted with caution in the context of our overall analysis.

To test whether *Debt-to-equity* is a valid instrumental variable and our IV model is well specified, we use three common diagnostic tests for the GMM assumptions: (1) the Hansen j-test for over-identification of our instrumental variable, (2) a relevance test to assess whether excluding the instrument from Stage II is valid, and (3) the exclusion criterion, where we assess the orthogonality of the instrument to the error term in Stage II. The statistics of the Hansen j-test is 2.29, lower than the critical value. This indicates the model is over-identified and thus consistent with the GMM

[18] We thank the anonymous reviewer for clarifying this issue.

assumptions. The relevance test rejects the null hypothesis that *Debt-to-equity* is a weak instrument, and we conclude that the instrument is significantly related with the endogenous variable *Sponsor-less*. Finally, the test for the exclusion criterion does not reject the null that the instrumental variable is orthogonal to the error terms, and we conclude that the instrument is not significantly related with the Stage-II dependent variable. Overall, the diagnostic tests show that our IV model is well specified. The exclusion test that demonstrates that *Debt-to-equity* does not significantly impact deal performance also indicates that money chasing deals is unlikely to explain our results.

Despite these diagnostic tests, readers may still question whether *Debt-to-equity* really satisfies the exclusion criterion. As discussed above, *Debt-to-equity* in a given country-year may be correlated with the past and present performance of private-debt funds because variations in individual deal performance are correlated with aggregate performance of the private-debt industry. We address this by decomposing IRR into a systematic part that is related to aggregate (industry-, country-, year-specific) performance, and a residual or 'excess' part of IRR that is unrelated with aggregate performance by construction. For each subsample relating to a given industry, year and country, we calculate the average IRR within this subsample. For each individual deal in a given industry, year and country, we calculate the excess IRR as IRR minus the corresponding subsample average. We expect that the excess IRR has little correlation with current or lagged fund flows and hence with current and past values of *Debt-to-equity*. We confirm that in our sample the correlation between the variables *Excess IRR* and *Debt-to-equity* is low (0.088). We re-estimate the IV model in Table 3 using *Excess IRR* (instead of the unadjusted IRR) as the dependent variable in Stage II of the GMM model. The results using *Excess IRR* are qualitatively unchanged in that the Sponsor-less coefficient remains positive and highly significant albeit slightly lower (around 1 percentage point lower) than in the corresponding analysis using unadjusted IRR.[19]

Finally, we conduct a Heckman analysis. The first stage of the Heckman model is again the Logit model in the first column of Table 3. The second stage (in the final column of Table 3) includes the Inverse Mill's ratio derived from the Logit model. The Heckman results are in line with previous findings, and the sponsor-less premium is even slightly higher at 8 percentage points. Overall, the results in Table 3 are in line with the earlier estimates using OLS, PSM and entropy balancing in Table 2. The robustness of our results inspires us with confidence that any bias due to endogeneity in

[19] The results are available from the authors but are not reported here for the sake of brevity.

our baseline results or due to the invalid instruments in our IV analysis are likely to be negligible. Based on our results so far, we accept Hypothesis 1.

For robustness, we re-estimate all the models in Tables 2 and 3 using the investment multiple as an alternate performance measure besides IRR. The results are reported in Table OA4 in the Online Appendix. The estimated coefficients of the Sponsor-less variable in Table OA4 are consistently positive and statistically highly significant ranging from 0.1029 (in the PSM model, Model 3 in Table OA4) to 0.1381 in the IV model (Model 5). These results confirm our earlier findings based on IRR.

(TABLE 3 HERE)

(TABLE 4 HERE)

In addition, we examine whether this premium changes over time. We investigate deal performance by decade in our sample period and during selected subperiods. Using the 1980s as the base, the subsequent decade (1990-1999) coincides with the rise of private-debt funds. The following decade (2000-2009) spans periods of boom and bust, including the Global Financial Crisis, while the final half-decade (2010-2015) reflects the post-crisis period. The period 1997-2000 captures the internet bubble, and the years 2002-2006 comprise the bubble in the debt markets. By contrast, the period 2007-2009 captures a crisis originating in debt markets that grew into the Global Financial Crisis. To examine the performance differential between sponsored and sponsor-less deals during these periods, we interact dummy variables for each of the given periods with the sponsor-less dummy. The models also include the un-interacted time dummies to control for the performance of private debt overall in a given period. We conclude that the sponsor-less premium is present during most of our sample period. Focusing on the bubble and (post-) crisis periods, we find that the premium is particularly high during the debt-market bubble (2002-2006) and the post-crisis period (2010-2015). By contrast, sponsor-less debt underperforms sponsored debt during the Global Financial Crisis with a discount of almost 2 percentage points. Detailed discussions and the results of the analysis of the performance over time are reported Section OA3 in the Online Appendix. Finally, in unreported results, we examine whether the sponsor-less premium differs across countries and regions. We find that the results in each region are broadly consistent with those of our original baseline analysis. Overall, our results show that the sponsor-less premium is not an isolated phenomenon in a specific region but

instead is of similar magnitude across all Western markets. Furthermore, our results are not driven by the subsample of North American deals during 2010-2015.[20]

4.4 Sources and Costs of Risk and Risk Mitigation

Overall, our results in Tables 2-3 show that sponsor-less deals appear to outperform sponsored deals, consistent with Hypothesis 1. Although this analysis does control for a range of firm and deal characteristics, likely related to transaction costs and risk, it does not fully control for risk. Next, we examine whether there is a systematic difference in risk between sponsored and sponsor-less deals, which may explain the performance differential. We start by examining the risk of default, the main source of risk facing debt investors. Default is defined as the money earned by lenders upon exit being less than the money they invested. Table 4 examines the determinants of default for sponsored and sponsor-less deals. To investigate whether default differs between sponsored and sponsor-less deals, we estimate a Logit model where the dependent variable is the default dummy that equals one if the multiple of money earned over money invested is below one, and zero otherwise.[21] Our results show that the sponsor-less deals have a statistically significantly higher probability of default than the sponsored deals. The marginal effect of the *Sponsor-less* variable indicates that the sponsor-less deals have a probability of default that is between 3.5 and 4.5 percentage points higher than that of the sponsored deals (in Models 1-4). We control for several deal characteristics related to risk, specifically whether the debt fund acts as lead investor in a given deal (Model 2), whether the debt fund takes a seat on the portfolio-company board (Model 3), and both (Model 4). We also estimate a model that includes the leverage (debt/total assets) of the portfolio company immediately post-investment to examine whether the sponsor-less effect we observe is potentially due to the lower leverage of sponsored companies given their access to equity funding from VCPE sponsors. The coefficient of leverage in Model 5 is statistically significant but only at 10%. It is not surprising that leverage is of limited significance given that the default risk of the typical portfolio company is low.

[20] The regression results by regions and for the reduced sample excluding North American deals during 2010-2015 are not reported here for the sake of brevity but are available from the authors upon request.

[21] The Logit models in Table 4 include indicators of country, industry and year following the approach commonly used in the literature. Examples of such studies in leading academic journals include Dai, Jo and Kassicieh (2012) and Cumming and Zhang (2019). However, non-linear models with many fixed effects may yield inconsistent estimates. To check robustness, we repeat our analysis of default with varying sets of fixed effects. The robustness checks confirm that our results remain qualitatively unchanged when we include either no indicators or only one set of indicators (country, industry or year) at a time. These results are available from the authors on request.

It appears that the cost of debt is flat across the capital structures across which private-debt investors in our sample invest. The other results in Model 5 are qualitatively the same as those in the earlier models. The coefficients of *Sponsor-less* in Model 4 and 5 are not statistically significantly different (based on a t-test with p-value: 0.321).

Overall, the results in Table 4 on default risk, and the earlier results on the sponsor-less premium in Tables 2 and 3, are consistent with the risk-return trade-off. In other words, the sponsor-less premium can, at least in part, be rationalised as compensation for higher default risk. We conclude that our results are consistent with Hypothesis 2 that sponsored deals have lower default risk (controlling for deal characteristics).

(TABLE 5 HERE)

Hypothesis 3 predicts that investors will structure sponsor-less deals in systematically different ways due to their higher risk, information asymmetries and agency costs, including setting higher interest rates. We focus on two widely used types of contractual arrangements relating to interest payments in private-debt deals, namely common interest and PIK. As we noted in the univariate analysis in Table 1, most of our sample deals use either current interest or PIK (or both). We investigate whether the chosen types and levels of interest rates differ between sponsored and sponsor-less deals. Since the decision to use current interest or PIK is determined by the negotiations between private-debt investors and companies, the sample of deals that use current interest or PIK is subject to sample selection bias. Specifically, Hypothesis 3(a) predicts that PIK is less likely to be chosen in sponsor-less deals due to the higher interest-rate and default risk attached to PIK. Hence, we estimate two Heckman models: one for current interest reported in Panel A and another for PIK in Panel B of Table 5. The binary model in Stage I of the Heckman model determines the adoption of a given interest-rate type, while the linear model in Stage II estimates the interest-rate level conditional on the given interest-rate type being adopted. In Panel A of Table 5, we estimate the probability that managers choose current interest (either by itself or alongside PIK), while in Panel B we estimate the probability that they choose PIK (by itself or together with current interest).

In Stage I (but not in Stage II), we include the (natural logarithm of the) aggregate amount of capital committed to all private-debt funds in a given country and year. We collect this information from *Preqin*, and for a given deal, we observe this variable in the year of investment and the home country

of the portfolio company. We expect that the choice between current interest and PIK to depend on debt-market conditions. If the aggregate amount of capital committed in all private-debt funds is high, there will be more funds chasing fewer deals. In these conditions, private debt funds may be under greater pressure to accept PIK to secure deals. Similarly, when the capital committed is low, there will more deals and fewer debt funds. In these conditions, debt funds can use their greater bargaining power to insist on current interest as the safer option. Hence, we expect that the aggregate capital committed to debt funds (*Ln Aggregate Debt*) to be associated with a higher probability of PIK relative to current interest. The variable is statistically significant in Stage I in both Panels A and B of Table 5.

The results of Stage I in both panels of Table 5 show that sponsor-less deals are significantly more likely than sponsored deals to use current interest (although the difference here is small at only half a percentage point). Conversely, they are also significantly less likely to use PIK, with a difference in likelihood of over 2 percentage points. Consistent with Hypothesis 3(a), this indicates that private-debt funds investing in sponsor-less deals prefer regular interest payments to a lump sum upon repayment of the principal. Based on the results of Stage I, we determine the inverse Mill's ratio which is then included in Stage II, where we examine the impact of *Sponsor-less* on the interest-rate level.

The results of Stage II in both panels of Table 5 show that the interest-rate levels are significantly higher in the sponsor-less deals, controlling for company and deal characteristics and for sample selection. The inverse Mill's ratio is statistically significant in both panels, which suggests the presence of sample selection bias. Overall, consistent with Hypothesis 3(b), our results show that the interest rate charged by private-debt funds is higher in sponsor-less than sponsored deals. The difference is greater in the case of PIK where the differential is almost 1.5 percentage points (or 150 basis points) than for current interest where the difference is less than 1 percentage point at around 80 basis points.

(TABLE 6 HERE)

To sum up our results so far, the significant difference in default risk between sponsor-less and sponsored deals (that we report in Table 4) suggests that the higher interest rates and less risky interest-rate arrangements in sponsor-less deals compensate investors for higher risk. Having

examined risk compensation, our analysis next examines the methods available to debt investors for risk *mitigation*. Specifically, we examine debt investors' decisions to include equity stakes and warrants (options on the company's equity, priced mostly at a nominal price) in private-debt deals. In sponsored investments, debt funds may rely on the VCPE sponsor to affect internal change and make improvements if the company underperforms. In sponsor-less investments, debt funds are likely to take equity stakes or warrants to increase their control over the portfolio company, align incentives and participate in the company's upside risk. Based on Hypothesis 4, we expect the levels of equity and warrants to be higher in sponsor-less deals than sponsored deals.

We find that sponsor-less investors take higher equity stakes, both through direct investments in equity stakes in the portfolio company and through investments in warrants that are subsequently exercised. We focus on direct equity stakes first. The dependent variable in Table 6 is *Direct Equity,* defined as the percentage of equity in the portfolio company that the fund acquired through direct investments in equity. The coefficient of the *Sponsor-less* variable in Model 1 is highly statistically significant. In economic terms, we find that debt investors in sponsor-less deals take equity stakes that are about one percentage point higher than in sponsored deals. Model 2 in Table 6 shows that the extra 1% equity stake held by sponsor-less investors is of a similar magnitude to that of lead investors. Overall, these results are consistent with Hypothesis 4(a).

(TABLE 7 HERE)

The difference in equity stakes between sponsored and sponsor-less deals may seem relatively small when we focus on direct equity stakes acquired (the results in Table 6 suggest it is around 1%). However, private-debt investors acquire further equity stakes through their exercise of warrants. Our data on the proportion of private-debt funds that use warrants as part of the overall deal structure (i.e., 36.9%), and our analysis in Table 7, suggest that private-debt investors acquire substantial equity stakes through warrant exercise. We adopt a Heckman sample selection approach in which Stage I models whether a given deal includes warrants or not, using the full sample. We find that the probability of including warrants is significantly higher in the sponsor-less deals, with a difference of over 6 percentage points.

Using the subsample of deals that include warrants, Stage II estimates *Post-Deal Equity*, the percentage equity stakes held by private-debt investors as a result of exercising warrants they

acquired in the deal. Including the inverse Mill's ratio to correct for sample selection in Stage II, we find that the sponsor-less deals have significantly higher warrant ownership than the sponsored deals. The difference is both statistically significant (at the 1% level) and economically significant in that investors in the sponsor-less deals end up holding equity stakes around 7 percentage points higher due to warrant exercise than investors in the sponsored deals. The result remains qualitatively unchanged when we control for debt funds acting as lead investors or taking board seats in portfolio companies.

In sum, we find that investors in sponsor-less deals take significantly higher equity stakes, both directly and through warrant exercise, than investors in sponsored deals. We argue that sponsor-less investors use higher equity stakes as part of a more hands-on investment approach aimed at mitigating risk and transaction costs. Our results are consistent with Hypotheses 4(a) and 4(b).

(TABLE 8 HERE)

4.5 Risk Mitigation and Deal Performance

Our analysis started by showing significant differences in deal performance between sponsored and sponsor-less deals. Next, we found that sponsor-less investors adopted a more hands-on investment approach, involving higher equity stakes, greater use of warrants, and representation on company boards. We argued that this serves to emulate the role of VCPE sponsors in mitigating risk. To test Hypothesis 5, we revisit our analysis of deal performance. In our earlier analysis we aim to compare deals that are equivalent in terms of their intrinsic pre-deal risk and therefore match sponsor-less and sponsored deals using portfolio company characteristics (industry, assets and sales). In the current analysis, we aim to compare deals not just based on *ex ante*, pre-deal risk but based on *ex post* risk after risk mitigation. In Section 4.3, we show that sponsor-less lenders are more likely to use contracting and monitoring mechanisms to mitigate deal risk. As Table 1 showed, 8 out of 10 sponsor-less lenders choose to be on the board of their portfolio company or be a lead investor. By contrast, among lenders in sponsored deals only about half take this hands-on approach. In order to capture the differential approach to risk mitigation taken by lenders in sponsored and sponsor-less deals, we match sponsor-less and sponsored deals using key indicators of risk-mitigating

mechanisms (lead investor, board seat number of tranches and investment size) as well as a range of control variables.

We employ the entropy-balancing method which involves matching sponsor-less deals with equivalent sponsored deals. Our approach is similar to that in Section 4.2 and Table 2 but differs in terms of the variables we use to match the treatment and control groups. Specifically, we match here based on whether the lender takes a board seat and acts as the lead investor as well as the size and the number of tranches of a deal, in addition to portfolio-company sales, assets and industry. Using the sample of observations matched in this way, we re-examine the determinants of deal performance. The results presented in Table 8 show that there are no longer any significant differences in performance between sponsor-less deals and comparable sponsored deals, after controlling for observable differences in risk mitigation and deal characteristics.[22] Overall, consistent with Hypothesis 5, these results show that the premium to sponsor-less investors compensates them for risk and mitigating risk through contract design and monitoring.

(TABLE 9 HERE)

4.6 Risk Diversification

So far, our analysis has focused on risk compensation and mitigation from the private-debt funds' perspective. Next, we examine risk compensation and mitigation from the perspective of well-diversified investors in private debt funds such as the limited partners of private debt funds, including pension funds and other institutional investors. Such well-diversified investors are exposed to systematic risk but are able to diversify any idiosyncratic risk. We estimate the systematic risk of sponsored and sponsor-less deals based on the Capital Asset Pricing Model (CAPM). We use annualised deal IRRs as proxies of the security returns and returns on the Bloomberg bond index for the home country of each portfolio company as the corresponding market returns. We estimate the alpha and beta as the intercept and slope of the characteristic line. The alpha measures the outperformance of the investment relative to the market, and the beta measures the sensitivity of the investment return with respect to variations in the market return. We estimate the measures for sponsored and sponsor-less deals separately. We report the results in Panel A of Table 9.

[22] Panel B of Table 8 reports descriptive statistics confirming that post-entropy-balancing, the treatment and weighted control samples are indeed balanced.

The key result of our analysis is that the differences in alpha and beta between sponsored and sponsor-less deals are not statistically significant. This indicates that well-diversified investors expect the same risk-return trade-off from sponsored and sponsor-less debt. Well-diversified investors appear not to expect a premium for bearing any additional risk of sponsor-less deals over and above the risk of sponsored deals, which suggests that this incremental sponsor-less risk is diversifiable (idiosyncratic). Our earlier analysis explored the contractual and monitoring mechanisms that private debt-fund managers use to mitigate the risk of sponsor-less investing. The present result suggests that in addition to risk mitigation, fund managers can diversify the incremental risk of sponsor-less lending. This finding that sponsor-less risk is idiosyncratic and can be diversified as well as mitigated has important implications for debt-fund managers. It is also of interest to investors in private-debt funds (limited partners, etc.). Fund investors are concerned with fund-level rather than deal-level risk. While our analysis is at deal level, our finding that deal risk is diversifiable implies that the incremental sponsor-less risk is also diversifiable at the fund level.

A potential concern with the analysis in Panel A of Table 9 is our use of gross IRR. As fund investors receive returns *net* of fees, *gross* IRR are likely to overstate the returns to private-debt investors. Moreover, it is possible that fees differ significantly between sponsored and sponsor-less deals depending on the level of a fund's involvement in the portfolio company.[23] Hence, the appropriate measure of return for this analysis is *net* IRR (after deducting management fees and carried interest). Unfortunately, data on net IRR are available only for a subsample of 683 deals (159 sponsor-less and 524 sponsored deals). We repeat our earlier analysis based on this subsample using net IRR in Panel B of Table 9. For comparison, and to examine whether any changes in results are due to sample choice, we also repeat the analysis for gross IRR (see Panel C of Table 9).[24] We find that the results are consistent with our original analysis in Panel A of Table 9 in that the differences in alphas and betas between sponsor-less and sponsored deals remain statistically insignificant in either Panel B or Panel C. This confirms our earlier interpretation that the incremental risk of sponsor-less investing appears to be diversifiable.

[23] We thank the anonymous reviewer for drawing our attention to this.

[24] We thank the anonymous reviewer for this suggestion.

These results should not be interpreted as an indication that private debt outperforms the bond market. In terms of the levels of the estimated alphas (that indicate abnormal performance), we find that for both sponsored and sponsor-less deals they are lower using net IRR in Panel B as compared to using gross IRR in Panels A and C. For both sponsor-less and sponsored deals, we find statistically significant alphas using gross IRR (Panels A and C) but insignificant alphas using net IRR (Panel B). This is not surprising as gross IRR likely overstates the returns to private-debt investors. In conclusion, our results provide no conclusive evidence that private debt outperforms the bond-market benchmark.

(TABLE 10 HERE)

4.7 Alternative Explanations and Further Analysis

After examining debt-fund investing from the investors' perspective in the previous section, we next consider the possibility of agency conflicts between debt funds and VCPE sponsors as an alternative and complementary explanation for our finding of a positive sponsor-less premium.[25] This explanation builds on Fang, Ivashina and Lerner (2015) who find that direct private-equity investments by institutional investors outperform the same institutional investors' co-investments with private-equity firms. They conclude that their findings appear to be due to private-equity firms' propensity to invite institutional investors to co-invest in larger and riskier deals that tend to have lower performance. In the context of private-debt investing, similar agency conflicts may arise between informed VCPE sponsors, who have access to private information about the quality of portfolio company, and uninformed private-debt investors in sponsored deals. The basic agency conflicts between the providers of debt and equity (the latter include VCPE sponsors) are outlined in Smith and Warner (1979). Based on the results of Fang et al. (2015), informed sponsors may have an incentive to involve more private-debt investment in larger and lower-quality deals. This would result in lower returns for private-debt investors in sponsored deals affected by these agency conflicts relative to other deals, particularly relative to sponsor-less deals, which might account for our observation of a premium on sponsor-less deals.

[25] We are grateful to our anonymous reviewer for drawing our attention to these potential agency conflicts, and for inspiring the discussion in this section.

This new explanation and our existing explanation (that the sponsor-less premium serves to compensate sponsor-less debt investors for bearing and mitigating the risk of sponsor-less investing) are not mutually exclusive. However, while our previous analysis focuses on the additional risks of sponsor-less investing, and hence on the subsample of sponsor-less deals relative to the benchmark of sponsored deals, this agency explanation surrounding conflicts between debt-fund investors and sponsors focuses instead on the subsample of sponsored deals.

Assuming that there are agency conflicts between self-interested, informed sponsors and uninformed providers of private debt, these agency conflicts are likely to be particularly severe for inexperienced private-debt funds. Hence, we expect a positive association between the level of experience of a debt fund and the returns it earns (IRR). We measure fund-manager experience using the so-called fund-sequence number (e.g., Kaplan and Schoar 2005, Phalippou and Gottschalg 2009). A fund-sequence number of 1, 2 or 3 indicates that the fund is the first, second or third fund, respectively, of a given fund-management firm. We collect fund sequence numbers from CEPRES and find that the vast majority of debt-fund managers in our sample are experienced: the first and second lowest deciles of the fund-sequence number are 5 and 7, respectively. The median fund-sequence number for the debt funds involved in sponsored deals is 9. For our analysis, we code a binary indicator of debt-fund inexperience that equals one if a debt fund has below-median fund-sequence number and zero otherwise. We find 30.8% of our debt funds to be inexperienced (i.e., below median).

The potential agency conflicts between debt providers and VCPE sponsors may be mitigated when the sponsor is more reputable. Reputable sponsors may risk losing their valuable reputational capital if they are seen to exploit private-debt investors (Fang et al. 2015). Hence, we would expect a positive association between sponsor reputation and debt-fund returns (IRR). Conversely, if the sponsor's reputation inspires trust with debt funds, a reputable sponsor may have access to cheaper private debt. This may result if trust reduces the agency costs of debt that arise from the conflict of interests between the sponsor and debt funds. Moreover, some sponsors may have built up a reputation for getting the best deal for portfolio companies even at the expense of debt funds. Such reputable sponsors may use their experience to press down the return available to debt-fund

investors.[26] The latter two arguments suggest that we should expect more reputable or experienced VCPE sponsors to be associated with private-debt funds earning lower returns (IRR).

For the VCPE sponsor, we interpret a higher fund-sequence number as an indicator not just of greater experience but also of 'better' reputation.[27] We find that the VCPE sponsors in our sample have a median fund-sequence number of 11. As a measure of VCPE sponsor reputation in our analysis, we code a binary indicator that is one for VCPE sponsors with above-median fund sequence numbers and zero otherwise. We find 27.4% VCPE sponsors to be reputable (above-median).

Finally, we would expect any agency conflicts to be ameliorated if the sponsor and the private-debt fund are affiliated (Fang, Ivashina and Lerner 2013). Consequently, we collect data from CEPRES to construct an indicator of affiliation between the private-debt funds and the VCPE sponsor for our full sample. This affiliation indicator is coded one for sponsored deals that are backed by at least one private-debt fund that is affiliated with the VCPE sponsor and zero otherwise. We find only 68 out of the 1065 sponsored deals in our sample involve affiliated sponsors.[28]

To test our predictions regarding debt-fund experience, VCPE reputation and affiliation, we focus on the subsample of sponsored deals and estimate a model of IRR that includes a binary indicator of the private-debt investor's inexperience coded one for debt funds with below-median fund-sequence number. This analysis is similar to our baseline analysis (in Table 2) but excludes the sponsor-less indicator as the model is estimated using only the subsample of 1065 sponsored deals. We address the potential selection bias due to excluding sponsor-less deals by estimating a two-stage Heckman model in addition to using OLS. The first stage of the Heckman model is the same as Stage I of the IV model in Table 3, except that the dependent variable is now coded one whenever a deal is

[26] We thank the anonymous reviewer for drawing our attention to this argument.

[27] Previous studies (e.g., Metrick and Yasuda 2010) use fund sequence as a measure of experience, while others (e.g., Tian 2012) use as a measure of reputation. To the best of our knowledge, the literature has not settled on a universally accepted measure to identify experience and reputation of VCPE. Hence, we use the fund sequence as a measure of both experience and reputation of the VCPE sponsor.

[28] In addition to this extended analysis of the sponsored subsample, we also check whether our previous analyses using the full sample (of both sponsored and sponsor-less deals) are robust to controlling for the affiliation between the sponsor and debt funds. We include the *Affiliated* indicator in our earlier models of IRR, investment multiple, default, interest rate levels and direct and post-deal equity holdings. We find our previous results to be robust. The results are not reported here for the sake of brevity but are available from the authors.

sponsored, and zero otherwise. The results are reported in Online Appendix Table OA6 and indicate that neither debt-funds' inexperience nor VCPE sponsors' reputation has any economically or statistically significant impact on IRRs. The coefficient of the indicator of affiliation between the debt fund and the sponsor is estimated as 0.015 and is statistically significant but only at 10%. This suggests that the premium from investing with an affiliated VCPE sponsor is small at only 1.5%. This is substantially smaller than the sponsor-less premiums we report in Tables 2 and 3. These results suggest that any agency conflicts between VCPE sponsors and debt investors are unaffected by VCPE sponsors' reputations and debt-fund experience.[29] Based on our results it seems unlikely that the impact on IRRs of the agency conflicts between VCPE sponsors and debt funds are sufficiently large and significant to account for the sponsor-less premium we observe in our earlier analysis. Therefore, we conclude that agency conflicts between debt-fund investors and sponsors do not drive our earlier results on the sponsor-less premium.

5. Conclusion

Our study provides a comprehensive analysis of sponsor-less and sponsored private debt. Both have been economically significant sources of finance and asset classes for decades and have been under-explored despite their substantial and growing size and economic impact. A better understanding of these asset classes will promote the future development of the private-debt market.

In this study, we examine the roles of private-debt funds and VCPE backers ('sponsors') and their impact on the performance of sponsored and sponsor-less debt. Using a novel proprietary dataset of private-debt deals over the past three decades, we identify and explain the systematic differences in performance and investment approach between sponsored and sponsor-less deals. Our initial analysis suggests that sponsor-less deals generate higher IRR and investment multiples, and this sponsor-less premium is around 5 percentage points. On the other hand, sponsor-less lending is associated with higher default risk. We examine interest-rate levels and contractual arrangements and find that lenders are compensated for higher sponsor-less risk not only through higher levels of interest rates

[29] In unreported robustness checks, we use alternative measures of debt-fund inexperience and sponsor reputation. This includes measuring inexperienced debt fund as having fund-sequence numbers in the bottom quartile, and reputable sponsors having fund-sequence numbers in the top quartile. Alternately, we define inexperience as being a first fund rather than a follow-on fund, and reputation as being a follow-on fund. We thank the anonymous reviewer for suggesting this alternative definition. In either case, we find the results to be statistically insignificant. The results are available from the authors on request.

but, more interestingly, also through contractual interest-rate arrangements that are less risky. Our results show that sponsor-less investors adopt a more hands-on investment approach involving higher equity stakes and other costly risk-mitigating mechanisms. We find that the sponsor-less premium compensates lenders for bearing the additional default risk and the costs of risk mitigation involved in sponsor-less lending.

Our findings have important lessons for private lending. Private debt is an essential source of financing that is bound to play a key role in rebuilding the economy following the Covid-19 pandemic. A better understanding of sponsor-less investing is essential for the future development and expansion of private-debt markets. Our results reveal that the hands-on approach developed by VCPE providers to mitigate investment risks in investee companies has been successfully adopted and adapted by private-debt funds investing in sponsor-less debt. Nevertheless, we find that the performance of sponsor-less debt is more cyclical than that of sponsored debt resulting in a narrowing of the sponsor-less premium during adverse periods in the debt market and a widening during favourable periods. During the Global Financial Crisis, which originated in credit markets, the risk-mitigation measures developed by sponsor-less investors appear to have been inadequate to deal with the heightened risk in credit market.

The results of our study are also relevant to companies seeking alternative sources of finance, including novel and innovative sources of debt such as venture lending, peer-to-peer lending and other forms of direct lending. A key insight of our study is that managers of private companies need to recognise the wide and increasing range of alternative types of lenders, and to understand these lenders' approaches to risk compensation and risk mitigation.

Examining the performance of sponsor-less and sponsored debt from the point of view of diversified investors, we find that the incremental risk of sponsor-less lending is not systematic and does not attract a risk premium. This result is of interest to large numbers of institutional investors given that a growing majority of institutional investors are investing in private debt (Rajan 2015). These investors may worry about being exploited by self-interested, unreputable sponsors but our results suggest that these fears are likely to be unfounded as we find little evidence of agency conflicts between VCPE sponsors and lenders. Our results suggest that there is little difference in the returns earned by debt funds irrespective of their experience, or the sponsor's reputation, or whether the debt fund is affiliated with the sponsor. This inspires confidence in the functioning of the private-debt market.

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Table 1. Descriptive Statistics

This table shows the descriptive statistics for the full sample. *IRR* is the internal rate of return, as calculated by CEPRES from cash-flow data provided by the private-debt fund to the CEPRES database. *Multiple* is the multiple of money earned over money invested in a given deal calculated by CEPRES from cash-flow data provided by the private-debt fund to the CEPRES database. *Default* is a binary variable coded one if the multiple is less than one, and zero otherwise. *Current Interest* can be explained as follows: Private debt tranches that exhibit a debt-like nature (e.g., junior or senior subordinated debt) are typically priced at a certain interest rate, the so-called current interest rate, payable monthly, quarterly, or yearly. This interest rate may be fixed (common in the US) or defined as a spread over a base rate such as Euribor or Libor (common in Europe). Current interest is the least risky return component of a private-debt deal. *PIK* (payment in kind) is another interest rate, typically due on junior debt tranches within private-debt deals, and is either a sole contractual return component or an add-on to a current interest component. PIK is not paid on a periodic basis but deferred and paid in a lump sum upon repayment of the principal, in a similar way to a zero-coupon bond. *Direct Equity* is the percentage of equity in the portfolio company that the fund acquired through (the equity part of) the deal. *Post-Deal Equity* is the percentage of equity in the portfolio company that a private-debt fund could buy through exercising the warrants included in the deal. *Lead investor* is a binary variable coded one if the private debt fund reports that it is the lead investor in the deal, and zero otherwise. *Board seat* is a binary variable coded one if the debt fund takes a board seat in the portfolio company following the investment, and zero otherwise. *Tranches* refers to the structure of the debt deal. Deals are structured to include multiple components or tranches. A higher number of tranches suggests a more complicated deal structure. *Investment size* is the deal size in terms of the amount invested in the portfolio company by a given fund through a given deal (in US$ millions). *Assets* is the total assets of the portfolio company in the investment year (in US$ millions). *Sales* is the sales of the portfolio company in the investment year (in US$ millions). *Fund sequence* indicates that the fund is the *i*th fund for a given fund management firm (e.g., if it is the first fund, the number equals 1); the fund sequence number is used as a proxy for fund-management reputation. *Leverage* is measured as total debt divided by the total asset immediately after debt financing. All variables are defined in Table OA2. T-test and Z-test measure the difference in the mean and median values respectively. ***, ** and * indicate 1%, 5% and 10% significance levels.

	Mean	***Median***	***STD***
Descriptive Statistics			
IRR	0.198	0.180	0.256
Multiple	1.509	1.400	0.671
Default	0.071	0.000	0.256
Current Interest (level)	0.097	0.110	0.056
PIK (level)	0.128	0.114	0.101
Direct Equity	0.066	0.031	0.1656
Post-Deal Equity (Warrants)	0.0394	0.010	0.077
Lead investor	0.6318	1.000	0.4823
Board seat	0.5848	1.000	0.6471
Tranches (#)	4.000	3.000	2.000
Investment size ($m)	11.200	8.177	9.334
Assets ($m)	138.000	100.000	12.000
Sales ($m)	97.000	76.200	18.800
Fund sequence	12.898	10.000	3.962
Leverage	0.322	0.314	0.141
No of obs	***1924***		

Table 2. Univariate Analysis

This table shows the descriptive statistics for all the variables, split into sponsored and sponsor-less deals. *Sponsor-less* is a binary variable coded one if the deal is not sponsored and zero otherwise (i.e., sponsored by a PE fund). *IRR* is the internal rate of return, as calculated by CEPRES from cash-flow data provided by the private-debt fund to the CEPRES database. *Multiple* is the multiple of money earned over money invested in a given deal calculated by CEPRES from cash-flow data provided by the private-debt fund to the CEPRES database. *Default* is a binary variable coded one if the multiple is less than one, and zero otherwise. *Current Interest* can be explained as follows: Private debt tranches that exhibit a debt-like nature (e.g., junior or senior subordinated debt) are typically priced at a certain interest rate, the so-called current interest rate, payable monthly, quarterly, or yearly. This interest rate may be fixed (common in the US) or defined as a spread over a base rate such as Euribor or Libor (common in Europe). Current interest is the least risky return component of a private-debt deal. *PIK* (payment in kind) is another interest rate, typically due on junior debt tranches within private-debt deals, and is either a sole contractual return component or an add-on to a current interest component. PIK is not paid on a periodic basis but deferred and paid in a lump sum upon repayment of the principal, in a similar way to a zero-coupon bond. *Direct Equity* is the percentage of equity in the portfolio company that the fund acquired through (the equity part of) the deal. *Post-Deal Equity* is the percentage of equity in the portfolio company that a private-debt fund could buy through exercising the warrants included in the deal. *Lead investor* is a binary variable coded one if the private debt fund reports that it is the lead investor in the deal, and zero otherwise. *Board seat* is *a* binary variable coded one if the debt fund takes a board seat in the portfolio company following the investment, and zero otherwise. *Tranches* refers to the structure of the debt deal. Deals are structured to include multiple components or tranches. A higher number of tranches suggests a more complicated deal structure. *Investment size* is the deal size in terms of the amount invested in the portfolio company by a given fund through a given deal (in US$ millions). *Assets* is the total assets of the portfolio company in the investment year (in US$ millions). *Sales* is the sales of the portfolio company in the investment year (in US$ millions). *Fund sequence* indicates that the fund is the *i*th fund for a given fund management firm (e.g., if it is the first fund, the number equals 1); the fund sequence number is used as a proxy for fund-management reputation. *Leverage* is measured as total debt divided by the total asset immediately after debt financing. All variables are defined in Table OA2 in the Online Appendix. T-test and Z-test measure the difference in the mean and median values respectively. ***, ** and * indicate 1%, 5% and 10% significance levels.

	Sponsor-less		**Sponsored**			
	Mean	**Median**	**Mean**	**Median**		
Univariate Analysis					***T-test***	***Z-value***
IRR	0.232***	0.200***	0.187	0.170	-4.030	-3.110
Multiple	1.598***	1.470**	1.481	1.380	-3.980	-2.350
Default	0.114***	0.000**	0.059	0.000	-4.740	-1.990
Current Interest (level)	0.100*	0.120*	0.096	0.110	-1.750	-1.690
Current Interest (binary)	0.859***	1.000***	0.639	1.000	-3.564	-3.514
PIK (level)	0.146***	0.131***	0.112	0.101	4.11	3.21
PIK (binary)	0.141***	0.000**	0.361	0.000	3.11	2.981
Direct Equity	0.076**	0.032	0.058	0.028	-2.117	-0.441
Post-Deal Equity (Warrants)	0.042**	0.020**	0.031	0.010	-1.981	-1.961
Lead investor	0.811**	1.000	0.577	1.000	-2.117	0.241
Board seat	0.798**	1.000	0.519	1.000	-2.411	0.334
Tranches (#)	5.000**	3.000	4.000	3.000	-2.250	-1.110
Investment size ($m)	11.200	8.896	11.300	8.012	-0.200	-0.110
Assets ($m)	138.000	100.000	137.670	112.500	1.100	-1.300
Sales ($m)	87.000***	62.000	106.000	89.100	-8.410	-5.610
Fund sequence	12.328	10.000	12.038	9.000	-0.381	-0.411
Leverage	0.346*	0.335*	0.314	0.306	-1.731	-1.751
No of obs.	***859***		***1065***			

Table 3: Baseline Analysis of Private-Debt Performance (Internal Rate of Return)

This table shows the results of multivariate analyses of private-debt deal performance in Panel A. Model 1 is estimated using OLS on the full sample. Model 2 is estimated using OLS only on the subsample of realized deals (from 1982-2012). Models 3 and 4 match deals by risk (based on portfolio-company characteristics) using propensity-score matching (PSM) and entropy balancing. The dependent variable is the internal rate of return (IRR) of private-debt deals. The explanatory variable of interest is the binary indicator of sponsor-less investing, *Sponsor-less* (coded one if the deal is sponsor-less, and zero otherwise). All other variables are defined in Table OA2 in the Online Appendix. All models control for industry, country and year fixed effects. Panel B presents the results of the first-stage selection equation which is a Logit model with dependent variable *Sponsor-less*. The model includes all variables included in the Stage-II main equation plus an additional variable *Debt-to-equity*. For a given year and country, *Debt-to-equity* is the ratio of the aggregate amount of capital committed to private-*debt* funds relative to the aggregate amount committed to all private-*equity* funds. The Panel C reports the univariate analysis testing differences in means and medians between sponsor-less and sponsored deals of the matching variables used in the PSM and Entropy-balancing analyses. The figures in brackets are p-values. ***, ** and * indicate 1%, 5% and 10% significance levels. **U**: unmatched; **M**: matched. Nearest-neighbour matching and caliper of (0.066)

Panel A: Multivariate	**OLS (full sample)**	**OLS (realized deals only)**	**PSM**	**Entropy Balancing**
Variables	**Model 1** *Coeff*	**Model 2** *Coeff*	**Model 3** *Coeff*	**Model 4** *Coeff*
Sponsor-less (binary)	0.0644***	0.0512***	0.0401***	0.0496***
	(0.000)	(0.000)	(0.000)	(0.000)
Lead investor	-0.0106***	-0.0100***	-0.0104**	-0.0103***
	(0.000)	(0.000)	(0.023)	(0.003)
Board seat	0.0110***	0.0112***	0.0101*	0.0108**
	(0.000)	(0.000)	(0.085)	(0.014)
Tranches (#)	0.0152***	0.0148***	0.0119***	0.0166***
	(0.000)	(0.000)	(0.000)	(0.001)
Ln Investment size	-0.0079***	-0.0061***	-0.0052*	-0.0062*
	(0.000)	(0.000)	(0.081)	(0.062)
Ln Assets	-0.0029***	-0.0031***	-0.0011**	-0.0013**
	(0.000)	(0.000)	(0.022)	(0.031)
Ln Sales	-0.00218***	-0.00241***	-0.0017**	-0.0020**
	(0.000)	(0.000)	(0.031)	(0.022)
Industry, Country & Year	***Y***	***Y***	***Y***	***Y***
No of obs	***1924***	***1491***	***1514***	***1924***
Adj. R-sq	***0.211***	***0.181***	***0.165***	***0.196***

Panel B: PSM first stage & diagnostics	
	Model 1 *Coeff*
Debt-to-equity	0.1126**
	(0.033)
Lead investor	0.0363***
	(0.000)
Board seat	0.0222**
	(0.025)
Tranches (#)	0.0443***
	(0.000)
Ln investment size	0.0082***
	(0.000)
Ln Assets	0.0021
	(0.263)
Ln Sales	0.0062***
	(0.000)
Industry, Country & Year	***Y***
No of obs	***1924***
Adj. R-sq	***0.196***

Panel C: Univariate analysis reduced sample				
			Sponsor less	***Sponsored***	***T-test***
Assets ($m)	***U***		134.125	130.694	2.11**
	M		132.411	131.884	0.19
Sales ($m)	***U***		90.186	103.102	8.42***
	M		87.221	88.433	0.611
No of obs			***589***	***925***	

Table 4: Instrumental Variable (IV) Model of IRR

This table shows the results of multivariate analyses of private-debt deal performance using a two-stage instrumental-variable approach to address endogeneity. Model 1 is a Logit model with dependent variable *Sponsor-less* (a binary variable coded one if the deal is sponsor-less and zero otherwise). The predicted values from this Logit model are used as instrumental variable in Model 2 which is Stage-I of the two-stage GMM model. Both Models 1 and 2 are estimated as Logit models with dependent variable *Sponsor-less* and both include *Debt-to-equity*. For a given year and country, *Debt-to-equity* is the ratio of the aggregate amount of capital committed to private-*debt* funds relative to the aggregate amount committed to all private-*equity* funds. Model 3 is Stage II of the GMM model with dependent variable IRR and includes *Sponsor-less (Inst)* which is an instrumental variable estimated from Model 3 (GMM Stage I). All other variables are defined in Table OA2 in the Online Appendix. Model 4 is a two-stage Heckman model with Model 1 as the first stage and IRR as the dependent variable in the second stage. All models control for industry, country and year fixed effects. The figures in brackets are p-values. ***, ** and * indicate 1%, 5% and 10% significance levels.

	Model 1 **Logit** **Dep: Sponsor-less**	**Model 2** **GMM Stage I** **Dep: Sponsor-less**	**Model 3** **GMM Stage II** **Dep: IRR**	**Model 4** **Heckman** **Dep: IRR**
Variables	Marginal effects	Coeff	Coeff	Coeff
Debt-to-equity	0.1124**	0.0947**		
	(0.044)	(0.021)		
Sponsor-less (Inst)			0.0694***	0.0811**
			(0.000)	(0.013)
Lead investor			-0.0133***	-0.0215***
			(0.000)	(0.000)
Board seat			0.0110*	0.0221**
			(0.077)	(0.031)
Tranches (#)	0.0483***	0.0532***	0.0150***	0.0230***
	(0.000)	(0.000)	(0.000)	(0.000)
Ln Investment size	0.0081***	0.0057**	-0.0036***	-0.0034**
	(0.000)	(0.016)	(0.000)	(0.022)
Ln Assets	0.0021	0.0028	-0.0013***	-0.0028***
	(0.264)	(0.425)	(0.000)	(0.000)
Ln Sales	0.0062***	0.0056***	-0.0038***	-0.0019**
	(0.000)	(0.000)	(0.000)	(0.031)
Est. Prob. Sponsor-less from Logit		0.2532***		
		(0.000)		
Inverse mills ratio				0.006
				(0.121)
Hansen j-test			***2.29***	
Relevance test			***5.09***	
Exclusion criteria test			***0.544***	
Industry, Country & Year	***Y***	***Y***	***Y***	***Y***
No of obs	***1924***	***1924***	***1924***	***1924***
Adj. R-sq	***0.212***	***0.226***	***0.221***	***0.195***

Table 5: Probability of Default of Private-Debt Deals

This table shows the results of Logit models of default with the dependent variable *Default* coded one if the investment multiple of a given deal is below one, and zero otherwise. *Sponsor-less* is a binary variable coded one if the deal is sponsor-less, and zero otherwise. All variables are defined in Table OA2 in the Online Appendix. All models control for industry, country and year fixed effects. The figures in brackets are p-values. ***, ** and * indicate 1%, 5% and 10% significance levels.

Variables	**Model 1** Marginal effect	**Model 2** Marginal effect	**Model 3** Marginal effect	**Model 4** Marginal effect	**Model 5** Marginal effect
Sponsor-less	0.0342***	0.0455**	0.0357**	0.0447**	0.0445**
	(0.008)	(0.033)	(0.017)	(0.013)	(0.012)
Lead investor		0.00590***		0.00523***	0.00522***
		(0.000)		(0.000)	(0.000)
Board seat			0.0230***	0.0185***	0.0186***
			(0.000)	(0.000)	(0.000)
Tranches (#)	-0.0025	-0.00276	-0.00168	-0.00238	-0.00237
	(0.500)	(0.397)	(0.639)	(0.459)	(0.456)
Ln Investment size	0.000111	-0.00011	7.78E-05	-4.6E-05	-4.6E-04
	(0.842)	(0.824)	(0.882)	(0.923)	(0.924)
Ln Assets	0.00553	0.00485	0.0058	0.00496*	0.00495*
	(0.146)	(0.111)	(0.106)	(0.092)	(0.096)
Ln Sales	0.00376***	0.00355***	0.00258***	0.00285***	0.00284***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Leverage					0.0144*
					(0.072)
Industry, Country & Year	***Y***	***Y***	***Y***	***Y***	***Y***
No of obs	***1924***	***1924***	***1924***	***1924***	***1924***
Pseudo R-sq	***0.109***	***0.119***	***0.144***	***0.156***	***0.160***

Table 6: Current Interest and PIK in Private-Debt Deals

This table shows the results of multivariate analyses of the determinants of interest-rate levels and types using a two-stage Heckman approach. In Panel A, Stage I involves a Logit model with the dependent variable equal to one if a given deal is structured to include current interest either on its own or alongside payment-in-kind (PIK), and zero otherwise (i.e., PIK only). In Stage II of Panel A, the dependent variable in Models 1 to 5 is the level of the current interest rate paid. In Panel B, Stage I involves a Logit model with the dependent variable equal to one if the deal is structured to include PIK (either on its own or together with current interest) and zero otherwise (i.e., current interest only). In Stage II of Panel B, the dependent variable in Models 1 to 5 is the level of PIK paid. *Sponsor-less* is a binary variable coded one if the deal is sponsor-less, and zero otherwise. The *Inverse Mills* ratio is derived from the Stage I estimates. All variables are defined in Table OA2 in the Online Appendix. All models control for industry, country and year fixed effects. The figures in brackets are p-values. ***, ** and * indicate 1%, 5% and 10% significance levels.

Panel A: Current Interest	**Stage I**	**Stage II**				**Panel B: PIK**	**Stage I**	**Stage II**			
		Model 1	**Model 2**	**Model 3**	**Model 4**			**Model 1**	**Model 2**	**Model 3**	**Model 4**
Variables	Marginal effects	Coeff	Coeff	Coeff	Coeff		Marginal effects	Coeff	Coeff	Coeff	Coeff
Sponsor-less	0.0042**	0.00760***	0.00830***	0.00754***	0.00810***		-0.0234**	0.0136***	0.0143***	0.0141***	0.0147***
	(0.041)	(0.000)	(0.000)	(0.000)	(0.000)		(0.038)	(0.000)	(0.000)	(0.000)	(0.000)
Lead investor			0.00419***		0.00523***				0.00148*		0.00238**
			(0.001)		(0.000)				(0.089)		(0.046)
Board seat				-0.00525***	-0.00561***					-0.00242***	-0.00328***
				(0.000)	(0.000)					(0.005)	(0.000)
Tranches (#)	0.0229***	0.0568***	0.0557***	0.0559***	0.0553***		0.0976***	0.0365***	0.0387***	0.0364***	0.0364***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Ln investment size	0.0015***	0.00139**	0.00272**	0.00373***	0.00393***		0.0101***	0.000458***	0.000343***	0.000536***	0.000506***
	(0.000)	(0.049)	(0.012)	(0.001)	(0.000)		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Ln Assets	0.0114***	0.0295***	0.0296***	0.0294***	0.0298***		0.1064***	0.0283***	0.0283***	0.0288***	0.0287***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Ln Sales	0.0008**	0.000437***	0.000420***	0.000616***	0.000629***		0.0005	8.67E-05	0.000104*	0.000136**	0.000156**
	(0.042)	(0.000)	(0.000)	(0.000)	(0.000)		(0.245)	(0.148)	(0.074)	(0.036)	(0.018)
Ln (Aggregate debt)	-0.1312**						0.1041**				
	(0.015)						(0.016)				
Inverse-Mills		0.215***	0.217***	0.218***	0.222***			0.0418***	0.0419***	0.0431***	0.0432***
		(0.000)	(0.000)	(0.000)	(0.000)			(0.000)	(0.000)	(0.000)	(0.000)
Industry, Country & Year	***Y***	***Y***	***Y***	***Y***	***Y***		***Y***	***Y***	***Y***	***Y***	***Y***
No of obs	***1924***	***1673***	***1673***	***1673***	***1673***		***1924***	***1321***	***1321***	***1321***	***1321***
Adj. R-sq	***0.218***	***0.217***	***0.215***	***0.210***	***0.221***		***0.291***	***0.210***	***0.217***	***0.212***	***0.211***

Table 7: Direct Equity Components in Private-Debt Deals

This table shows the results of multivariate analyses of the determinants of direct equity ownership using OLS. The dependent variable is *Direct Equity,* defined as the percentage of equity in the portfolio company that the fund acquires through (the equity part of) the deal. *Sponsor-less* is a binary variable coded one if the deal is sponsor-less, and zero otherwise. All variables are defined in Table OA2 in the Online Appendix. All models control for industry, country and year fixed effects. The figures in brackets are p-values. ***, ** and * indicate 1%, 5% and 10% significance levels.

	Model 1	**Model 2**
Variables	Coeff	Coeff
Sponsor-less	0.01044***	0.01041***
	(0.001)	(0.002)
Lead investor		0.0098***
		(0.000)
Tranches (#)	0.00856***	0.00791***
	(0.000)	(0.000)
Ln Investment size	-0.00204***	-0.00196***
	(0.000)	(0.000)
Ln Assets	-0.0319***	-0.0321***
	(0.000)	(0.000)
Ln Sales	-0.000568***	-0.000623***
	(0.000)	(0.000)
Industry, Country & Year	***Y***	***Y***
No of obs	***1924***	***1924***
Adj. R-sq	***0.212***	***0.213***

Table 8: Warrant Issuance and Post-Deal Equity Ownership (after Warrant Exercise)

This table shows the results of multivariate analyses of warrant issuance and post-deal equity ownership by private-debt investors using a two-stage Heckman approach. Stage I is a Logit model with the dependent variable equal to one if the private-debt deal includes warrants (in 711 out of 1,924 observations) and zero otherwise. In Stage II (Models 1 and 2), the dependent variable is *Post-Deal Equity*, which is the percentage of equity in the portfolio company a private-debt fund could buy through exercising the warrants included in the deal. *Sponsor-less* is a binary variable coded one if the deal is sponsor-less, and zero otherwise. The *Inverse Mills* ratio is derived from the Stage I estimates. All variables are defined in Table OA2 in the Online Appendix. All models control for industry, country and year fixed effects. The figures in brackets are p-values. ***, ** and * indicate 1%, 5% and 10% significance levels.

	Stage I	**Stage II**	
		Model 1	**Model 2**
Variables	Marginal effects	Coeff	Coeff
Sponsor-less	0.0604***	0.0657**	0.0704**
	(0.000)	(0.016)	(0.010)
Lead investor			-0.00169**
			(0.039)
Tranches (#)	-0.0624***	-0.0004	0.0001
	(0.000)	(0.200)	(0.174)
Ln Investment size	0.0010	0.00001	0.0001
	(0.283)	(0.677)	(0.702)
Ln Assets	-0.0049	-0.00242***	-0.00242***
	(0.188)	(0.000)	(0.000)
Ln Sales	0.0010	0.00001	0.0001
	(0.162)	(0.205)	(0.151)
Inverse-Mills		0.0008	0.0011
		(0.530)	(0.456)
Industry, Country & Year	***Y***	***Y***	***Y***
No of obs	***1924***	***933***	***933***
Adj. R-sq	***0.214***	***0.210***	***0.213***

Table 9: Private-debt Deal Performance Controlling for Risk-Mitigation

This table shows the results of multivariate analyses of private-debt deal performance using both IRR and investment multiple (money earned over money invested). The analyses employ entropy balancing as in Tables 2 and OA4 but use a broader range of matching variables comprising indicators of portfolio-company risk as well as of risk-mitigating measures taken by lenders. The dependent variable is the internal rate of return (IRR) in Model 1 and the investment multiple in Model 2. The explanatory variable of interest is the binary indicator of sponsor-less investing, *Sponsor-less* (coded one if the deal is sponsor-less, and zero otherwise). All variables are defined in Table OA2 in the Online Appendix. All models control for industry, country and year fixed effects. Panel B reports the univariate analysis testing differences in means and medians between sponsor-less and sponsored deals of the matching variables used in the entropy-balancing analyses. The figures in brackets are p-values. ***, ** and * indicate 1%, 5% and 10% significance levels.

Panel A: Multivariate	**Model 1**	**Model 2**
	Dep=IRR	Dep=Multiple
Sponsor-less (binary)	0.0081	0.0172
	(0.505)	(0.554)
Lead investor	-0.0099**	-0.0029**
	(0.022)	(0.031)
Board seat	0.01854	0.02854
	(0.150)	(0.21)
Tranches (#)	0.0136*	0.0234*
	(0.088)	(0.063)
Ln investment size	-0.00329*	-0.0028*
	(0.081)	(0.061)
Ln Assets	-0.0011**	-0.0002
	(0.022)	(0.241)
Ln Sales	-0.0013*	-0.0036**
	(0.066)	(0.022)
Industry, Country & Year	***Y***	***Y***
No of obs	***1924***	***1924***
Adj. R-sq	***0.203***	***0.146***

	Sponsor-less		***Sponsored***			
Panel B: Univariate	Mean	Median	Mean	Median	*Mean Diff*	*Median Diff*
Lead investor	0.811	1.000	0.795	1.020	0.016	-0.020
Board seat	0.798	1.000	0.790	0.990	0.008	0.010
Tranches (#)	5.000	3.000	5.050	3.030	-0.050	-0.030
Investment size ($m)	11.200	8.896	11.200	8.807	0.000	0.089
Assets ($m)	138.000	100.000	135.240	102.000	2.760	-2.000
Sales ($m)	83.100	33.000	81.438	33.660	1.662	-0.660
Obs	***859***		***1065***			

Table 10: Risk and Returns of Private-debt Deals

This table shows estimates of Jensen alpha and beta based on the Capital Asset Pricing Model (CAPM). Panel A reports the results for the full sample using *gross* IRR, Panel B reports the results for a subsample using *net* IRR, while Panel C reports the results for gross IRR of the subsample of deals for which we observe net IRR. We use the Bloomberg bond index as the benchmark for deal returns (IRR) to estimate the alphas and betas separately for sponsor-less and sponsored deals. The alpha measures the outperformance of the investment relative to the bond market, and beta measures the sensitivity of deal returns with respect to variations in the bond-market return. The p-values relate to tests of the null hypotheses. The final column (Diff-Coeff) reports test statistics for t-tests of the differences between sponsor-less and sponsored deals in their estimated alphas and betas. ***, ** and * indicate 1%, 5% and 10% significance levels.

Panel A: Gross IRR (Full sample)	**Sponsor-less**		**Sponsor**		***Diff-Coeff***
	Coeff	p-value	Coeff	p-value	t-value
α	0.0241**	(0.021)	0.0231**	(0.032)	0.083
β	1.7401***	(0.000)	1.355***	(0.000)	1.085
Panel B: Net IRR (Subsample)					
α	0.0068	(0.147)	0.0026	(0.211)	1.691
β	1.517***	(0.000)	1.2451***	(0.000)	1.431
Panel C: Gross IRR (Subsample)					
α	0.0174*	(0.062)	0.0168*	(0.071)	0.077
β	1.667***	(0.000)	1.298***	(0.000)	1.022