Risk-Adjusting the Returns to Private Debt Funds *

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Abstract

Private debt funds are the fastest-growing segment of the private capital market. We evaluate their risk and risk-adjusted returns, applying cash-flow-based methods to construct replicating portfolios that mimic their payoffs. A typical private credit fund contains not only credit risk but also equity risk and delivers insignificant abnormal returns to its investors. However, gross-of-fee abnormal returns are positive, and ignoring equity risk also results in positive abnormal returns. The rates at which private debt funds lend appear to be high enough to offset funds' fees and risks, but not high enough to exceed investors' fees and risk-adjusted rates of return.

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JEL Classification: G12, G21, G23

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1 Introduction

Private debt is the fastest growing asset class in private capital markets, with about $1.8 trillion assets under management by 2024 (Pitchbook, 2025). Although various financial institutions less regulated than commercial banks (henceforth *nonbanks*) –e.g., finance companies, investment banks, insurance companies, and hedge funds– provide direct loans to firms, the most important participant in this lending market is private debt funds. These funds raise money from investors –i.e., limited partners (LPs)– and provide mostly direct loans to firms that typically cannot get bank loans based on their creditworthiness (Block et al. (2024)). However, surprisingly little is known about this market, especially the risks and risk-adjusted returns of private debt funds.

Market participants tout the high returns of private credit relative to their risks, claiming they offer better returns than traditional types of lending. For example, Steve Schwarzman, the co-founder of Blackstone, commented on private credit: "If you can earn 12 percent, maybe 13 percent on a really good day in senior secured bank debt,... with almost no prospect of loss, that's about the best thing you can do" (Financial Times, 2023). However, most debt funds make loans that are substantially riskier than Schwarzman's characterization of them. Higher risk is due not only to the riskier loans these private *debt* funds specialize in, but also to the significant *equity* investments they make. It is not at all clear whether, in practice, private debt funds' returns are sufficiently large to offset their risk.

Given the dramatic increase in capital that has been allocated to private debt in recent years, investors clearly believe that private credit returns justify their risk. Academic research, however, has been silent on the question of whether, in practice, net-of-fee and risk-adjusted returns are high enough to create significant *alpha* for funds' investors. This issue is critical for many investors in the private debt sector –e.g., insurance companies and pension funds– as well as academics studying the private capital market.

There are several reasons why an LP in a debt fund could earn an abnormal return. First, the growing role of nonbank lenders challenges the traditional view of banks' "specialness" in credit intermediation. Managers of private credit funds could possess skill in evaluating potential portfolio companies, negotiating deals with them, and adding value subsequently. If these skills are reflected in the funds' gross returns and are not competed away through fees, then private credit funds could earn abnormal returns.

Second, investments in private debt funds, like in other parts of the private capital market, are relatively illiquid and costly to trade (Nadauld et al. (2019)). In case of banks, such illiquidity is managed by having access to deposits (e.g., Diamond and Dybvig (1983) and Hanson et al. (2015)), which private debt funds do not have access to. As a result, LPs of these funds may demand compensation in the form of an illiquidity premium for committing capital over longer horizons. Indeed, many investors cite illiquidity premiums as a source of return (e.g., Muzinich & Co. (2025)).

Finally, since debt funds represent a relatively new and rapidly growing segment of the private capital market, it is possible that the market had not yet fully equilibrated during our sample period covering funds raised from 1992 to 2015. Given the enormous growth in private debt markets following our sample period, it is possible that funds had unusually high returns during this period, leading to subsequent inflows to the market and accumulation of dry powder, which equals about 30% of assets under management by 2024 (Pitchbook (2025). We would expect abnormal returns to converge towards zero as the market approaches equilibrium.

In this paper, we use state-of-the-art methods to evaluate the risk-adjusted returns of private debt funds originated between 1992 and 2015.[1] Our database from Burgiss-MSCI provides in-depth information on the net-of-fee cash flows paid to the LPs; it includes not only net asset values (NAVs) but also distributions and contributions throughout the life of the funds. A major advantage of the Burgiss-MSCI dataset is that there is no survivorship bias because the data are directly sourced from LPs, and their cash flows must be reported regardless of performance. The risk-adjustment methods we use are based on Flanagan (2024), which adapts the approach

[1] In robustness tests, we show that our main results also hold on more recent vintages of private credit funds up to those started in 2018.

of Gupta and Van Nieuwerburgh (2021) for valuing debt/fixed income cash flows.

The idea underlying this approach is that the cash flows of private assets, for which one would like to know the price, can be spanned by publicly traded benchmarks that do have observable market prices. The market price of a replicating portfolio constructed from these benchmarks can then be used to price the assets of interest. Flanagan (2024) develops market benchmarks that are well-suited for spanning and pricing debt-like cash flows such as loans, relying only on the law of one price without requiring estimation of an asset pricing model to get prices.

We apply and extend the Flanagan (2024) methodology to price the cash flows of private debt funds, adjusting for differences between loan-level cash flows and fund cash flows, such as allowing for delayed cash-flow contributions. An important difference between bank loans and private debt funds is that private debt funds are much more subject to "equity-like" risks, both because their loans are substantially riskier than most other debt, and also because roughly 20 percent of their portfolios (during our sample period) is made up of equity or equity-linked instruments.[2] An advantage of this approach is that it is capable of including both credit risk factors and equity risk factors. Therefore, to adjust for the risks inherent in private debt funds, our analysis includes loadings on both debt and equity factors when building replicating portfolios.

Borrowers generally approach private debt funds when they are unable to obtain bank financing (see, e.g., Chernenko et al. (2022) and Block et al. (2024)). Consequently, firms that borrow privately are generally riskier than firms that receive bank loans, so their cost of borrowing is higher. In addition, private debt funds have substantial fees, so the cost of borrowing includes these fees. The providers of the capital, the fund's LPs, must receive a return sufficient to offset the risk they face on the net-of-fee cash flows earned by the fund. Promised returns must be large enough to offset the probability of default, the systematic risk of these defaults, and also the fees that the funds' general partners earn. Consequently, promised

[2] In more recent vintages, the equity share ranges from 19% to 27%. See Table 2 below.

returns on loans from debt funds are substantially higher than the promised returns on bank loans or even risky bonds.

Our estimates suggest that the risk-adjusted abnormal return on $1 of capital invested in private credit funds is indistinguishable from zero. We get similar results using both the risk-adjusted profit (RAP) approach (Gupta and Van Nieuwerburgh (2021), Flanagan (2024)), which estimates an insignificant abnormal return of $0.017 per $1 invested, and the Korteweg and Nagel (2016)'s generalized public market equivalent (GPME) method, which estimates an insignificant abnormal return of $-0.001 per $1 invested. These findings imply that private debt funds lend at rates high enough to offset the funds' fees and risks. However, competition limits the extent to which funds can raise their rates. In equilibrium, fund investors earn only a rate of return appropriate for the risks they face, but no more.

An important caveat to this zero abnormal return result is that it depends crucially on a discounting approach that adjusts for risks correlated with both debt and equity returns. When we use only debt as a risk factor, the estimated risk-adjusted profit becomes a positive, statistically significant $0.27 per $1 of capital invested. This estimate translates to a 4.4% alpha on private credit funds if only adjusting for corporate debt risk factors. However, private debt is sufficiently equity-like that equity-specific risk factors must be accounted for to adjust for risk appropriately. When compared to other debt instruments alone, private debt returns look more attractive than they actually are, because the discounting approach does not adjust for the funds' equity-linked risks.

Additionally, we use the replicating portfolio estimated from RAP to explicitly characterize their risk factor betas. To compute these betas, we first calculate the risk factor betas on individual benchmark funds comprising the replicating portfolio, then take a weighted average using the replicating portfolio weights. We use this procedure to estimate betas on our credit fund replicating portfolio throughout the life of a fund – that is, our methodology implies credit funds have time-varying betas. Early in a fund's life, we find a beta of 0.6 on the CRSP value-weighted index over the fund's life, a beta of 0.2 on a 10-year Treasury bond, and a beta of

0.25 on high-yield corporate bond benchmarks. The same betas on a private credit fund, 10 years after inception, become 0.29, -0.28, and 0.34, respectively. These loadings imply that credit risk, interest rate risk/prepayment risk, and equity risks are all relevant in explaining the cash flows of private credit.

Our data set differentiates between fund types (“generalists”, “mezzanine” or “distressed”), as well as fund size (“small” or “large” relative to the median fund size). Following Munday et al. (2018), we also classify "direct lenders" as funds that "directly originate 70% or more of their assets," comprising 35% of our sample. Across these subsamples, we still observe positive and significant returns when only risk-adjusting using corporate-bond risk factors, but find no evidence of abnormal returns when including equity factors across almost all fund types. Even direct lenders, which are very representative of the most recent private credit fund vintages, fail to deliver abnormal returns to LPs and show significant exposure to equity-like risks. Comparing time periods, we see a larger point estimate of \$0.14 per \$1 invested for the pre-GFC period when the asset class was emerging, while post-GFC returns have declined to -\$0.065, consistent with diminishing returns as the asset class matures, although neither estimate is statistically different from zero.

We also perform our analysis on gross returns, which are the returns from the cash flows received from portfolio firms and also include the fees that general partners charge their investors. Our estimates indicate that gross alphas are around 4.0 percent, which is approximately equal to what general partners would earn with management fees of 1.5 percent and carried interest of 15 or 20 percent. Although the rates charged to borrowers are set sufficiently high – the typical loan rate is about 700 basis points over LIBOR (see Jang (2024)) – the rents from these high rates appear to be captured by the funds’ general partners. Their fees provide compensation for the services they provide, including identifying borrowers, negotiating loans, and monitoring them after providing the capital.

As a comparison, the 4.0 percent required by private credit funds is more than twice that of the 1.7 percent gross alpha on syndicated bank loan cash flows when also calculated using a similar cash flow-based method (Flanagan (2024)). Despite the higher costs, these nonbank lenders are still the best option for some firms that are unable to obtain bank financing (Chernenko et al. (2022)). These findings are consistent with a model in which banks can provide intermediation services at a lower cost than other financial intermediaries (for example, see Diamond (1997)), but some riskier borrowers are segmented from borrowing from banks due to increased bank regulation after the 2008 Financial Crisis. In addition, some borrowers prefer the speed and flexibility that these alternative lenders provide.

Overall, the results in our paper are consistent with the view that private debt funds enjoy high yields from lending to firms that typically cannot receive financing from banks or public markets. The rates they charge reflect both the risk that their limited partners must bear and the costs of lending to these small- and mid-sized, riskier firms. However, our findings challenge the notion that illiquidity premiums are a significant source of abnormal returns, as any such premiums appear to be fully offset by risks when properly accounting for both debt and equity factors. The return that borrowers pay in excess of the risk-adjusted interest rate approximately equals the fees that the private debt funds charge. Rents earned by the funds from making private direct loans accrue to the general partners and appear to reflect compensation for identifying, negotiating, and monitoring private loans to firms that could not otherwise raise financing. However, the zero net-of-fee abnormal returns suggest that competition prevents LPs from capturing excess returns. Overall, the private debt market appears to have matured quickly, consistent with any early advantages dissipating as capital inflows drive risk-adjusted returns toward competitive levels.

The remainder of this paper is organized as follows. Section 2 discusses the institutional details and the existing literature. Section 3 presents our main empirical strategy. Section 4 describes the data. We discuss descriptive statistics on fund characteristics in Section 5 and present our main results in Section 6. Section 7 concludes.

2 Institutional Details and Related Literature

Private debt funds are rapidly growing institutions that provide credit intermediation. They are limited partnerships of private capital that are raised by a General Partner (the "GP") from investors, the limited partners (the "LPs"). These funds typically charge an annual management fee of about 1.5 percent and a "carried interest" of about 15 percent. Because of these relatively high fees, they are a relatively expensive form of financing, so they cater to borrowers who are unable to receive financing from more conventional sources. Such borrowers include low-rated or unrated firms, and also leveraged buyouts, which require substantial quantities of debt that can be arranged relatively quickly. Commercial banks used to be the primary lenders in this market, but the risks that banks can take are limited by regulation. This regulation does not affect nonbanks, so it has helped create the enormous nonbank lending market.

Private debt portfolios typically include some equity components: often it is preferred stock but sometimes common equity; and warrants are regularly included as "equity kickers". In total, equity amounts to about 20 percent of their investments. Although these debt funds utilize some leverage, most of their funding is from typical private equity (PE) investors or Business Development Companies (BDCs).[3]

Block et al. (2024) summarizes a recent survey of general partners (GPs) of some U.S. and European private debt funds, focusing on the way in which their lending compares to banks' direct and syndicated loans by commercial banks. This survey suggests that private-debt funds lend to riskier companies than a typical bank borrower. However, they include both financial and negative covenants in their contracts to monitor these loans.[4] Nonbanks have gained a substantial market share in both corporate loan and bond markets, especially since the Great Recession. Jang (2024) explores whether private debt funds lend more like banks or arm's-length investors. Using detailed data on loan contracts extended by private debt funds in

[3]BDCs are special types of closed-end funds that were established by the Small Business Investment Incentive Act of 1980 to provide funding directly to small and mid-sized companies. See Davydiuk et al. (2024b).

[4]See also Fristch et al. (2021) for a review of European private debt funds and Erel and Inozemtsev (2024) for an extensive review of the participation of not only private debt funds but also other nonbank financial institutions in the loan and bond markets. See Brown et al. (2025) for a broad survey of the performance of private funds.

private equity buyouts, the author shows that direct lenders actively monitor and engage in loan restructurings similar to a bank. Davydiuk et al. (2024a) focus on the prevalence of dual holdings of equity and debt of the same portfolio firms by the same private debt fund and how this dual-holding structure relates to loan terms.

Our paper also contributes to the literature on the growth of FinTech and other nonbanks in credit intermediation. In the corporate loan market, nonbank participation is the largest in the syndicated deals, with nonbank lending in riskier leveraged term loans reaching to about 80% in 2021 (Erel and Inozemtsev (2024)). Although initially finance companies were the primary lenders to riskier borrowers (Carey et al. (1998)), CLOs, hedge funds, private equity firms, and loan mutual funds increased their presence significantly over time (Irani et al. (2021)). Considering direct loans to mid-sized firms, Chernenko et al. (2022) show that about one-third of these firms borrow directly from nonbanks, especially finance companies, private equity firms, and hedge funds. These lenders charge higher interest rates than banks, even after controlling for the risk of their borrowers.[5] In the market for small corporate business loans, Gopal and Schnabl (2022) document that finance companies and FinTech lenders dominate small business loans secured by non-real estate collateral post Financial Crisis. Focusing on larger loans, Haque et al. (2024a) show that nonbanks provide more junior and riskier term loans while banks focus on lines of credit if they finance the same borrowers.[6]

The growth in nonbank participation in the direct loan market increased substantially because of the lending gap created by large banks during the Financial Crisis and also increased bank regulation afterwards (see, e.g., Chen et al. (2017), Cordell et al. (2023), Cortés et al. (2020), and Chernenko et al. (2022)).[7] Private debt funds are relatively younger, but the

[5]See also Davydiuk et al. (2024a) emphasizing the fast-growing role of BDCs as lenders in the middle market and how their lending helps spur employment growth and innovation of these firms.

[6]Nonbank participation has been growing in the personal loans as well. See, for example, Buchak et al. (2018) and Fuster et al. (2021) for evidence from the U.S. mortgage market. There is also a growing literature on peer-to-peer unsecured personal loans that use FinTech. See Morse (2015) for a review.

[7]See also Acharya et al. (2024) and Chernenko et al. (2024) focusing on bank capital –i.e., regulatory capital arbitrage– and Haque et al. (2024b) private equity fueling growth in nonbank lending. There is also a growing literature on the risks that linkages between private debt funds and banks are creating for financial stability (see, e.g., Albuquerque and Zawadowski, 2024; Cai and Haque, 2024; Jang and Rosen, 2024).

fastest growing players in this market (Block et al. (2024)). In addition to providing loans to riskier customers that banks do not typically lend to, these nonbank lenders also provide speed and convenience in the loan approval process as well as more flexible, innovative loan terms.

There is some work that examines the performance of these funds in comparison to leveraged loan or bond markets and shows that their returns are higher (e.g., Munday et al. (2018), Böni and Manigart (2023), and Suhonen (2024)). These papers use the funds' net asset values (NAVs) as an approximation to market values in order to measure returns and estimate alphas. For example, Böni and de Roon (2023) compute private credit funds using reported NAV and use these returns in a factor model and find evidence of risk-adjusted returns. In contrast with using NAVs to construct returns, our analysis relies entirely on a cash flow-based valuation approach. Our results can be potentially reconciled with this prior work if reported NAVs are not priced so as to fully incorporate the credit risk and equity risk of the investments, because they are not marked to market.[8]

Our paper also contributes to and builds on the approach developed by Flanagan (2024) to value non-traded bank loan cash flows by applying private equity-based risk-adjustment (Gupta and Van Nieuwerburgh, 2021) to fixed income instruments. The primary innovation of this approach involves constructing benchmark funds designed to replicate fixed income cash flows using directly observable market prices without needing an asset pricing model. Another closely related paper using this approach is Flanagan (2025), which applies this methodology to value the GSE credit risk insurance contracts on residential mortgage loans. We extend this approach by developing benchmark funds to span fixed income *funds* that have delayed capital contributions, unlike individual loans. Although this paper focuses on applying these fixed income valuation approach to private credit funds, we also replicate the original private equity methodology of Gupta and Van Nieuwerburgh (2021) on our sample of private debt funds and find a negative risk-adjusted profit of $-0.11 per $1 of invested capital for LPs, which would

[8]Boyer et al. (2023) discuss potential issues with using alphas derived from NAVs when private equity NAVs differ substantially from market values.

suggest a negative alpha of around -2% on an annualized basis.[9] In contrast to the estimates implied by this approach, our findings suggest that LPs are at least compensated for the fees and risk of their credit fund investments. The difference between these approaches suggests that methods specifically tailored to fixed income valuation may be more appropriate for analyzing private credit funds, given their distinct cash flow patterns and risk characteristics compared to traditional private equity investments.

Finally, our paper is also related to the research on risk-adjusted returns in financial intermediation more broadly, including Begenau and Stafford (2019), which examines whether bank activities generate excess returns for bank shareholders, Flanagan (2024), which studies the valuation of bank loan cash flows, and Cordell et al. (2023), which examines the risk-adjusted returns of CLO tranches.

3 Discounting Methods

The risk-adjustment methods we use are based on Flanagan (2024), which adapts the Risk-Adjusted Profit (RAP) approach of Gupta and Van Nieuwerburgh (2021) for valuing debt/fixed income cash flows. An important difference between bank loans, as in Flanagan (2024), and private debt funds as in our paper is that private debt funds are much more subject to "equity-like" risks, both because their loans are substantially riskier than most other debt, and also because roughly 20 percent of their portfolios (during our sample period) is made up of equity or equity-linked instruments. Moreover, private credit funds differ in terms of the timing of their cash flows as well as their horizon-varying exposures to the equity and debt risks. We also apply the generalized public market equivalent (GPME) approach of Korteweg and Nagel (2016) and find similar valuations. An advantage of both approaches is that they are capable of including both credit risk factors and equity risk factors.

[9] See Table A8 in the Internet Appendix.

3.1 Risk-Adjusted Profit (RAP)

The primary risk-adjustment approach in this paper adopts the methodology of Gupta and Van Nieuwerburgh (2021) and Flanagan (2024) to private credit funds. This approach involves regressing fund cash flows on the payoffs of publicly traded securities and using the prices of these securities to discount the cash flows. Formally, let R^k_{t+h} denote the return on a public security k bought at time t and held for h periods, and let X^i_{t+h} be a cash flow to a private debt fund i at h periods after origination at time t, normalized to a \$1 capital investment. Gupta and Van Nieuwerburgh (2021) estimate the following regression of cash-flows on security payoffs with horizon varying risk exposures at each cash-flow horizon h:

$$X^i_{t+h} = a_h + b_h R^k_{t+h} + e^i_{t+h}. \tag{1}$$

Estimating this equation is equivalent to discounting the fund cash flows using the known prices of these benchmarks. The model's key identification assumption is that the replicating portfolio, composed of publicly traded benchmarks $b_h R^k_{t+h}$, spans the priced risk in the cash flows, X^i_{t+h}, and the market prices of R^k_{t+h} are known. In Gupta and Van Nieuwerburgh (2021), R^k_{t+h} represents the cash flows of the dividend and gains strips, whose prices are estimated with an affine term structure model.

Flanagan (2024) uses a reduced form version of this approach using public securities returns to form benchmarks, R^k_{t+h}, and the law of price to price them. When R^k_{t+h} is the *total return* on a publicly traded security until horizon h, the market price of any return is 1 by the law of one price:

$$E_t[M_{t,t+h} R_{t+h}] = 1. \tag{2}$$

This reduced-form approach offers flexibility in terms of including any risk factors for which return data are available without the need to estimate an asset pricing model. Because the primary underlying asset of private debt funds is loans, this reduced-form approach easily allows for incorporating interest rate risk/prepayment risk, corporate debt risk, liquidity risk factors, loan risk factors, as well as equity risk factors. This flexibility helps to achieve the key empirical task of selecting right-hand side benchmarks that span the relevant priced risk for private debt funds.

In addition to selecting the risk factors that matter for private credit, we also carefully account for the timing and horizon-varying exposure of private credit funds to these risk exposures. Because the funds' underlying assets are loans and fixed-income instruments such as preferred equity, the two major sources of the private credit fund cash flows are interest/dividends and principal repayment. Both sources of cash flows crucially depend on how the amount of a fund's outstanding invested capital changes over time following fund inception. To construct benchmark funds that invest capital and distribute cash flows similar to debt funds, we estimate the outstanding capital balance for each fund. We estimate each fund's outstanding principal by treating it like a fixed income instrument whose balance grows by a promised rate of return and is adjusted for observed contributions and distributions, ensuring the balance reaches zero at the end of the fund's life.[10] Using each fund's estimated outstanding capital balance, we construct two types of benchmark funds to explain the variation in each source of cash flows. Each benchmark fund is matched to a corresponding debt fund i to replicate the payouts from making a similarly timed investment in a given risk factor k.

First, to explain variation in the principal repayment of credit funds, we construct "gain" benchmark funds, $G_{t+h}^{i,k}$ following Flanagan (2024). These benchmark funds explain the cash flow risk of making a loan and having it default at h horizons later – aggregating across all investment holdings to the fund level.[11]. This benchmark fund starts with a normalized \$1 at fund inception, reinvests and compounds returns on that invested capital, and pays out any change in capital balance as the underlying fund's capital balance declines. This benchmark fund construction captures risk exposures that are proportional to the outstanding capital balance of a matched fund, and that uncertainty is resolved as the principal is returned to in-

[10]As an alternative approach, we also show in the Internet Appendix Table A7 that the results are robust to using the funds' reported NAVs to form the timing strategy of these benchmark funds.

[11]The definition and price of this benchmark are identical to that in Flanagan (2024)

vestors. Consequently, these gain benchmark funds account for the fund's time-varying default risk exposures as well as allowing for horizon-specific loadings.

Second, we construct "rollover" benchmark funds, $\tilde{F}_{t+j}$, to explain variation in the interest payment cash flows of credit funds. We construct these rollover benchmark funds such that they earn returns from investing the exact same stream of capital contributions as their matched private debt funds. Each period, a rollover benchmark fund invests its outstanding capital balance plus additional capital contributions into a security k, and pays out any interest/dividends earned from this security. Because any dividends/interest are paid out, the capital invested will grow at the rate of the price return of security k. Although the rollover benchmark fund always distributes dividends/interest, when the capital balance of its matched debt fund pays out a fraction of its invested capital, the benchmark fund also pays out the same fraction out of its own capital balance. This construction captures that the total interest paid out from the fund portfolio will be proportional to the total capital balance outstanding at that point in time. We provide a formal derivation of this benchmark and its price in Appendix B.

Because each rollover benchmark strategy involves earning returns from investing capital contributions at the exact same time as its matched credit fund, and the present value of these capital contributions is normalized to \$1, the price of implementing this strategy is also \$1.

$$E_t[\sum_{j=1}^{H} M_{t,t+j}\tilde{F}_{t+j}] = 1$$

To summarize, the primary difference between gain and rollover benchmarks is that "gain benchmarks" reinvest any returns into the next period's capital balance, allowing for compounded returns across horizons. In contrast, "rollover benchmarks" immediately distribute any earned interest/dividends. The gain benchmarks also have pre-specified maturities, allowing for horizon-specific loadings denoted by the h subscript in c_h. For each security k, we include both rollover $F^{i,k}_{t+h}$, and gain benchmarks $G^{i,k}_{t+h}$ in the following baseline specification:

$$X^i_{t+h} = a_h + \sum_{k=1}[b^k F^{i,k}_{t+h} + c^k_h G^{i,k}_{t+h}] + e^i_{t+h} \tag{3}$$

By the law of one price, the risk-adjusted profit of the credit fund cash flows can be computed by taking the present discounted value of both sides of Equation (3). As in Flanagan (2024), we apply the market prices to the replicating portfolio benchmarks and compare it to the normalized \$1 of invested capital in the private credit funds. Private credit funds, therefore, have a risk-adjusted return if the market price of replicating the cash flows exceeds the \$1 of capital needed to fund the investment:

$$RAP^i = \sum_{h=1} P^{\$}_{t,h} a_h + \sum_{k=1} b^k + \sum_{h=1} P^{\$}_{t,h} e^i_{t+h} - 1. \tag{4}$$

The market price of the replicating portfolio consists of (a) the price of purchasing the zero-coupon bonds that correspond with the horizon fixed effects a_h, (b) the price of purchasing the rollover benchmarks, which is the sum of the loading since the price is \$1 and (c) the residual cash flows discounted at the risk-free rate. The prices of the gain benchmarks are zero because they are implemented as long-short portfolios. We subtract \$1, which corresponds to the normalized one-dollar investment in the private credit fund cash flows.

The risk-adjusted profit measure corresponds to the net present value of \$1 invested in private credit funds. In practice, we can also compute an "alpha" by annualizing the risk-adjusted profit with the fund's ex-post cash-flow duration:

$$Alpha = (1 + RAP)^{(1/Duration)} - 1. \tag{5}$$

3.1.1 RAP Implementation

Following Gupta and Van Nieuwerburgh (2021) and Flanagan (2024), we use cash-flows and returns at the quarterly frequency and specify horizon dummies h at the yearly frequency.[12] We compute fund size by discounting all the funds' contributions using the risk-free rate and normalizing the cash-flow distributions to a \$1 capital investment using this fund size. We follow Gupta and Van Nieuwerburgh (2021) and only risk-adjust the cash flow distributions and discount cash flow contributions at the risk-free rate. We estimate Equation (3) using OLS and compute each fund's risk-adjusted profit using Equation (4). Where applicable, we also report the annualized risk-adjusted profit, alpha, using Equation (5).[13] We compute the standard errors of the risk-adjusted profit measure by bootstrapping –i.e., re-sampling individual private credit funds without replacement using 50 replications.

Additionally, we report results in which we estimate the extended specification using elastic net. In our baseline model with Treasury bonds, corporate bond factors, and equity factors, we have five risk factors, each with a rollover benchmark loading and 16 gain benchmark loadings for a total of 85 parameters to estimate. Elastic net is a regularization technique that combines lasso and ridge regression penalties to handle high-dimensional or highly correlated predictors by shrinking and eliminating many of these coefficients. This approach reduces the risk of over-fitting but makes standard error estimation infeasible.

3.1.2 Benchmark Specifications

In estimating Equation (3), we use the following factor specifications, which consist of different right-hand side market benchmarks:

Bonds Only: This specification only uses Treasury bonds and corporate bonds. Specifically, it includes benchmarks constructed from the returns of ten-year (10Y) Treasury bonds, high-

[12]Specifying yearly loadings significantly reduces the number of parameters to estimate by assuming that the risk factors fund's cash flows in a given year do not change across quarters.

[13]We compute the ex-post duration of each fund by discounting the cash-flows at the risk-free rate and taking the weighted average duration using the risk-free discounted values as weights.

yield (HY) corporate bonds, and BBB-rated corporate bonds.[14]

Stocks Only: This specification only uses returns to the CRSP value-weighted (VW) market portfolio.

Both: This specification uses Treasury bonds, corporate bonds, and stocks. Specifically, it includes benchmarks constructed from the returns of 10Y Treasury bonds, BBB-rated corporate bonds, HY corporate bonds, and the CRSP value-weighted index returns.

Extended: This specification uses Treasury bonds, both corporate bond factors and stocks, as well as a loan factor, a small stock factor, a value stock value, and a liquidity factor. Specifically, it includes benchmarks constructed from the returns of 10Y Treasury bonds, high-yield corporate bonds, BBB-rated corporate bonds, the lowest quintile of small firms, the highest quintile of value firms, the U.S. LSTA leveraged loan index[15], and the Pastor and Stambaugh (2003) liquidity factor.[16] Because the price return needed to construct rollover benchmarks (that is, the return excluding dividends/interest) is not available for all of these factors, we only include these gain benchmarks for this additional set of factors.

3.1.3 Estimating Replicating Portfolio Betas

Although Equation (3) represents a market-based replicating portfolio for private credit fund cash flows, the loadings from this equation do not immediately translate into risk loadings that researchers typically report in estimating single-period linear factor models.

To better understand the risk loading from the estimation of a replicating portfolio – i.e., how Equation (3) translates into risk loadings, we decompose the expected excess return on

[14] Additionally, all the specifications described here include the zero coupon bond fixed effects and a rollover benchmark investing in three-month (3M) Treasury bonds. This 3M Treasury bond benchmark corresponds to the payoffs of a floating-rate bond. Because it is not ex-ante known what fraction of loans in the funds are floating or fixed rate instruments, we also include benchmark funds constructed using 10Y Treasury bonds and let the data speak for whether the cash flows can be better explained by the returns of these floating rate or fixed rate instruments.

[15] The U.S. LSTA leveraged loan index is a "market-value weighted index designed to measure the performance of the US leveraged loan market." Its return series begins in 1997. Available at https://indexes.morningstar.com/indexes/details/morningstar-lsta-us-leveraged-loan-FS0000HS4A?currency=USD&variant=TR&tab=overview

[16] Specifically we use the 10th decile of liquidity sorted portfolios from Pastor and Stambaugh (2003).

the replicating portfolio, $E[R^p_{t,t+1} - r_f]$ as a weighted sum of the expected excess returns on each individual component of the benchmark fund $E[R^{F/G}_{t,t+1}(k) - r_f]$ for both rollover (F) and gain funds (G).

$$E[R^p_{t+h,t+h+1} - r_f] = \sum_k [w^F_{t,h}(k) * E[R^F_{t+h,t+h+1}(k) - r_f] + \sum_k w^G_{t,h}(k) * E[R^G_{t+h,t+h+1}(k) - r_f] \quad (6)$$

The weights for each replicating benchmark are given by $w^F_{t,h}(k) = b^k * F^{bal}_{t+h}$ for rollover benchmark funds and $w^G_{t,h}(k) = \sum_{h<t} c^k_h * G^{bal}_{t+h}$ for gain benchmark funds. In words, the weights are the product of the outstanding market price of that type of benchmark fund and the corresponding loadings from Equation (3). We also standardize these weights by dividing them by the total outstanding dollar amount of the replicating portfolio at a given point in time so that the weighted expected return corresponds to the expected return of \$1 of capital invested in the replicating portfolio at any given point in time.

Because each benchmark fund invests in some combination of risky asset k and the risk-free asset earning r_f, we specify that $E[R^{F/G}_{t+h,t+h+1}(k) - r_f] = \beta^{F/G}(k) * E(R^k_{t+h,t+h+1} - r_f)$. For rollover funds $\beta^F(k) = 1$ by definition because the rollover fund is always long risky asset k following a \$1 investment. For gain benchmark funds, $\beta^G(k) = \beta^G_h(k)$ is horizon varying. At horizon 1, the beta is one and shrinks towards zero as the gain fund reallocates capital from the risky asset k into the risk-free asset. We estimate the horizon varying $\beta^G_h(k)$ for gain funds across horizons, h, by running a simple linear factor regression (across t holding h fixed) of the gain portfolio returns on the excess return of the underlying factor k.

By substituting the beta representation of expected returns, we can express the expected excess returns on the replicating portfolio as a weighted sum of the betas on single-period expected excess returns:

$$E[R^p_{t+h,t+h+1} - r_f] = \sum_k w^F_{t,h}(k) * \beta^F(k) * E(R^k_{t+h,t+h+1} - r_f) + \sum_k w^G_{t,h}(k) * \beta^G(k) * E(R^k_{t+h,t+h+1} - r_f). \quad (7)$$

We use this decomposition to identify the betas on \$1 invested in the replicating portfolio

P across different investment horizons, h:

$$\beta_h^P(k) = w_{t,h}^F(k) + w_{t,h}^G(k) * \beta_h^G(k). \tag{8}$$

Intuitively, the replicating portfolio's beta on a given risk factor k can be computed by adding up the product of the replicating portfolio weights on the benchmark funds and the betas of the individual benchmark funds. The replicating-portfolio betas for each risk factor vary by horizon because the underlying balance of these benchmark funds changes over h and because the gain risk loadings and betas vary by h. We compute betas on different risk factors across horizons using Equation (8) and include all intermediate steps within a bootstrap to get standard errors of the betas.

3.2 Generalized Public Market Equivalent (GPME)

We also apply the generalized public market equivalent (GPME) approach of Korteweg and Nagel (2016) to value the cash flows of the private debt funds. The idea behind GPME is to estimate a stochastic discount factor (SDF) that correctly prices capital market benchmarks that have outstanding investments of similar magnitude to the assets one would like to know the price of. This SDF can then be used to discount the cash flows and price the asset of interest. To this end, Korteweg and Nagel (2016) construct benchmark funds with capital market investments to private equity funds, with similar timing of capital investments and distributions. To apply GPME to private *credit*, we exploit the fact that in the previous section, we have already constructed capital market benchmarks that have similar investment timing and magnitude to credit funds and for which we know the price. In particular, we estimate corporate bond and equity versions of GPME that use the corporate bond and equity returns to form SDFs that price their respective rollover capital market benchmarks as well as a rollover benchmark investing in 10Y Treasury bonds. These benchmarks effectively invest in these capital market assets in a way that is proportional to the outstanding capital balance of the private credit funds, similar to the implementation of GPME in Gredil et al. (2019).

We use the estimated SDF to discount the private credit fund cash-flow distributions normalized to a $1 capital investment as we did in the risk-adjusted profit case. We use influence functions to obtain standard errors for these estimates.

4 Data

We employ three key data sources, which are described below.

Burgiss-MSCI: Our central database on private debt funds is sourced from Burgiss-MSCI, which is described in detail in (Munday et al., 2018). Our data provide in-depth information on the net-of-fee cash flows paid to Limited Partners investing in private debt funds. In particular, it includes distributions, contributions, and NAVs of a comprehensive sample of private credit funds. Because Burgiss-MSCI obtains information on the total cash flows contributed and distributed by all LPs in a given fund, our return evaluation represents that of an average LP. Notably, it offers greater coverage of private credit fund cash flows than other databases since it sources the data from Limited Partners rather than relying on FOIA requests (Munday et al., 2018). In addition, Burgiss-MSCI also provides data on the gross cash flows paid from portfolio firms to the debt funds prior to any fees or compensation paid to General Partners (GPs), although a disadvantage of this data is that it is available for a much smaller number of funds than our sample of funds with information on net cash flows. A drawback of the Burgiss-MSCI data is that the funds are anonymous.

We apply several filters to our sample. First, we consider only private debt funds denominated in US dollars. Second, we narrow the sample to funds that were initiated between 1992 and 2015. The start date of 1992 is chosen because of the absence of corporate bond returns before this time. The end date of 2015 is selected to allow for a sufficient number of years to observe distributions and estimate risk loadings.[17] Finally, we exclude funds with less than 5

[17] In the Internet Appendix, Table A3 reports results for choosing different end dates of sample Vintages

years of cash flow data post-inception. These filters result in a sample of 532 private credit funds.

Following the standard approach in the private equity literature (Gupta and Van Nieuwerburgh, 2021; Korteweg and Nagel, 2016), we compute the fund size as the contribution cash flows discounted at the risk-free rate. We scale the cash flow distributions by this computed fund size, which represents a cash flow relative to a $1 investment. Following Gupta and Van Nieuwerburgh (2021), if a fund has not distributed all of its capital after 16 years since inception, we sum up any remaining cash flow distributions, discount them back to year 16 using Treasury bond rates, and assume they are paid out at year 16. In Table A2 and Table A3 in the Appendix, we show that the results are robust to this assumption, as nearly all cash flows have been distributed by year 16.

If a fund has unliquidated NAVs at the end of our sample period, we follow Korteweg and Nagel (2016) and assume the remaining Net Asset Value (NAV) is liquidated. We discount this final NAV cash flow at 90% to account for potentially inflated NAVs, as reported by the funds and not market to market (e.g., see Phalippou and Gottschalg (2009) and Boyer et al. (2023)). Supporting this assumption, we follow Andonov et al. (2024) and estimate the average discount to NAVs when credit fund LP stakes are sold in the secondary market. Specifically, we compare the change in NAV of an LP that sells their stake to the change in NAVs of LPs that remain in the fund. Using this procedure, we find the average market value of private credit fund stakes is approximately 90% of their reported NAVs, as shown in Figure A1 of the Internet Appendix. Further, in Table A3 of the Internet Appendix, we show that our main results are robust to a sample of old vintages (e.g., limit the sample to funds originated on or before 2010) when nearly all the NAV has been paid out by the end of the sample. We also report results in Table A5 where we instead assume the fund recovers 100% of NAV upon liquidation and still find a risk-adjusted return that is not different from zero.

For a subset of funds, Burgiss-MSCI provides holding-level cash flows of individual fund investments (i.e., individual loan cash flows). For these funds, we can calculate the gross returns, which are the returns received by the funds prior to the payment of fees. For these data, we apply the same filters as described above for the broader net-of-fee fund sample.

Pitchbook: Because the Burgiss-MSCI dataset does not provide information on the characteristics of the underlying investments of private credit funds, we turn to Pitchbook data to offer basic summary statistics on the holdings of private credit funds. Particularly relevant are data from Pitchbook on funds' underlying investments such as the fraction of underlying investments in private debt funds that have equity-like features.

Dealscan: We utilize the sample of syndicated term loan cash flows from Flanagan (2024) to estimate the risk-adjusted returns on these loans, involving at least one non-bank as a lead agent in the syndicate.

5 Descriptive Statistics: Private Debt Fund Characteristics

Despite their high costs, private debt funds have grown substantially in recent years. Figure 1 shows the total outstanding assets under management of the entire Burgiss-MSCI sample of credit funds by year in which any fund is active. This figure documents the large increase in capital raised by private debt funds, with very little capital raised around 2000 and nearly $400 billion by 2022. This quantity represents approximately half of the deployed capital in the private credit universe (Preqin, 2024).

5.1 Fund Investments

We provide information on two actual private debt funds in Table 1, *Main Street Capital II* and *CapitalSouth Partners Fund III*. *Main Street Capital II* raised $159m in 2006, and earned a 7% IRR, while *CapitalSouth Partners Fund III* raised $ 280m in 2009 and earned a 12% IRR (Source: Pitchbook). Each fund's portfolio contained mostly debt but also had some equity. The returns of the funds are lower than the rates on the loans it provides for several reasons. First, some of the loans default. Second, the funds charge substantial fees, which can lower the funds' (net-of-fee) returns by two or three percentage points. Third, the funds contain some equity, the returns of which could be higher or lower than those of the debt.

This table highlights an important feature of all private capital funds: unlike other managers of similar types of portfolios, such as mutual funds or insurance companies, they are essentially unconstrained in the types of securities in which they can invest. Consequently, general partners do whatever possible (legally) to boost returns. Two ways to do so in debt funds is to add leverage to the fund by delaying draw-downs through lines of credit backed by the fund's capital commitments, and by adding equity and equity-linked securities such as warrants to their portfolios.

Table 2 provides statistics on private debt funds' holdings. These data are taken from the *Pitchbook* holdings database that reports the type of investment holdings the credit funds make and which have any type of equity attached to them.[18] These holdings could be direct preferred equity investments (common in Mezzanine funds), preferred equity paired with loans, warrants attached to a buyout, or even common stock investments in startups. This table indicates that 15% of the private credit investments have some equity-like features attached to them. When value-weighted, the fraction of equity-linked investments increases to 20%. Most of these equity investments in private debt funds come from preferred equity investments, which comprise 10.6% of the holdings. Overall, about 60% of private credit funds have at least one equity-linked investment.

Equity-linked investments of the funds are very different from one another – preferred equity can be only slightly riskier than debt, while warrants are substantially more risky than common equity. We do not have sufficient information on the funds' investments to attempt to assess the portfolios' risks directly. While not the majority of the investments - these are credit funds after all - equity-linked investments are nonetheless an important part of the funds' portfolios. Consequently, we rely on methods that account for both equity and debt-related risks when computing the funds' risk-adjusted returns. The risk-adjustment methodology, which

[18] We require that funds report at least 5 of their investment holdings to be included in this sample and apply sample filters in the same way that we apply to our Burgiss-MSCI sample.

is designed to price fixed-income cash flows, is also well suited for valuing cash flows such as preferred equity, although they are riskier than debt and can easily incorporate equity risk factors.

Another important takeaway from Table 2 is that the most common investment type of private debt funds is loans to fund leveraged buyouts, comprising 62% of fund investments.

An important question is the extent to which our findings, which are measured on historical data, are relevant to funds being raised more recently. A particular concern is the possibility that the composition of private debt fund holdings have changed substantially in recent times. Providing more recent data, the subpanel of 2 reports the fraction of portfolio holdings from Burgiss-MSCI that are equity, warrants, convertible debt, and or preferred equity from 2020 to 2022. The subpanel shows that the percentage of these equity investments is 22.2% in 2020 and 26.8% in 2022. These facts show that equity risk in the portfolio of the current private debt fund is still highly relevant and, if anything, appears to be increasing.

5.2 Fund Cash Flows

Credit funds, like other private capital funds, receive capital commitments at the initial (and sometimes subsequent) closing, and draw down this capital over the next few years. This drawdown process is illustrated in Panel A of Figure 2. About 25% of a fund's capital is drawn down in each of the first two years, and the vast majority is drawn down by year 6.

This capital is eventually returned (with interest) to the fund's investors. Panel B of Figure 2 illustrates the timing of these distributions. The largest distributions are in years 4 and 5, with about 20 % of initial capital returned in each year. Following Gupta and Van Nieuwerburgh (2021) we truncate the capital distributions at year 16, and discount any remaining cash flows back to year 16 using the term structure of Treasury bonds. Because the overwhelming majority of the capital distributions happen before year 16, this cutoff does not greatly impact the results. In Table A2 in the internet appendix, we show our results are robust to relaxing this assumption and using different cutoffs.

We provide summary statistics on our sample in Table 3: The average fund size is $787M, and the average IRR of the net-of-fee cash flows received by LPs is 8.5%. If we compute the NPV of cash flows using risk-free rates, the average NPV is $0.34 per $1 of capital invested. The average duration of the distributions is 5.6 years.

6 Empirical Analysis: Main Results

6.1 Risk-Adjusting Net-of-Fee Distributions Received by LPs

The average private debt fund's net-of-fee cash flows to its limited partners have an NPV of $0.34 per $1 of capital invested when discounted at the risk-free rate. However, this NPV is an overstatement, and it should be adjusted to reflect the risks the LPs actually face, since the risk-free rate is clearly too low. In this section, we focus on measuring risk-adjusted returns to the LPs.

We present estimates of the risk-adjusted returns received by LPs in Table 4, discounting using the approaches discussed in Section 3. For convenience, in Panel A, we repeat the calculation of the returns without adjusting for risk. The average IRR is 8.5%, and the average "risk-free NPV" is $0.34 on a $1 investment.

In Panel B, we report estimates of the risk-adjusted return calculated using the Gupta and Van Nieuwerburgh (2021) risk-adjusted profit (RAP) approach. For this approach, one must specify the risk factors facing the cash flows. We present estimates using only bond factors, only stock factors, and both, which are likely the most appropriate since private debt funds contain both debt and equity.

The estimates presented in Panel B indicate that when we discount the cash flows using just corporate bonds (returns to BBB and HY rated bonds) and Treasury bonds, we find a statistically significant risk-adjusted profit of $0.27 per $1 of capital invested. Annualizing this total return using the duration of the credit funds, we find a statistically significant alpha of 4.4% using the corporate and Treasury bond factors. When we replace corporate bond factors and the 10Y Treasury bond factor with a single stock factor, the CRSP VW index, the estimate decreases to a statistically significant \$0.14 risk-adjusted profit per \$1 invested.

When we include both corporate bond and stock factors (10Y Treasury bonds, BBB-rated bonds, HY bonds, and CRSP VW index), we find that the risk-adjusted profit is essentially zero. We convert this NPV to an alpha by annualizing the total return to \$1 of capital using the duration of the fund. The resulting alpha is an insignificant 0.3%. The standard error of this estimate is 0.8%, meaning that a 95% confidence interval cannot rule out an alpha less than 1.9%.

We also include an 'extended' specification that includes a Pastor and Stambaugh (2003) liquidity factor, small stocks, value stocks, and the U.S. LSTA leveraged loan return index as factors. Because the loan factor is only available beginning in 1997, the sample for this specification is somewhat smaller. The results again are similar in this specification, with a risk-adjusted profit indistinguishable from zero.

Finally, we address the potential concern that including almost 150 factor loadings leads to spurious replicating portfolios by re-estimating the model using elastic net to estimate risk-adjusted profit loadings. Elastic net estimation involves selecting penalty parameters to shrink spurious coefficients, setting those with little out-of-sample predictive power to zero, reducing over-fitting, and improving model stability. When we estimate the specification with elastic net, we find a similar NPV point estimate of \$0.016 per dollar invested. The downside of elastic net is that obtaining standard errors is not feasible.

The estimates using GPME in Panel C are similar to those using the Gupta and Van Nieuwerburgh (2021) approach. The estimated NPV equals a statistically significant \$0.096 per \$1 invested using the corporate bond returns in GPME to discount the cash flows. If we discount using stocks, it decreases in value to \$0.080 and is also not statistically significantly different from zero. We also estimate a GPME specification including both a high-yield corporate bond factor as well as the CRSP value-weighted stock factor in Column (3). We again find a similar estimate that is practically zero and is not statistically different from zero.

6.2 Fund Betas

With the replicating portfolio in hand, we compute the betas of the returns on the replicating portfolio by following the approach described in Section 3.1.3. In particular, the betas are computed by taking a weighted average of the betas on the benchmark funds' subcomponents, using the replicating portfolio loadings to form the weights. In our baseline specification, we include a term risk factor from investing in 10-year Treasury bonds, a BBB-rated corporate bond factor, a high-yield (HY) corporate bond factor, and an equity risk factor from investing in the CRSP VW index. Because the BBB-rated and HY corporate bond returns are very highly collinear, we present betas on a version of the replicating portfolio using only the term, HY bond, and equity factor in order to understand broadly what risk factors explain private credit fund returns.[19]

Table 5 presents the betas over the 16-year investment horizon of the estimated private credit fund replicating portfolio. In the first year following the inception of a private credit fund, the replicating portfolio has a beta of 0.2 on the 10Y Treasury term risk factor, a beta of 0.24 on the high-yield credit risk factor, and a beta of 0.60 on the equity risk factor. These loadings also shift further into the life of a fund. Ten years into the life of a private credit fund, the beta on the HY credit factor increases to 0.34, the beta on equities decreases to 0.28, and the term risk factor declines to a negative loading of -0.28. The relevance of the term risk in the early life of the fund is consistent with prepayment risk, while the long-term HY bond and short-term equity risk factor is consistent with a pure credit risk factor (e.g. Gilchrist and Zakrajšek (2012)). The positive stock beta throughout a fund's life is consistent with private credit funds having equity-like risks. Together, these loadings are consistent with the holdings of private credit funds comprising risky debt and junior equity-like investments, and the proportion of these risks changes throughout the life of the fund.

These betas indicate the risk factors that are relevant in forming a capital market replicating

[19]The corresponding point estimate to this portfolio is similar to the baseline estimate with a statistically insignificant \$0.03 NPV per \$1 invested.

portfolio to explain the cash flows coming from private credit funds. The significance of risky corporate bond and equity capital market benchmarks indicates that risky capital markets are needed to explain variation in private credit returns and that risk-free benchmarks are not sufficient. The *R-Squared* of the model's replicating portfolio is also reasonably high (79%), indicating that our capital market benchmarks form a replicating portfolio that explains much of the variation of fund cash flows. As confirmed by our evidence in Table 2, equity factors seem to matter for pricing the risks in private credit funds.

From an arbitrage pricing perspective, an *R-Squared* of 79% means that 79% of the variation that we can explain with our benchmarks is priced exactly because we know the true prices of these benchmarks. The key assumption is that the residuals, the remaining unexplained 21% variation, are orthogonal to priced risk factors. In Table A4 of the Internet Appendix, we directly test this assumption by providing an alternative discounting procedure for the residuals. Specifically, when we discount the residuals using GPME, we still cannot reject that the risk-adjusted profit is different from $0.[20]

6.3 Fund Heterogeneity

Private debt funds are not uniform; they vary substantially by size, and also by the type of firms to which they lend. Some funds specialize in lending to firms in financial distress, while others are "mezzanine" funds that provide loans that are typically junior to the firm's other debt. It is possible that there is cross-sectional variation in abnormal performance where some types of funds perform better than others.

Table 6 presents risk-adjusted returns sorted by fund type, including "generalists", "senior," "mezzanine", and "distressed" funds, as defined by Burgiss-MSCI.[21] We also identify "small" and "large" funds based on the median fund size within a given vintage-quarter. Fund size is determined by the discounted capital calls rather than the total AUM of the fund advisor. We

[20] Even though GPME is also estimated using the same factors, this two-step procedure is nontrivial because RAP requires that the cash flows are linear in the specified benchmarks, whereas GPME does not.

[21] Munday et al. (2018) provides an in depth discussion of these categories.

also identify funds of "large fund managers", namely those that source an above median number of private debt funds in our sample period, in order to test whether there is heterogeneity in the ability of different types of fund managers. We split the sample into funds originated before and after the Financial Crisis of 2008. We label funds that started on or before 2009Q1 'Pre-GFC' Funds and funds that started after 2009Q1 as 'Post-GFC' Funds. Finally, we report results dropping outliers (top 1% and bottom 1% performers) from our fund sample.

In addition to these categories, we follow Munday et al. (2018) and identify "direct lenders" as those funds that "directly originate 70% or more of their assets." "Direct lenders" comprise 35% of our sample in terms of the number of funds. Direct lenders comprise most of the recent private debt vintages (Morgan Stanley Investment Management, 2025). The performance of this category can therefore speak to whether funds similar to recent vintages are delivering abnormal returns to their investors.

Across these subsamples, we still see positive and significant returns when only risk-adjusting using corporate bond risk factors, but find no evidence of abnormal returns when we include equity factors across almost all fund types. There do not appear to be noticeable differences in risk-adjusted returns across fund types. Even direct lenders, which are more representative of recent private debt vintages, do not deliver abnormal returns to LPs. Direct lenders also seem to be significantly exposed to equity-like risks, with the RAP estimate significantly shrinking after controlling for equity factors compared to the bonds-only specification. Comparing the pre- and post-GFC periods, we see a larger point estimate of $0.14 per $1 invested for the post-GFC period, when the asset class was just beginning, although it is not statistically significant. Post-GFC returns have come down to -$0.065, consistent with diminishing returns as the asset class matures, although the point estimate is not statistically significant from zero.

6.4 Fund Persistence

Next, we evaluate whether the risk-adjusted performance of a fund manager predicts future risk-adjusted performance. In the previous analysis, we reported the average risk-adjusted profit across all funds or subsets of funds. In this set of analyses, we use *fund-level* risk-adjusted profits using Equation (4) by making the assumption that all funds share the same risk loadings. With fund-level estimates, we use information on fund managers and take the average risk-adjusted return of a fund manager in a given vintage quarter. We then estimate the effect of a fund manager's risk-adjusted performance from previous funds on their current funds' risk-adjusted performance to evaluate whether there is persistence. In estimating this equation, we include time-fixed effects, log fund size, and the ex-post duration of the fund as controls.

Even if alpha is zero on average, there could still be heterogeneity in the skill of credit fund managers. Such skill would lead managers who deliver outperformance due to their superior ability to continue to perform well in subsequent fund vintages. Alternatively, if there is no heterogeneity in fund manager ability, then prior performance should have no effect on subsequent performance.

Table 7 presents the results of this exercise. The estimates indicate that the risk-adjusted performance of a fund manager's previous fund has no statistically significant relationship with the performance of that fund manager's current fund. Further, we find no significant relationship between current performance and the performance of the prior two, three, or four funds.

These findings suggest that managerial skill is not an important determinant of performance. Private debt managers appear to be more like mutual fund managers, for which skill is minimal, than like private equity managers, for whom it is extremely important (see Kaplan and Schoar (2005) and Korteweg and Sorensen (2010)). Not only do the results imply that managers deliver zero alpha to their LPs on average, but also that cross-sectional differences in managers' abilities to deliver returns to LPs appear to be minimal.

6.5 Gross-of-Fee Returns

6.5.1 Fee Structure

A major difference between private debt funds and other providers of private debt is the fee structure. Private debt funds' fees are typically lower than private equity funds but substantially higher than those of other lenders who issue private loans. While there is some variation across funds, a common fee structure consists of a 1.5% management fee and a 15% carried interest (a fraction of the profits) (Callan, 2023). Presumably, the reason why funds can charge so much and still find borrowers is that they have skill at identifying quality borrowers, negotiating loans, and monitoring them after they are made. Because of the fees, a fund must charge higher rates than a lender providing a similar loan.

Fees on private debt funds are nonlinear, and increase more when returns are higher. Therefore, it is impossible to convert the fees that a fund charges to a specific increase in the cost of finance without making a number of other assumptions. However, it is possible to do some illustrative calculations, which we present in Table 8.

Panel A reports a back-of-the-envelope calculation of the annual fees earned by GPs. To estimate the fees, we assume that all funds follow a typical private credit fund contract, consisting of a 1.5% management fee with 15% carried interest, and a 6% hurdle rate (as is typical). We then use the IRRs of the fund to solve for these fees when assuming one of these contract structures across all funds: GP Fee = .015 + max(.15*((IRR+.015)/.85),0) if IRR > .06; and .015 if IRR < .06. Alternatively, we also present similar calculations for 2% management fee with a 20% carry and an 8% hurdle rate.

Using this approach, we find that if all our funds had a 1.5/15% contract structure, GPs would earn 3.2% per year and if they had a 2/20% contract they would earn 4.2% per year.[22] We also provide an alternative estimate of the annual GP fees by calculating the difference between the gross IRR and net-of-fee IRR of the same fund using our gross cash flow subsample. Using this measure, we find GPs earn around 5.2% per year. This wedge likely represents an

[22] This calculation is similar in spirit to the calculation of management fees in Phalippou (2024).

upper bound to the annual fees because the difference between the gross and net returns may reflect the cost of any debt financing the fund uses or other noncompensation costs of the fund.

6.5.2 Risk-Adjusted Gross of Fee Returns

Next, we consider the subsample of funds for which Burgiss-MSCI has access to the cash flows between funds and their portfolio firms. These cash flows occur prior to the payment of the fund's fees, so they are higher than the net-of-fee cash flows that are paid to the LPs. In our sample, the IRR of the gross cash flows is 14.2%, which is substantially higher than the 8.5% IRR of the net cash flows going to LPs. Note that the net cash flows are from a much larger sample of funds; our sample contains 424 funds with data on net of fee returns but only 55 with data on gross of fee returns).[23].

We adjust these gross returns for risk using the Gupta and Van Nieuwerburgh (2021) approach and present the estimates in Panel B of Table 8. The estimates imply that the gross abnormal returns are positive and statistically significantly different from zero. When discounted using both equity and debt factors using our baseline specification, the alpha is 5.2%. Because we must estimate over 80 coefficients in our model, one concern with using this procedure on a smaller sample of funds is that it results in a noisy estimate. When we re-estimate the specification with all the factors using elastic net, which shrinks spurious coefficients, we find a smaller alpha of 3.6%.

The abnormal return from the gross cash flows is approximately equal to the estimated fees paid by the fund. This pattern suggests that the loans are priced above their fundamental risks, but that any rents go to the GPs who manage the fund rather than the LPs who invest in it. Presumably, these GPs are adding value through their ability to source, negotiate, and manage deals.

[23]Table A6 in the online appendix shows that the risk-adjusted value of the net-of-fee cash flows for this subsample is not different than zero.

6.5.3 Comparison to Syndicated Loans

Another way to illustrate the importance of fees in the pricing of loans from private debt funds is to consider a sample of loans from nonbank lenders who do not charge the same level of fees. We consider a sample of syndicated loans from the Dealscan database that have a nonbank as a lead lender in the syndicate.[24] For a stricter comparison of banks and nonbanks, we focus on loans that only have a single lead lender.

Table 9 reports the annualized risk-adjusted profit on the cash flows from these syndicated loans. This table suggests that nonbank abnormal returns are about 2.3%, which is substantially lower than the 3.6% abnormal returns of the gross of fee cash flows from the private debt funds in our sample. It is nonetheless slightly higher than the bank loan abnormal returns of 1.7% estimated using the Flanagan (2024) approach. The difference between the gross returns of debt funds and nonbank syndicated loans likely reflects a number of factors: a) The firms that turn to private credit funds probably could not get (cheaper) funding from syndicated loans; b) private credit also includes equity-linked investments; and c) loans from private debt funds have to be priced so that the ultimate providers of capital, the funds' LPs, receive a sufficiently high return to justify investing given the loans high risk when fees are netted out.

7 Concluding Remarks

The fastest growing sector of the private capital market involves lending, and in particular, private debt funds, which currently surpass $1.5 trillion under management. Yet, the academic literature on private debt funds is remarkably sparse. While practitioners argue that these funds are excellent investments, our knowledge is limited about their returns and whether these returns are sufficient to justify their risk.

Private debt funds, like private equity funds, charge substantial fees, usually a 1.5% annual

[24] We rely on the definition of a nonbank used by Chernenko et al. (2022).

management fee and a 15% carried interest. Since other nonbank lenders have much lower fees, private debt funds must lend at much higher rates than other nonbank lenders, and consequently do business with lower quality borrowers who do not have other sources of capital. To boost returns, private debt funds supplement the loans in their portfolios with equity or equity linked instruments such as warrants. Consequently, to measure the risk adjusted returns investors receive, it is important to take the net-of-fee distributions and discount them using an approach that adjusts for both equity and debt-related risks.

In this paper, we follow such a procedure that was developed by Flanagan (2024) for evaluating bank loans. Our estimates indicate that once we adjust for fees and risks, private debt funds provide their investors with returns just appropriate for the risks they face, but not more. When we examine the gross-of-fee cash flows received by the debt funds from their portfolio firms, they do have an alpha that approximately equals the fees that they charge.

We emphasize that even though our results suggest that investors in private debt funds do not earn *abnormal* returns, they do provide investors with the returns they should receive given the risks they face. Consequently, our results do not imply that investors should avoid investing in private credit. These funds provide their investors with an appropriate return given their risks, and, as implied by finance theory, should be a part of a diversified portfolio.[25]

Overall, the results in our paper are consistent with the view that private debt funds charge rates to their borrowers that reflect their fees and also the risks involved in lending to these small and mid-sized, riskier firms. The return that borrowers pay in excess of the risk-adjusted interest rate approximately equals the fees that the private debt funds charge. Rents earned by the funds from making private direct loans accrue to the general partners, not to the limited partners. These rents appear to reflect compensation for identifying, negotiating, and monitoring private loans to firms that could not otherwise raise financing.

[25] Although our measure of alpha shows that adding private debt funds cannot improve the performance of a well-diversified portfolio, our findings do not rule out whether private debt generates alpha for under-diversified private capital investors (e.g., see Brown et al. (2024) that uses realistic simulations that account for illiquidity and underdiversification in private markets to estimate alphas for buyout, venture capital, and real estate funds.

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Figure 1: Sample AUM over time

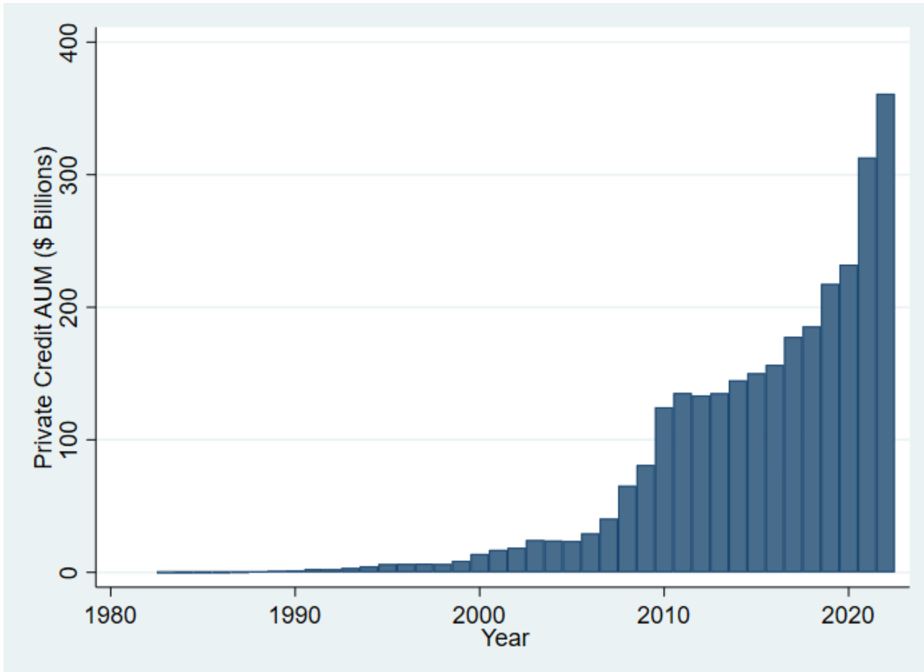
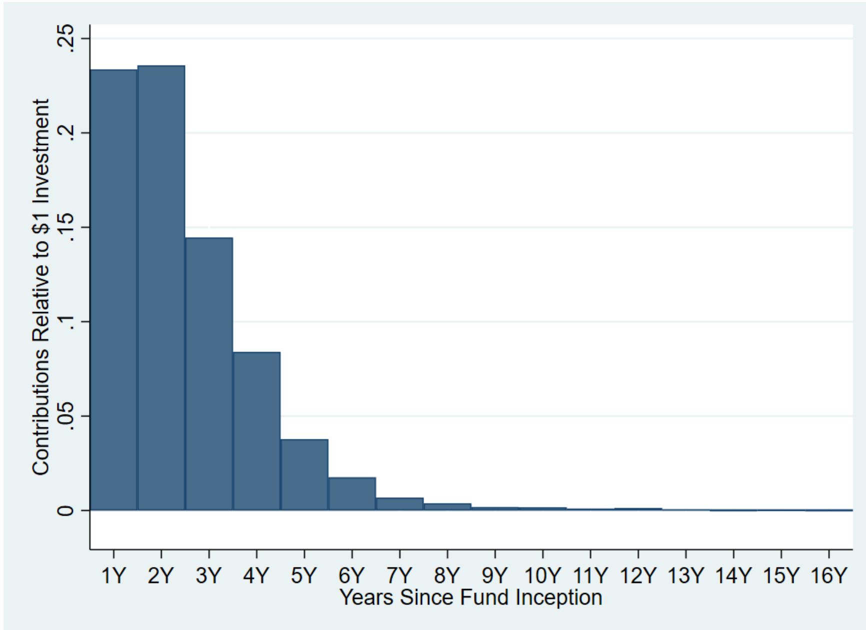
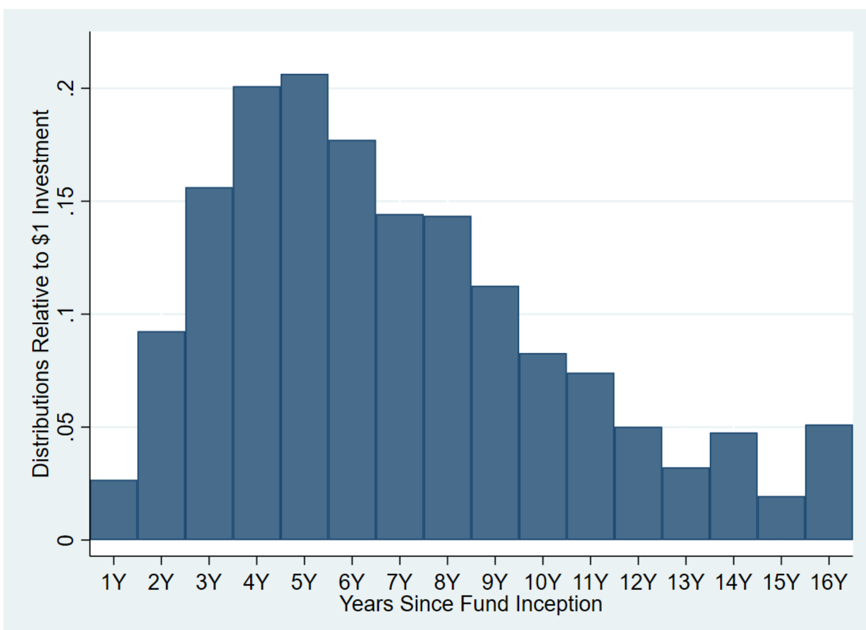


Figure 1 plots the assets under management (AUM) of the entire sample of credit funds in the Burgiss-MSCI sample by vintage year in which the fund was created. Source: Burgiss-MSCI

Figure 2: Private Credit Contributions and Distributions by Horizon



Panel A: Average contributions into Private Credit Funds by number of years since fund inception. Contributions are normalized to a $ 1 capital investment. Source: Burgiss-MSCI



Panel B: Average distributions into Private Credit Funds by number of years since fund inception. Distributions are normalized to a $ 1 capital investment. Source: Burgiss-MSCI

Table 1: Fund and Investment Examples

Loan Level Example A		
Firm Name	Investment Type	Amount
CHMB	12% Loan	$1.4M
Merrick Systems	13% Loan	$3M
CAI Software	12% Loan	$6.75M
Cody Pools	Preferred Equity + 10.5% Loan	$16M

Fund Level Example A		
Fund/Lender Name	IRR	Fund Size
Main Street Capital II	7%	$159M

Loan Level Example B		
Firm Name	Investment Type	Amount
Immersive Media	13% Loan	$1.3M
B&W Growers	14% Loan	$10M
SOAR Transportation	Preferred Equity + Warrants	$16M
Abutec	Preferred Equity	$5.4M

Fund Level Example B		
Fund/Lender Name	IRR	Fund Size
CapitalSouth Partners Fund III	12%	$280M

Notes: Table 1 provides some examples of typical private credit funds and their underlying investments
Source: Pitchbook

Table 2: Investment Holdings in Private Credit Funds

	Mean	SD	Min	P25	P50	P75	Max	N
% Equity Investments	0.150	0.233	0.000	0.000	0.059	0.182	1.000	424
% Preferred Equity Investments	0.106	0.214	0.000	0.000	0.000	0.105	1.000	424
% LBO Investments	0.623	0.300	0.000	0.400	0.712	0.857	1.000	424
Any Equity Investments	0.590	0.492	0.000	0.000	1.000	1.000	1.000	424
% Equity Investments (Dollar Amt)	0.198	0.308	0.000	0.000	0.011	0.282	1.000	407
% Preferred Equity Investments (Dollar Amt)	0.131	0.268	0.000	0.000	0.000	0.107	1.000	407
% LBO Investments (Dollar Amt)	0.557	0.396	0.000	0.120	0.641	0.978	1.000	407

Subpanel: Recent Equity Investments (2020-2022)

Year	2020	2021	2022
% Equity Investments	22.2%	19.2%	26.8%

Notes: Table 2 provides descriptive statistics on the credit funds' holdings, including the fraction of investments that are equity or have any equity-like attachments (% Equity Investments). % Preferred Equity Investments measures the fraction of fund investments that are preferred equity. %LBO Investments measures the fraction of fund investments that are loans as a part of leverage buyouts. We report a discretized version of the variable 'Any Equity Investments' which is equal to 1 if any of the funds' investments are equity or have equity attachments. 'Dollar Amt' indicates if the percentage is value-weighted. The subpanel reports the fraction of investments that are equity, warrants, convertible debt, or preferred equity over the period 2020-2022. Source: Main Panel – Pitchbook; Sub Panel – Burgiss-MSCI;

Table 3: Fund-Level Cash-Flow Summary Statistics

	Mean	SD	Min	P25	P50	P75	Max	N
Fund Size	787	1157	2	166	417	907	10744	545
Fund Duration	5.576	1.817	1.803	4.364	5.427	6.674	13.478	545
IRR	0.085	0.103	-0.344	0.049	0.084	0.123	0.811	545
Amt. Distributed	1079	1681	3	220	588	1269	17194	545
Amt. Contributed	800	1168	2	172	436	940	10825	545
Rf NPV	0.337	0.527	-0.783	0.148	0.286	0.461	7.238	545
Generalist	0.161	0.368	0.000	0.000	0.000	0.000	1.000	545
Mezzanine	0.161	0.368	0.000	0.000	0.000	0.000	1.000	545
Distressed	0.301	0.459	0.000	0.000	0.000	1.000	1.000	545
Direct	0.345	0.476	0.000	0.000	0.000	1.000	1.000	545
Large Fund	0.538	0.499	0.000	0.000	1.000	1.000	1.000	545
Large Fund Manager	0.624	0.484	0.000	1.000	1.000	1.000	1.000	545
Post-GFC Fund	0.495	0.500	0.000	0.000	0.000	1.000	1.000	545

Notes: Table 3 presents summary statistics on the net-of-fee LP private credit cash-flow dataset. Fund size is the present value of fund contributions discounted at the risk-free rate in $ millions. Fund Duration is the Macaulay Duration of the fund's cash-flow distributions. IRR is the IRR of the fund's net cash flows. Amt. Distributed is the raw sum of total distributions of a fund in $ millions. Amt. Contributed is the raw sum of total contributions of a fund in $ millions. Rf NPV is the present value using the risk-free rate of the fund distributions relative to a $1 capital investment into the fund. 'Generalist,' 'Distressed,' 'Direct,' 'Large Fund,' and 'Post-GFC Fund' are indicator variables used in the subsample analysis. Source: Burgiss-MSCI

Table 4: Baseline Fund Risk-Adjusted Returns

Panel A: Risk Free Benchmarks

	LP Net of Fee Cash-Flows	
	(1) IRR	(2) NPV
Estimate	0.085***	0.337***
	(0.004)	(0.023)
Observations	545	545

Panel B: Risk-Adjusted Profit

	NPV				
	(1) Bonds	(2) Stocks	(3) Both	(4) Extended	(5) Elastic Net
Estimate	0.269***	0.139***	0.017	0.049	0.016
	(0.055)	(0.043)	(0.063)	(0.053)	
Observations	545	545	545	519	519
R2	0.76	0.78	0.79	0.81	0.77

	Alpha				
	(6) Bonds	(7) Stocks	(8) Both	(9) Extended	(10) Elastic Net
Estimate	0.044***	0.024***	0.003	0.009	0.003
	(0.008)	(0.007)	(0.008)	(0.009)	
Observations	545	545	545	519	519
R2	0.76	0.78	0.79	0.81	0.77

Panel C: GPME

	NPV		
	(1) Bonds	(2) Stocks	(3) Both
Estimate	0.096***	0.080	-0.001
	(0.030)	(0.049)	(0.027)
$b1$	0.06	0.05	0.09
$b2$	5.13		4.12
$b3$		3.35	2.31
Observations	545	545	545

Standard errors in parentheses

* $p < .10$, ** $p < .05$, *** $p < .01$

Notes: Table 4 presents estimates of the risk-adjusted returns received by LPs. Panel A starts by reporting returns without adjusting for risk, including the mean IRR and mean NPV discounted at the risk-free rate. Panel B reports the risk-adjusted profit measure using only corporate bond and treasury term risk bond factors (Column 1), the stock market CRSP VW portfolio (Column 2), both corporate bond factors, the CRSP VW portfolio, as well as the treasury term-risk bond factors (Column 3), an 'extended' specification that also includes, a HY corporate bond factor, a small stock factor, a value stock factor, the Pastor and Stambaugh (2003) factor, and the U.S. LSTA leveraged loan factor (Column 4) and an elastic net version of the estimate (Column 5). In columns (6)- (10), we report the annualized "alpha" version of this risk-adjusted profit. In Panel C, we report the risk-adjusted NPV measures estimated by using GPME, which uses the HY corporate bond factor (Column 1), a stock factor (Column 2), and both corporate bond and stock factors (Column 3).
Source: Burgiss-MSCI

Table 5: RAP Replicating Portfolio Betas

	Term	HY	Stock
	(1)	(2)	(3)
Horizon 1	0.193***	0.241***	0.597***
	(0.028)	(0.031)	(0.073)
Horizon 2	0.365***	0.164***	0.541***
	(0.025)	(0.011)	(0.035)
Horizon 3	0.379***	0.165***	0.496***
	(0.024)	(0.010)	(0.027)
Horizon 4	0.389***	0.161***	0.495***
	(0.023)	(0.010)	(0.028)
Horizon 5	0.351***	0.111***	0.481***
	(0.021)	(0.007)	(0.028)
Horizon 6	0.025	0.236***	0.370***
	(0.019)	(0.014)	(0.019)
Horizon 7	-0.245***	0.274***	0.315***
	(0.041)	(0.024)	(0.023)
Horizon 8	-0.281***	0.251***	0.273***
	(0.060)	(0.030)	(0.030)
Horizon 9	-0.372***	0.323***	0.241***
	(0.095)	(0.052)	(0.041)
Horizon 10	-0.284***	0.339***	0.287***
	(0.081)	(0.044)	(0.043)
Horizon 11	-0.718***	0.398***	0.266***
	(0.152)	(0.061)	(0.051)
Horizon 12	-1.083***	0.284***	0.311***
	(0.391)	(0.101)	(0.100)
Horizon 13	-0.830**	0.601***	0.223**
	(0.323)	(0.175)	(0.101)
Horizon 14	-0.852**	0.577***	0.201
	(0.385)	(0.202)	(0.149)
Horizon 15	-1.180**	1.258***	0.741***
	(0.556)	(0.402)	(0.120)
Horizon 16	-1.064	1.211**	0.683***
	(0.651)	(0.572)	(0.185)
Observations	26946	26946	26946
R^2	0.787	0.787	0.787

Standard errors in parentheses
* $p < .10$, ** $p < .05$, *** $p < .01$

Notes: Table 5 presents the beta loadings from our risk-adjusted profit replicating portfolio. The table presents beta loadings on our term factor, HY corporate bond factor, and equity risk factor by taking the replicating portfolio weights from Equation (3) and using them to compute betas following Equation (8). Because of the high collinearity between the BBB and HY bond factors, we omit the BBB bond benchmark for purposes of showing the risk loadings. The risk loadings for each factor correspond to betas on $1 invested in the replicating portfolio at a given investment horizon h. All standard errors are bootstrapped
Source: Burgiss-MSCI

Table 6: Fund-Level Heterogeneity in Risk-Adjusted Returns

	IRR	NPV (Rf)	RAP - Bonds	RAP	Num Funds
	(1)	(2)	(3)	(4)	(5)
Full Sample	0.085***	0.337***	0.269***	0.049	545
	(0.00)	(0.02)	(0.05)	(0.05)	
Direct Lenders	0.091***	0.366***	0.300***	0.040	188
	(0.01)	(0.03)	(0.08)	(0.10)	
Generalist	0.069***	0.236***	0.111*	0.028	88
	(0.01)	(0.04)	(0.07)	(0.10)	
Senior	0.075***	0.267***	0.145**	0.080	50
	(0.01)	(0.03)	(0.06)	(0.11)	
Mezzanine	0.083***	0.328***	0.333***	0.009	191
	(0.01)	(0.03)	(0.10)	(0.13)	
Distressed	0.083***	0.353***	0.212**	-0.003	164
	(0.01)	(0.05)	(0.09)	(0.09)	
Small Funds	0.079***	0.376***	0.332***	0.071	252
	(0.01)	(0.04)	(0.08)	(0.08)	
Large Funds	0.090***	0.303***	0.193***	-0.011	293
	(0.01)	(0.02)	(0.06)	(0.09)	
Large Fund Manager	0.089***	0.339***	0.25***	-0.042	340
	(0.01)	(0.02)	(0.05)	(0.06)	
No Outliers	0.085***	0.312***	0.204***	0.046	533
	(0.00)	(0.01)	(0.03)	(0.04)	
Pre GFC	0.089***	0.344***	0.427***	0.140	275
	(0.01)	(0.04)	(0.14)	(0.18)	
Post GFC	0.082***	0.329***	0.263***	-0.065	270
	(0.00)	(0.02)	(0.09)	(0.14)	

t statistics in parentheses

* $p < .10$, ** $p < .05$, *** $p < .01$

Notes: Table 6 reports the returns and risk-adjusted return measures on a subsample of private credit funds. We split the sample by fund type, including "direct lenders," "generalists," "mezzanine," "distressed," "small," "large" funds (defined as above /below median fund size), "large" fund managers (defined as above /below median managers' number of funds), "Pre GFC" funds, and "Post GFC" funds. We also report results when dropping outliers in our fund sample. We report estimates using the "extended" factor specification.
Source: Burgiss-MSCI

Table 7: Persistence

RAP Peristence

	RAP			
	(1)	(2)	(3)	(4)
L.RAP	0.154			
	(0.139)			
L2.RAP		-0.004		
		(0.098)		
L3.RAP			0.146	
			(0.199)	
L4.RAP				-0.109
				(1.248)
Log(Size)	0.017	0.014	0.050	0.081
	(0.015)	(0.028)	(0.053)	(0.224)
Duration	0.070	0.114	-0.008	0.087
	(0.069)	(0.136)	(0.167)	(0.629)
Observations	294	176	109	72
Time FE	Yes	Yes	Yes	Yes
R^2	0.266	0.379	0.405	0.451

Standard errors in parentheses

* $p < .10$, ** $p < .05$, *** $p < .01$

Notes: Table 7 tests for persistence across fund family managers in private debt. Risk-adjusted returns at the fund level are estimated using the assumption that all funds share the same risk loadings. This table tests for persistence by regressing risk-adjusted returns on lagged risk-adjusted returns, where 'L1.' indicates the risk-adjusted return on that fund family managers' last private debt funds. 'L2.' represents the fund family's risk-adjusted return from two funds ago and so on. Standard errors clustered by fund family are in parentheses.
Source: Burgiss-MSCI

Table 8: GP Fees and Gross Risk-Adjusted Returns

Panel A: GP Fee Estimates

	1.5 / 15 Contract	2.0 / 20 Contract	Gross-Net IRR
	(1)	(2)	(3)
Estimate	0.032***	0.042***	0.052***
	(0.001)	(0.001)	(0.006)
Observations	545	545	55

Panel B: Gross Risk-Adjusted Cfs

	IRR	NPV (Rf)	Alpha	
	(1)	(2)	(3) Baseline	(4) Elastic Net
Estimate	0.142***	0.440***	0.052***	0.036
	(0.015)	(0.040)	(0.017)	
Observations	55	55	55	55

standard errors in parentheses

* $p < .10$, ** $p < .05$, *** $p < .01$

Notes: Panel A reports estimates of GP fees by using the funds' IRRS to back out estimates of these annual fees. In column (1), we back out these fees by assuming the typical private credit fund contract has a 1.5 management fee with a 15% carried interest and a 6% hurdle rate. In column (2), we back out these fees by assuming a 2.0 management fee with 20% carried interest and an 8% hurdle rate. In column (3), we report the difference between the gross and net IRR (for the subsample of funds for which we have gross cash flows) as a measure of the annual fees. Panel B reports the risk-adjusted returns of the gross cash flows (i.e., before GP fees) of the subsample of funds for which Burgiss-MSCI has access to the payments between funds and their portfolio firms. Source: Burgiss-MSCI

Table 9: Risk-Adjusted Returns on Nonbank Syndicated Loans

Panel A: Bank Estimates

	NPV		Alpha	
	(1) RAP - Bonds	(2) RAP	(3) Alpha - Bonds	(4) Alpha
Estimate	3.400***	3.142***	1.807***	1.697***
	(19.07)	(15.58)	(18.44)	(14.07)

Panel B: Nonbank Estimates

	NPV		Alpha	
	(1) RAP - Bonds	(2) RAP	(3) Alpha - Bonds	(4) Alpha
Estimate	4.359***	4.146***	2.430***	2.293***
	(7.97)	(7.07)	(8.62)	(7.53)

t statistics in parentheses

* $p < .10$, ** $p < .05$, *** $p < .01$

Notes: Table 9 estimates the gross risk-adjusted returns on the realized cash-flows of syndicated loans in dealscan, for which at least one nonbank part of the lead syndicate. Panel A reports the risk-adjusted returns only on the sample of loans for which there is only a single bank as the lead agent in the syndicate. Panel B reports the risk-adjusted returns only on the sample of loans for which there is a single nonbank as the lead agent in the syndicate.
Source: Dealscan

Internet Appendix

A Additional Tables & Figures

Table A1: Time Clustered Standard Errors

	NPV			
	(1) Bonds Only	(2) CAPM	(3) Both	(4) Extended
Estimate	0.269***	0.139***	0.017	0.049
	(0.056)	(0.048)	(0.071)	(0.049)
Observations	545	545	545	519
R2	0.76	0.78	0.79	0.81

Notes: Table A1 repeats the estimates from Table 6 using time clustered bootstrapped standard errors.

Table A2: Sensitivity to number of H horizons

	18 year Horizon	14 year Horizon
RAP	0.025	0.018
	(0.059)	(0.063)

Notes: Table A2 reports the baseline RAP model estimates (using both corporate bonds and equities) when we alternatively specify a maximum of 14 year horizons or 18 year horizons.

Table A3: Different Sample Periods

Sample	Outstanding NAV	Sample size	RAP
Vintage ≤ 2019	0.270***	700	-0.037
	(0.014)		(0.068)
Vintage ≤ 2018	0.270***	699	-0.037
	(0.014)		(0.061)
Vintage ≤ 2017	0.239***	648	-0.036
	(0.014)		(0.073)
Vintage ≤ 2016	0.197***	586	-0.047
	(0.014)		(0.084)
Vintage ≤ 2015	0.141***	519	0.048
	(0.013)		(0.047)
Vintage ≤ 2014	0.109***	455	0.012
	(0.012)		(0.068)
Vintage ≤ 2013	0.095***	401	0.030
	(0.012)		(0.071)
Vintage ≤ 2012	0.080***	352	0.067
	(0.013)		(0.096)
Vintage ≤ 2011	0.070***	307	0.076
	(0.014)		(0.123)
Vintage ≤ 2010	0.058***	270	0.092
	(0.013)		(0.136)

Standard errors in parentheses

* $p < .10$, ** $p < .05$, *** $p < .01$

Notes: Table A3 repeats the baseline RAP model estimation using different sample windows of fund vintages. In the table, we report the sample size of funds, the outstanding NAV at the end of the sample (2022Q4), and the corresponding risk-adjusted profit estimate (using the extended model).

Table A4: Discounting Residuals

	NPV
RAP using GPME(e^i_{t+h})	-0.012
	(0.024)

Notes: Table A4 presents the RAP estimates when discounting the residuals from RAP model using GPME to test the identification assumption that the unspanned risk is orthogonal to the priced risk. In step (1) we compute market price of the replicating portfolio and the residuals from the RAP model using 10Y Treasury bond, HY bonds, and equities and in step (2), we discount these residuals using GPME estimated from pricing 10Y Treasury bond, HY bonds, and equities. In step (3), we compute the risk-adjusted profit using the market price of these residuals instead of discounting them at the risk-free rate as in the main specification.

Figure A1: Private Debt Secondary Market Discount

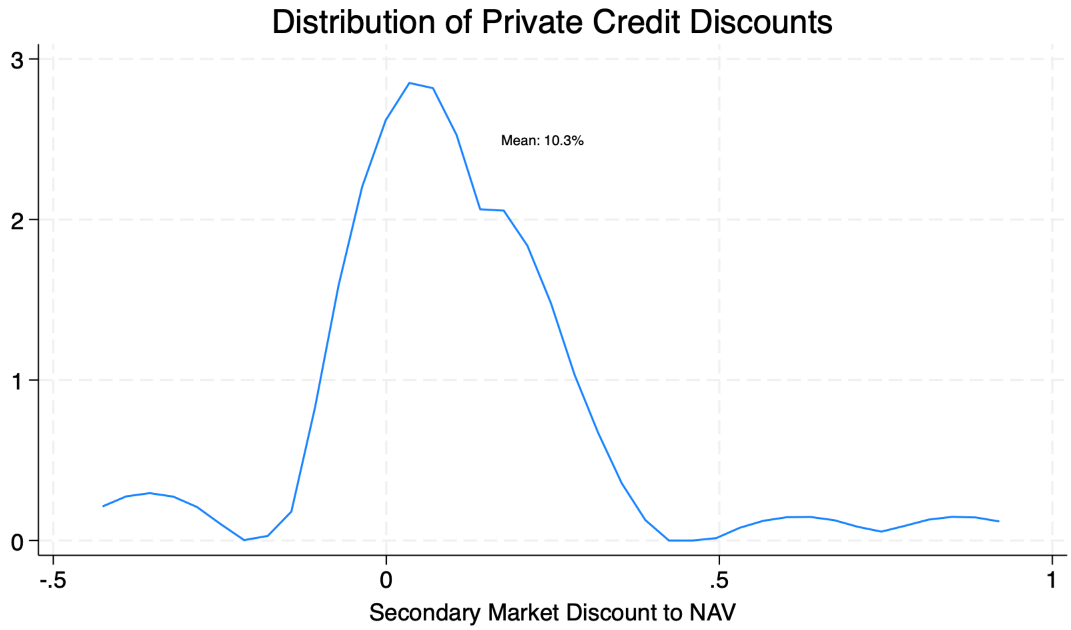


Figure A1 plots the distribution of estimated discount to NAV when LPs sell their private debt stakes. To estimate these discounts, we follow the methodology in Andonov et al. (2024) on a sample of private credit funds. The methodology compares the change in NAV of an LP who sells their stake in a private credit fund to the change in NAVs of the remaining LPs in the fund. Source: Pitchbook.

Table A5: Alternative Liquidity Assumption

	NPV
RAP (100% Liquidation)	0.029
	(0.064)

Notes: Table A5 presents the results from estimating the RAP model (using both corporate bonds and equity) under the alternative assumption that investors can recover 100% of NAV when selling their LP private credit stake before its maturity.

Table A6: Net Risk-Adjusted Returns on Gross Subsample

	NPV			
	(1) Bonds	(2) Stocks	(3) Both	(4) Extended
Estimate	0.250***	0.083	-0.012	0.083
	(0.11)	(0.19)	(0.18)	(0.20)

Notes: Table A6 presents the results (in NPV terms) from estimating the RAP model on the net-of-fee LP cash flows for the subsample of credit funds, for which we have gross cash flow data.

Table A7: Net Risk-Adjusted Returns – Alternative Benchmark Fund Estimation

Net Risk-Adjusted Profit

	NPV			
	(1)	(2)	(3)	(4)
	Bonds	Stocks	Both	Extended
Estimate	0.228***	0.049	-0.051	-0.059
	(0.050)	(0.035)	(0.054)	(0.047)

Notes: Table A7 repeats the baseline risk-adjusted profit estimation using a fund's reported NAVs instead of the estimated principal balances from Appendix B.2. to approximate the benchmark funds' principal balance at a given point in time.

Table A8: Gupta and Van Nieuwerburgh (2023) Estimation on Sample

ZCB and Dividend Strip Loadings								
Horizon	agedum	cohort_small	cohort_stock	cohort_growth	cohort_reit	cohort_infra	cohort_nr	cohort_value
1	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2	0.000	0.004	0.001	0.000	0.000	0.000	0.000	0.000
3	0.000	0.001	0.000	0.000	0.000	0.000	0.003	0.000
4	0.000	0.000	0.000	0.003	0.004	0.000	0.000	0.000
5	0.000	0.000	0.000	0.014	0.000	0.000	0.000	0.000
6	0.010	0.000	0.000	0.000	0.004	0.000	0.000	0.000
7	0.005	0.000	0.000	0.000	0.011	0.000	0.000	0.000
8	0.001	0.000	0.000	0.004	0.006	0.001	0.000	0.001
9	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.007
10	0.000	0.000	0.000	0.000	0.005	0.000	0.000	0.007
11	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000
12	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
13	0.000	0.000	0.000	0.002	0.000	0.001	0.000	0.000
14	0.000	0.000	0.000	0.002	0.000	0.000	0.000	0.000
15	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
16	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Gain Strip Loadings								
Horizon	gain_stock	gain_small	gain_growth	gain_reit	gain_infra	gain_nr	gain_value	
1	0.000	0.005	0.000	0.002	0.000	0.001	0.000	
2	0.000	0.012	0.000	0.003	0.000	0.000	0.000	
3	0.000	0.019	0.000	0.009	0.000	0.000	0.000	
4	0.010	0.013	0.006	0.000	0.000	0.003	0.000	
5	0.000	0.000	0.026	0.000	0.000	0.000	0.000	
6	0.000	0.000	0.020	0.010	0.000	0.000	0.000	
7	0.000	0.000	0.015	0.000	0.000	0.000	0.000	
8	0.000	0.000	0.007	0.000	0.000	0.000	0.000	
9	0.000	0.000	0.006	0.000	0.000	0.000	0.003	
10	0.000	0.000	0.001	0.000	0.000	0.000	0.000	
11	0.000	0.000	0.001	0.005	0.002	0.000	0.000	
12	0.000	0.000	0.006	0.000	0.000	0.000	0.000	
13	0.000	0.000	0.001	0.000	0.000	0.000	0.000	
14	0.000	0.000	0.003	0.000	0.000	0.000	0.000	
15	0.000	0.000	0.003	0.000	0.000	0.000	0.000	
16	0.000	0.000	0.003	0.000	0.000	0.000	0.000	
RAP Elastic Net Estimate								
RAP				-0.1104947				

Notes: Table A8 reports the risk-adjusted profit and loadings of the net-of-fee cash flows using the market benchmarks, prices, and methodology in Gupta and Van Nieuwerburgh (2021). The top two panels report the risk-loadings of the cash flow on the benchmarks from Gupta and Van Nieuwerburgh (2021), and the bottom panel reports the corresponding risk-adjusted profit measure.

B Benchmark Derivations

B.1 Rollover Investment Benchmark

A rollover benchmark fund invests an initial amount of capital c_0 in a security, k, which determines its initial capital balance:

$$C_0^{i,k} = c_0.$$

After the initial capital investment, the capital balance, $C_{t+1}^{i,k}$ of the rollover fund follows the following law of motion:

$$C_{t+1}^{i,k} = C_t^{i,k} * \frac{p_{t+1}^k}{p_t^k} * (1 - z_{t+1}^i) + c_{t+1}$$

This relationship states that the principal balance grows at the rate of the price return of the security k, plus any additional capital contributions, c_{t+1}. Further, when the investment balance of the matched fund i declines, the benchmark pays out the same fraction z_t^i of its own invested capital balance as a distribution.
In each period, the payoff to this rollover benchmark consists of both the dividend/interest rate $\frac{d_{t+1}^k}{p_t^k}$ plus a fraction of its capital balance that is distributed:

$$\tilde{F}_{t+1}^{i,k} = C_t^{i,k} * \frac{d_{t+1}^k}{p_t^k} + z_{t+1}^i * C_t^{i,k} * \frac{p_{t+1}^k}{p_t^k}$$

Because each benchmark strategy involves earning returns from investing capital contributions $\{c_t^i\}$ at the exact same time as its matched credit fund, the price of implementing this strategy is simply \$1.

$$E_t[\sum_{j=1}^{H} M_{t,t+j}\tilde{F}_{t+j}] = 1$$

Proof: Let $z_t \in [0,1]$ for $t \leq H$. Assume the law of one price holds for every cash flow horizon and $E_{t+h-1}[m_{t,t+h}r_{t+h}] = E_{t+h-1}[m_{t,t+h}((p_{t+h} + d_{t+h})/p_t)] = 1$ where m and r are one-period SDF and returns, respectively. Define the pricing function $P_t(F_{t+h}) = E_t[M_{t,t+h}F_{t+h}]$. $M_{t,t+h}$ is the cumulatively compounded one-period SDF. This implies $P_t(F_{t+h}) = P_t(P_{t+1}(F_{t+h}))$.
Additionally, assume that an investor knows the capital call schedule of its matched private debt fund in advance and the discounted value using risk-free rates is \$1: $\sum_{j=1}^{H}[P_0(c_{j-1})] = 1$.
Additionally, assume that there are no capital contributions at the final time, $c_H = 0$. Also assume that at the final date H, any remaining capital is paid out and therefore $z_H = 1$.
Normalize t = 0.
Substituting $r_{t+h} = (p_{t+h} + d_{t+h})/p_t$ and rearranging gives the following expression:

$$
\begin{aligned}
\tilde{F}^{i,k}_{t+1} &= C^{i,k}_t * \frac{d^k_{t+1}}{p^k_t} + z^i_{t+1} * C^{i,k}_t * \frac{p^k_{t+1}}{p^k_t} \\
&= C^{i,k}_t * r^k_{t+1} - C^{i,k}_t * \frac{p^k_{t+1}}{p^k_t} + z^i_{t+1} * C^{i,k}_t * \frac{p^k_{t+1}}{p^k_t} \\
&= C^{i,k}_t * r^k_{t+1} + (z^i_{t+1} - 1) * C^{i,k}_t * \frac{p^k_{t+1}}{p^k_t} \\
&= C^{i,k}_t * r^k_{t+1} + (z^i_{t+1} - 1) * C^{i,k}_t * \frac{p^k_{t+1}}{p^k_t} \\
&= C^{i,k}_t * r^k_{t+1} - (C^{i,k}_{t+1} - c_{t+1}) \\
&= c_t * r^k_{t+1} + (C^{i,k}_t * r^k_{t+1} - c_t * r^k_{t+1}) - (C^{i,k}_{t+1} - c_{t+1})
\end{aligned}
$$

The time 0 price of the cash flows can be calculated by taking prices of both sides and applying the LOP :

$$
\begin{aligned}
P_0(\tilde{F}^{i,k}_{t+1}) &= P_0(c_t * r^k_{t+1}) P_0((C^{i,k}_t * r^k_{t+1} - c_t * r^k_{t+1})) - P_0((C^{i,k}_{t+1} - c_{t+1})) \\
&= P_0(P_t(c_t * r^k_{t+1})) + P_0(P_t((C^{i,k}_t * r^k_{t+1} - c_t * r^k_{t+1}))) - P_0((C^{i,k}_{t+1} - c_{t+1})) \\
&= P_0(c_t) + P_0(C^{i,k}_t - c_t) - P_0(C^{i,k}_{t+1} - c_{t+1})
\end{aligned}
$$

The Net Present Value of the entire stream of cash flows is therefore:

$$
\begin{aligned}
E_t[\sum_{j=1}^{H} M_{0,j} \tilde{F}_j] &= \sum_{j=1}^{H} (P_0(c_{j-1}) + P_0(C^{i,k}_{j-1} - c_{j-1}) - P_0(C^{i,k}_j - c_j))] \\
&= \sum_{j=1}^{H} [P_0(c_{j-1})] + P_0(C^{i,k}_0 - c_0) - P_0(C^{i,k}_H - c_H))
\end{aligned}
$$

By definition, $C^{i,k}_0 - c_0 = 0$. By the assumption that $z_H = 1$ and $c_H = 0$, in the final period any remaining capital balance will be paid out and there will be no additional contributions, such that $(C^{i,k}_H - c_H) = 0$. Therefore, the final expression holds true.

$$
E_t[\sum_{j=1}^{H} M_{0,j} \tilde{F}_j] = \sum_{j=1}^{H} [P_0(c_{j-1})] = 1
$$

$\square$

B.2 Computing Fixed Income Balances

Unlike in the case of bank loans, the principal balance of private credit funds, which is needed to construct the replicating portfolio benchmarks, is not directly observable. By assuming the cash flows follow a fixed income structure (e.g., debt and preferred equity), we obtain a straightforward approximation of the outstanding principal balance when debt/fixed income in each private debt fund earns a promised rate of return c_i on an outstanding principal balance $Prin_t^i$. Under this structure, the following law of motion can describe the principal balance of each private credit fund:

$$Prin_{t+1}^i = Cont_{t+1}^i + Prin_t^i * (1 + c_i) - Dist_{t+1}^i$$

The law of motion says that the principal balance of the debt fund is equal to any new capital contributions, plus the return on the previous period's capital balance, minus any capital distribution. Further, this law of motion requires the terminal condition that the principal balance becomes zero at the end of the fund's life, $Prin_{t_{final}}^i = 0$.
Because the $Dist_{t+1}^i$ and $Cont_{t+1}^i$ are directly observable, we solve for the c_i for each fund that satisfies the terminal condition, to obtain a series of $Prin_t^i$ for each private debt fund i in our sample. The change in $Prin_{t+1}^i$ is used to construct the gain benchmark funds following Flanagan (2024), and the fraction of principal paid out each period is used for the construction of the rollover benchmark funds described above.