

WORKING PAPER





Performance of Private Credit Funds: A First Look

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ABSTRACT

Although private credit funds have rapidly grown into a standalone asset class over the last decade, little is known about the aggregate performance of these funds. To provide a first look at absolute and relative performance, we utilize the Burgiss database of 476 private credit funds with nearly \$480 billion in committed capital, including a subset of 155 direct lending funds. We review the recent trends within private credit, provide an overview of various strategies, describe returns since 2004 and compare private credit to several benchmark indices in order to develop a preliminary view of performance and risk across various private credit strategies. Measures of absolute performance reveal IRRs that are positive for the top three quartiles across all strategies. The leveraged loan index provides the best fit as a benchmark across most private credit strategies. Measures of relative performance (PMEs) suggest that private credit funds have performed about as well, or better than, leveraged-loan, high-yield and BDC indexes. Direct lending funds have relatively low beta and positive alpha compared to the leveraged loan or high yield indices. In addition, direct lending funds low correlation with benchmark indices may indicate diversification benefits relative to other credit strategies.

1. Introduction

Private credit funds rapidly grew in popularity before the financial crisis, but fundraising activity slowed significantly in 2009-2012. More recently private credit funds have collected capital commitments on par with the market peak in 2008 and have cemented their position as a standalone asset class. However, little is known about the characteristics, including performance, of the asset class. Limited disclosure requirements along with variations in strategy, differences in structure and lack of long track records contribute to the problem. Several commercial data providers collect some descriptive and performance data on these funds. However, each has a unique approach to doing so, incorporates different potential biases, and captures only a subset of the private credit fund universe. In this analysis, we utilize the Burgiss database of institutional-quality private credit funds to evaluate performance of 476 private credit funds, including a subset of 155 direct lending funds. Utilizing this data set, we review the current trends within private credit, provide an overview of various strategies, describe returns since 2004 and compare private credit to several benchmark indices in order to develop a preliminary view of performance and risk across various private credit strategies.

Opportunities to invest in private credit have expanded dramatically over the last decade as traditional bank lending was constrained during the credit crisis and alternative sources of risk capital stepped in to fill the void. In the wake of the financial crisis, many financial institutions faced the need to de-lever, increased regulatory scrutiny and higher capital reserve requirements. Post-financial-

crisis regulation, including adoption of Basel III in 2010 placed increased capital requirements on the global banking system, particularly those identified as systemically important financial institutions. Similarly, the passage of the Dodd-Frank Wall Street Reform and Consumer Protection Act in the United States placed additional restrictions and oversight on the banking system to limit risk taking. One provision, the so-called Volker Rule, limited proprietary trading and bank's exposure to illiquid investments, particularly private equity and hedge fund investments. Although not directed generally at commercial loans, the rule bars loans to certain private equity funds or hedge funds. In order to strengthen their balance sheets and comply with the new regulatory regimes, traditional banks curtailed their corporate lending operations. As the banks retreated, asset managers developed a range of private credit strategies to meet the growing capital needs of companies, particularly in the middle market, which were no longer being met by traditional sources of capital. Similarly on the demand side, institutional investor appetite for private credit has grown. Faced with a historically low interest rate environment, institutional investors have increased allocations to private credit under the auspices of attractive risk-reward characteristics, cash yields frequently with an embedded inflationary hedge, expectations for low correlation with the rest of their portfolio, and the assumptions of an imbedded liquidity premium relative to traditional fixed income investments.

The increase of both supply and demand for private credit has resulted in substantial growth in assets under management (AUM). A recent analysis by Preqin reported that private credit AUM has grown 16% annually since 2006, with most of that growth having been realized in the post-financial-crisis period. Panel A of Figure 1 shows that investments in private credit approached \$600 billion globally by the end of 2016.¹ Likewise, a 2017 survey conducted by Pension & Investments indicated that U.S. institutional investors quadrupled allocations to private credit strategies in the years since the financial crisis (see Panel B of Figure 1). According to their survey, commitments to private credit grew every year since 2010 reaching \$18.3 billion in 2016. In 2017, global private credit funds closed on \$118.7 billion of new fund commitments, the most of any year on record.² In fact, global fundraising in private credit has grown more than 2.5 times the annual growth rate of private equity buyout funds.³

¹ 2017 Preqin Global Private Debt Report

² See Cox and Hanson (2017)

³ Ibid

2. The Structure of Private Credit

Private credit includes a wide array of fund structures and investment strategies, so defining the universe of private credit can be difficult. In the broadest sense, private credit investments are debt-like instruments that have no readily tradeable market or publicly quoted price. Typically, private debt is provided by non-bank entities to fund middle-market companies, but can include funding for larger companies as well. Private credit has many features similar to traditional credit instruments including variations in seniority, tenor, amortization, collateral provisions and floating or fixed interest rate coupons, among others. However, there is significant variation across private credit investment fund structures and strategies.

Closed-end investment vehicles are often, but not exclusively, utilized to invest in private credit because of the limited liquidity in the underlying credits. Many private credit transactions involve the bilateral negotiation of terms and conditions to meet the specific needs and objectives of the individual borrower and lender(s) without the need to conform or comply with traditional regulatory or listing requirements. The bilateral origination of a loan between a single borrower and lender is often referred to as “direct lending”, but transactions originated between a borrower and narrow group of lenders can be described as direct lending as well. Since there is often limited active trading in the primary or secondary markets for private credit instruments, lenders tend to structure or purchase the loans with a view towards holding the exposure until maturity or a refinancing event. As a result, the instruments can include features uncommon to traditional loans, such as a structured equity component, high prepayment penalties, customized amortization schedule or a role in oversight or management of the company. Private credit vehicles invest in both performing loans as well as debt in stressed or distressed companies.

As a result of the significant variation in underlying strategies, terms, structure and liquidity, the risk and return expectations vary widely across private credit strategies. The landscape of private credit includes business development companies (BDCs), mezzanine funds, distressed funds, special situations funds, direct lending funds, and various other strategies like structured credit vehicles or multi-credit strategy funds, among others. Definitions of private credit vehicles can also be expanded to include syndicated leveraged loan funds, venture debt and peer-to-peer lending platforms like Lending Tree, Lending Club, and SoFi, but characteristics of these strategies begin to diverge from other private credit strategies.

Structured, closed-end credit vehicles like CLOs that invest in syndicated leveraged loans are often conflated with private credit. The leveraged loan market has many similar characteristics to private credit funds including structure, tenor, spread, less regulatory oversight, fewer reporting requirements and trading in a smaller, less liquid market. The CLO structure has additional characteristics that are similar to a private credit fund. However, there are substantial differences, including tranching, that make CLOs distinct. The underlying assets, leveraged loans, are originated by banks on behalf of large corporate borrowers, rated by the credit rating agencies, syndicated to institutional investors and subsequently traded in the secondary (over-the-counter) market. Also, syndicated leveraged loans generally have conforming characteristics such as seniority, terms and conditions and are almost exclusively originated by banks that syndicate to institutional investors, which subsequently trade or hold the loans. This results in less inherent price discovery, causing lower yields and higher volatility in the leveraged loan market compared to most private credit strategies. Similarly, while venture debt and peer-to-peer lending platforms are more analogous to private credit in terms of price uncertainty, liquidity and lack of a trading market, they compose a very small segment of the private credit landscape in terms of total AUM and come with idiosyncratic risks that make them less similar to more common private credit strategies. Consequently, syndicated leveraged loans funds like CLOs, venture debt and peer-to-peer lending are excluded from this discussion.

What follows is a brief description of the major strategies in private credit:

- **Business Development Companies (BDCs):** BDCs are closed-end investment vehicles organized under the Investment Company Act of 1940. BDCs generally invest in small and mid-sized companies through debt and equity securities as well as derivative securities. BDCs operate under specific regulations designed to spur economic growth through investment in small- and medium-sized businesses. For example, BDCs are required to make available “significant managerial assistance” to certain qualifying investments, leading to active involvement by the BDC in the management and operations of many portfolio investments. The majority of BDCs elect to be treated as regulated investment companies (RIC) for tax purposes, and as a result receive tax-exempt treatment on income, provided they distribute at least 90% of their investment company taxable income. The additional regulatory oversight requires detailed quarterly disclosure, including asset-level loan performance across the portfolio. BDCs can be private or publicly traded investment vehicles. Some BDCs have origination platforms allowing them to source and structure proprietary transactions while

others either purchase assets in the secondary market or from other lenders. BDCs often utilize leverage at the fund level to enhance returns subject to certain statutory constraints. Investors allocate capital to BDCs with the expectations of attractive current income and capital appreciation. Investors in publicly traded BDCs have access to all the required regulatory disclosure and the added benefit of daily liquidity. BDC managers typically target gross returns in the high single digits to low double digits range.

- **Senior Loan Funds:** Senior Loan funds are closed-end vehicles that make senior loan (first or second lien) or unitranche investments in small and mid-sized companies. Unitranche investments are single-tranche financings that combine characteristics of senior and junior debt and serve as the only debt in the company's capital structure. Similar to BDCs, senior loan funds can have origination capabilities and often invest in private equity-backed companies. Senior loans utilize floating rate spreads composed of a risk premium that incorporates the asset specific credit risk and a benchmark rate. Senior loan funds often utilize leverage at the fund level to enhance returns. Senior loan managers typically target gross returns in the high single digits to low double digits range.
- **Mezzanine Funds:** Mezzanine funds are closed-end vehicles that typically make junior capital investments in small and mid-sized companies to fund acquisitions, growth, recapitalizations or buyouts. Mezzanine capital is traditionally a hybrid between debt and equity taking the form of subordinated, unsecured debt or preferred stock. Most mezzanine funds have origination capabilities to source transactions, which are often private equity-backed leveraged buyouts. Mezzanine capital typically includes a fixed-rate coupon commensurate with risks associated with the subordinated position and often includes warrants or other equity-like features to achieve return targets, subject to market conditions. This hybrid structure allows a mezzanine investor to emphasize the capital preservation and current-pay features of a loan while also seeking additional upside through equity participation. Many mezzanine funds also utilize leverage at the fund level. Mezzanine fund managers typically target gross returns in the mid- to upper-teens.
- **Distressed Debt Funds:** Distressed debt funds are closed-end or open-end vehicles that invest in debt securities of mid- to large-sized companies that are experiencing financial distress. Investments are made either by purchasing at steep discounts in the open market or from existing creditors. Distressed debt managers can pursue a variety of strategies including control (loan-to-own), non-control and restructuring (or turnarounds), among others.

Distress for control strategies invest in debt positions identified as the “fulcrum security”—the security that will typically receive the equity of the restructured company upon emergence from bankruptcy, and as a result control the go-forward operations of the company. Non-control strategies, more typical among hedge fund managers with open-end funds, target temporary dislocations in a sector or business. These managers utilize trading strategies to derive attractive yields without pursuing control or holding their positions through a restructuring. Restructuring (or turnaround) strategies focus on acquiring assets at steep discounts that often have an attractive current yield. These strategies exert some operational control to dispose of or reposition specific assets and restructure the company’s capital structure to create value. Restructuring strategies are often executed over an extended period of time, sometimes several years, and as a result, closed-end fund structures are preferred since managers can pursue their strategy without having to manage through redemption requests. While non-control strategies often utilized fund level leverage to enhance returns, it is less common among distress for control and restructuring strategies. Distressed debt managers typically target gross returns in the mid to upper-teens and above. Distress for control and restructuring managers tend to target higher returns than non-control strategies due to the underlying risk profile, extended hold period and reduced liquidity.

- **Special Situation Funds** are typically closed-end vehicles that target investment in mid- to large-sized companies undergoing pricing or liquidity dislocation caused by financial stress or event-driven factors. These situations often involve borrowers with (a) stressed, complex, or underappreciated assets, (b) cyclical, contrarian, or event-driven situations or (c) broader market dislocations. These funds can invest in both privately negotiated transactions and in the secondary markets, seeking to earn strong risk-adjusted returns. Special situation funds differ from distressed debt funds in that they have a much broader mandate of the type of investments they pursue. Additionally, special situation funds can invest across the capital structure, including equity and structured equity. Special situation funds typically target gross returns in the mid- to upper-teens.
- **Other Funds** (structured credit vehicles, opportunity funds, multi-credit strategy funds, specialty finance strategies, etc.): There are a host of other private credit vehicles that pursue a variety of alternative strategies including: structured credit vehicles like CLO’s (previously discussed), CMBS, RMBS and ABS; tactical funds that invest opportunistically anywhere in the capital structure to capture returns in idiosyncratic situations; sector specific strategies like

ship leasing, aircraft leasing, royalty, art or intellectual property financing; and multi-strategy funds that pursue some combination of other strategies as part of a focus on identify and capturing returns through dislocation, illiquidity and mispricing opportunities.

As previously mentioned, a distinction is increasingly made in the market for a subcategory of funds known as “direct lending” funds. The term “direct lending” is often used interchangeably with private credit, but should distinguish private credit funds that predominantly originate investment opportunities bilaterally from private credit funds that predominantly source through a bank or some other intermediary. These direct lending funds cultivate proprietary relationships to source transactions and make investments. These investments are generally senior obligations, but may include unitranche or junior capital. As a result, direct lending investment vehicles include both senior loan and mezzanine funds, as well as BDCs and other funds that predominantly originate loans for investment through proprietary sourcing networks. Direct lending vehicles are often characterized as a stand-alone category within private credit because of the perceived benefit of bilateral negotiated transactions. Characteristics often attributed to direct lending funds are summarized in Figure 2.

Perhaps because of the perceived benefit to investors attributable to proprietary origination versus sourcing through intermediaries, many private credit funds market themselves as direct lenders. Among the various private credit investment strategies, direct lending in particular has experienced the most substantial growth. A recent article in Pensions & Investments found that while institutional investor commitments to private credit strategies continue to grow, direct lending funds have attracted a disproportionate amount of new commitments.⁴ According to a study by Pitchbook, \$52.6 billion was raised in direct lending funds in 2017, the highest ever.⁵ The growth rate of 39.4% annually since 2009 far outpaced the broader 20.4% annual growth of global private credit over the same timeframe.⁶ In addition to evaluating the performance of various private credit strategies, it is also helpful to evaluate direct lending separately, in order to determine if any of the perceived benefits ascribed to it by investors have manifested historically.

3. Data

A new private credit classification and dataset was made available by Burgiss in 2017. We examine a subset of the data that includes 476 private credit funds with vintage years between 2004

⁴ Pensions & Investments Special Report: Private Credit, April 17, 2017

⁵ Pitchbook 1Q 2018 Private Equity Analyst Note: Welcome to the Private Debt Show.

⁶ 2017 Preqin Global Private Debt Report

and 2016. Summary statistics for our sample are provided in Table 1. Analogous to the Burgiss buyout and venture capital fund data utilized by Brown, Harris, Jenkinson, Kaplan, and Robinson (2015); Harris, Jenkinson, Kaplan and Stucke (2014); Harris, Jenkinson and Kaplan (2015), the private credit data are sourced from Burgiss. The Burgiss Manager Universe is a research-quality database that includes the complete transactional history for over 7,800 private capital funds with a total capitalization representing about \$5.5 trillion in committed capital across the full spectrum of private capital strategies. It is representative of actual investor experience because the data are sourced exclusively from limited partners, which avoids the natural biases introduced by sourcing data from general partners. The data include the date of cash flows and is further supplemented with fund profiles. As a result, the Burgiss data include exact size and timing of cash flows as well as precise to-date fund valuations, which are typically reported by each fund on a quarterly basis. The fund data are net of all fees, carried interest paid to the GP and fund-level leverage and thus represent net returns to limited partners.

As noted by Brown et al. (2015), the Burgiss dataset has a number of advantages, including cash flow level data sourced from Limited Partners as opposed to self-reported IRRs and investment multiples, and the overall size of the data set. The Burgiss data differs from many other datasets because of the level of data integrity and completeness that cannot be achieved by voluntary reporting by GPs, or involuntary reporting via Freedom of Information Act (FOIA) or other public records requests. Given detailed and comprehensive cash flow data, it is possible to analyze fund and strategy performance more precisely. For example, we are able to calculate adjusted performance measures analogous to the Kaplan and Schoar (2005) public market equivalents (PMEs) allowing the direct comparison of investments in particular private credit portfolios to an equivalently-timed investment in a benchmark index. The PME calculation discounts all cash flows (both fund contributions and distributions) using a benchmark return and provides a ratio of discounted distributions to contributions. The implication is that a PME greater than 1.0 indicates a fund (or portfolio) performance greater than the benchmark, and vice versa.

While practitioners identify private credit strategies using a wide range of methods, Burgiss adheres to a strict definitional taxonomy when categorizing funds (see Figure 3). For example, in order for a fund to be classified under either “Distressed” or “Mezzanine” at least 70% of the capital invested must be in distressed or mezzanine assets, respectively. Burgiss typically examines portfolio holdings to directly verify fund classification. Similarly, when Burgiss identifies an emerging new

strategy or there is insufficient information to otherwise classify a fund, they will categorize the fund as “Not Elsewhere Classified (NEC)” or “Unknown”, respectively. Here we combine the NEC and Unknown categories to simplify the analysis and exposition. In our sample there are 180 out of 476 debt funds that fall into the Generalist and “NEC & Unknown” categories. Additionally, Burgiss does not report a stand-alone classification for direct lending.

To abide by non-disclosure agreement requirements and safeguard the anonymity of individual funds, data are not tabulated when there are less than 5 funds in a grouping.⁷ Additionally, the impacts of fund-level leverage can create significant variability in returns when evaluating performance. While the adoption of fund-level leverage is a relatively new phenomenon in private equity, it has long been utilized in private credit to enhance LP returns. BDCs have for many years benefited from access to SBIC-guaranteed debt at the fund-level. Other private credit funds have access to loans at the fund level, often times in the form of subscription lines (i.e., capital call facilities). As a result, because the cash flows in the dataset are net of fund-level leverage, two funds composed of identical underlying loan portfolios can report differing LP performance due to fund-level leverage.

In addition to the private credit categorization described in Figure 3, we developed two additional strategies of direct lending funds with the assistance of Burgiss. The first strategy, All Direct Lending, includes all funds in the 476 fund dataset that directly originate 70% or more of their assets. This resulted in a subset of 155 funds being classified as All Direct Lending. The All Direct Lending category was further narrowed by excluding funds that are categorized by Burgiss as “Mezzanine” to obtain a subset of funds that predominantly originate senior loans. This resulted in 64 funds being classified as Direct Lending (excluding Mezzanine).

Table 1 provides statistics for the number of funds and committed capital in each category. Results are provided for all funds and separately for North America and the rest of the world. The 476 funds in our sample have total committed capital of nearly \$480 billion. Across geographies, North American funds comprises the majority of funds, representing nearly 70% of all funds by number of funds and committed capital. The ratios of funds and assets in North America to the rest of world are fairly similar across strategies. The breakdown of funds across strategies shows that 32% (153) are Mezzanine, 30% (143) Distressed, 16% (74) Generalist, and 22% (106) are NEC & Unknown. When measured by committed capital, Distressed is the largest strategy representing 43%

⁷ Note that we include all funds in our analysis, but cannot report individual statistics generated from fewer than 5 observations.

of all committed capital; Mezzanine is the next largest strategy with 27% of committed capital; Generalist and NEC & Unknown together combine for the remaining 30%. When considering our developed categories of direct lending, 33% of all funds can be categorized as All Direct Lending, which represents 25% of committed capital. Direct Lending (excluding Mezzanine) comprises only 13% of all funds by count and 12% by committed capital. Amongst All Direct Lending funds, over 40% are also classified Mezzanine on both a count and committed capital basis.

Table 2 details the number and total committed capital of funds by vintage year from 2004 to 2016. Over these years annual commitments to private credit strategies, including direct lending, grew rapidly across all strategies with the exception of Generalist. Interest in distressed investment strategies peaked in 2008 with \$37.3 billion of new fund commitments. Across all private credit strategies, new commitments declined precipitously in 2009 across every strategy as investors became substantially more risk averse in response to the global financial crisis. Post-crisis, commitments to private credit strategies rebounded across all categories. Direct lending, particularly excluding Mezzanine, experienced massive growth in fund commitments from 2009 through 2016. Commitments to direct lending have increased faster than new funds raised reflecting the growing size of the average fund. On a commitments per fund basis, All Direct Lending and Direct Lending (excluding Mezzanine) have increased more than any other strategy growing 19% and 43% annually in the post-crisis period.

4. Performance

We now turn to examining the performance of private credit funds. Our analysis focusses on pooled performance of strategies, which can be thought of as performance experienced by investors making size-weighted commitments to all funds in a particular strategy.

4.1 Internal Rates of Return and Multiples

Pooled internal rates of return (IRRs) and multiples of invested capital (MOICs) by vintage year are shown in Table 3. It is worth noting that private credit funds demonstrate generally higher IRRs relative to MOICs when compared to private equity funds consistent with the practice of shorter investment holding periods as compared to private equity investments. Across all funds, the pooled IRR is positive for every year from 2004 through 2016, varying from 1.2% for 2004 vintage funds to a high of 14.2% for 2011 vintage funds. Similarly, pooled MOICs ranged from 1.02 for 2016 funds to 1.48 for 2008 funds. The patterns in vintage year IRRs and MOICs for Mezzanine and Distressed

funds generally track the trends for all funds. The performance of Mezzanine funds as a whole is more stable than performance of other strategies. For example, Distressed fund IRRs (MOICs) ranged from 0.8% (1.04) for 2004 funds to 16.2% (1.15) in 2015, and Generalist funds showed the widest range of performance with several vintage years (2004, 2006, 2007, and 2016) experiencing negative IRRs. Direct Lending pooled IRRs and MOICs show performance patterns similar to All Funds but with levels generally exceeding All Fund pooled IRRs in the majority of years. The trend towards lower MOICs relative to IRRs is the result of more recent vintages still making and realizing investments in their portfolios and likely compounded by the use of fund level leverage, so we do not advise drawing inferences on performance from MOICs for vintages after 2011.

Table 4 provides pooled IRRs as well as a quartiles analysis across the full sample period. The results indicate that an investor would have achieved a consistently positive return across all private credit strategies overall and among the top three quartiles of funds. The pooled IRR for all vintages and strategies is 8.1% which is roughly on par with return expectations for equities over this period though perhaps below expectations set by fund managers. Of course, the financial crisis provided a large (and unexpected) negative shock to credit portfolios of earlier vintages. Pooled returns for the full sample period by strategy vary from a low of 2.9% annually for Generalist funds to 10.7% for NEC & Unknown. The direct lending strategies performed better than All Funds, and, in particular, Direct Lending (excluding Mezzanine) was the best performing of all strategies with an 11.8% annual pooled IRR. It is important to note that these values are potentially skewed relative to the All Funds sample because a larger percentage of the direct lending funds are from vintages after the financial crisis. Our subsequent analysis which splits the sample period and utilizes PME's addresses this potential bias.

The results presented in Table 4 also reveal that there is a substantial spread between 1st and 4th quartiles funds as is the case with buyout and venture capital funds. However, 3rd quartile to 1st quartile IRRs ranged from mid-single digits to mid-teens (or higher, for Generalists) for All Funds as well as for all of other strategies. The 3rd quartile All Direct Lending and Direct Lending (excluding Mezzanine) returns were as high or higher than every other category at 7.5% and 7.1%, respectively. The range of IRR outcomes for direct lending funds was similar to that for all funds, yet between the 3rd quartile and 1st quartile direct lending IRRs were tighter than other categories suggesting lower volatility of returns for the majority of funds. For example, in the case of Direct Lending funds the 3rd quartile to 1st quartile pooled IRRs ranged from 7.5% to 16.4%, a spread of 8.9%, compared to

7.1% to 16.7%, a spread of 9.6% for All Funds. These results could be affected by the skew toward more recent vintages for Direct Lending funds.

We repeat the quartile analysis after bifurcating the sample into pre-crisis and post-crises sub-periods and report the results in Table 5. Pooled IRRs for 2009-2016 funds are higher than for the pre-crisis vintages for All, Mezzanine, Distressed, and Generalist funds. Interestingly, the performance of direct lending funds raised in the post-crisis period is lower than for funds raised in the pre-crises period. However, referring back to Table 3, this result is driven largely by the very strong performance of 2008 vintage direct lending funds which likely made the bulk of their investments in the post-crisis period on quite favorable terms. The pooled IRRs improved in the post-crisis period across the top three quartiles for all primary strategies. For both categories of direct lending funds the performance of the top 3 quartiles is not much different for pre-crisis and post-crisis funds. Examining the differences between 1st and 4th quartile pooled IRRs indicates that the spread in returns widened across all primary strategies in the post-crisis period. For example the spread between 1st and 4th quartiles for All Funds increased from 16.4% in the pre-crisis period to 20.1% in the post-crisis period (despite the fact that there are many more funds in the post-crisis pooling which would tend to smooth out performance *ceteris paribus*). To further examine risk and relative returns we now turn to an analysis of portfolio time-series returns and benchmarked performance.

4.2 Private Credit Strategies and Benchmarks

Pooling cash flows and quarterly NAVs across funds allows us to generate quarterly time-series returns that can be thought of as return indices for private credit. We do this for all fund strategies. Table 6 presents excess returns (annualized returns less the risk free rate) and standard deviations for these indices as well as the ratio of excess returns to the annualized standard deviation of quarterly returns which is a proxy for the Sharpe ratio. These values allow for a sense of the risk-return trade-offs amongst various strategies. In general, the index return statistics are distinct from the pooled IRRs reported in Table 4, but the relative performance of strategies is similar and most comparable returns are within 1% of each other after accounting for the risk free rate. It is important to note that the standard deviations are calculated using quarterly returns, which in turn rely on fund-reported NAVs.

Table 6 shows that risk in private credit strategies varies. The All Funds and Distressed strategies exhibit risk characteristics generally consistent with those observed in public market equities and fixed income, while Mezzanine and both direct lending strategies are lower. Mezzanine and All Direct Lending strategies have the lowest standard deviations whereas Distressed and especially Generalist funds have higher standard deviations. The estimates of Sharpe ratios suggest that Mezzanine, All Direct Lending and Direct Lending (excluding Mezzanine) have the highest risk-adjusted returns over the 2004-2016 period.

Previous research (e.g., Brown, Gredil, and Kaplan, 2017) suggests that reported NAVs of private equity funds exhibited a smoothing effect. To address the effect of smoothing on our private credit indices we utilize the method described in Getmansky, Lo, and Makarov (2004) to calculate adjusted standard deviations and Sharpe ratios. Specifically, if true returns, R_t , are independently and identically distributed, the q -period standard deviation, $SD(q)$, is the one-period standard deviation multiplied by \sqrt{q} , i.e.,

$$SD(q) = \sqrt{q}SD.$$

Because we utilize quarterly return data $q=4$. However, if returns are autocorrelated from smoothing, the q -period standard deviation, $SD(q)$, can be adjusted by calculating

$$SD(q) = \sqrt{q + 2 \sum_{k=1}^{q-1} (q-k)\rho_k} SD.$$

where $\rho_k \equiv Cov[R_t, R_{t-k}]/Var[R_t]$. We note that the two equations above are identical when all $\rho_k = 0$. Accordingly, the relation between the adjusted Sharpe ratio $SR(q)$ and unadjusted Sharpe ratio SR is

$$SR(q) = \frac{q}{\sqrt{q + 2 \sum_{k=1}^{q-1} (q-k)\rho_k}} SR.$$

The last two columns of Table 6 suggest controlling for autocorrelation results in modestly higher adjusted standard deviations and correspondingly lower adjusted Sharpe Ratios. Despite these adjustments, both direct lending strategies have Sharpe ratios in excess of 1.0.

Another important facet of investing in private credit is the relationship between the risk-return profile of funds and other credit assets that would be available in an open-end fund or directly purchased and held by investors (e.g., leveraged loans or public BDCs). These alternatives can also serve as a potential benchmark and as an index for PME calculations. The question of appropriate benchmarks for private credit is an important one. Potential benchmarks include a high yield bond index, a leveraged loan index, and a BDC index. We consider specific industry standard indexes for each of these options as well as an index specifically created to benchmark direct lending funds created by Cliffwater LLC. Descriptions of each index are provided in Figure 4. Each index has its strengths and weaknesses for use as a benchmark for private credit funds. The High Yield Index (HYI) represents total returns for publicly traded non-investment grade corporate bonds of large global corporations. These will differ from most private credit deals in terms of liquidity, company size, disclosure, fixed versus floating interest rate, and seniority in the capital structure. One obvious difference is that the interest rate duration of the High Yield Index is typically around 4 years which is much longer than for the typical private credit fund because unlike most private credit deals, high yield bonds have fixed-rate coupons. The Levered Loan Index (LLI) represents total returns for syndicated and traded (over-the-counter) non-investment grade loans to large U.S. corporations. As previously discussed, company size and liquidity differ from many private credit strategies, particularly direct lending. The BDC Index is a composite of the returns on publicly traded BDCs. While the BDC Index is likely indicative of the underlying performance of the debt held in BDC portfolios, it is most representative of equity price movements of BDCs, not debt holdings. In contrast, the Cliffwater Direct Lending Index (CDLI) utilizes the underlying loan performance data from SEC filings of the BDCs to create its index and, as a result, should provide a better indication of the return on loans made by BDCs. However, the use of quarterly returns which in turn rely on fund-reported NAVs, makes the CDLI subject to the same NAV smoothing effects and leads to a significant downward bias of estimated volatility. The CDLI does not include fund level leverage or fund management fees (including performance fees) on returns. Finally, Cliffwater invokes the concept of a “3- year takeout yield” by which loans are assumed to converge to par over a 3-year horizon, regardless of the maturity date.⁸ Most of the time, this is a reasonable assumption which reflects the tendency of most loans to be refinanced, prepaid, or taken out prior to maturity. However, during

⁸ See “U.S. Direct Lending and the Cliffwater Direct Lending Index” by Cliffwater Research available at: <https://www.cliffwater.com/reader/viewer.html?file=https://storage.googleapis.com/cdli/DirectLendingandtheCliffwaterDirectLendingIndexNov2016.pdf>

periods such as the Global Financial Crisis when liquidity is scarce, such loans likely take longer than three years to converge to par. This could also contribute to the volatility of the CDLI being noticeably lower than that of similar indices when 2008-2009 are included.

Panel A of Table 7 reports summary statistics based on quarterly returns for the various benchmark indices from 2005 through 2016.⁹ Mean quarterly (annual) benchmark returns range from 1.35% (5.52%) for the LLI to 2.50% (10.37%) for BDCs. Annualized standard deviations vary dramatically from a low of 3.79% for CDLI to 29.82% for BDCs. To better understand the behavior of the benchmarks and the private credit strategies, we plot the time-series of index levels generated from the quarterly return series in Panel A of Figure 5. We standardize all of the index levels to 1.0 at the beginning of 2005. In Figure 5, the benchmarks are plotted with dotted lines and the private credit strategies are plotted with solid lines. The plots reveal that, as expected, most index returns experience large drops during the financial crisis (CDLI is the exception) though the magnitudes of the declines vary substantially. For example, the BDC index and Generalist funds strategy experience negative returns in excess of -50% from peak to trough in the 2007-2009 period whereas the Mezzanine strategy declines only about 15%. From 2009 through 2016, all of the private credit strategies experience nearly uninterrupted positive returns. During the same period, the benchmarks experience overall positive returns, but each benchmark except CDLI has notable periods of decline, most obviously in 2014-2015 period. Panel B of Figure 5 plots the same benchmarks as Panel A but also the return indices for the Direct Lending and Direct Lending (excluding Mezzanine). The plots clearly indicate the outperformance of both direct lending strategies over the full sample period. However, we again note an important caveat to this finding: a large majority of actual investments into direct lending funds came after the crisis period when the performance of the various benchmarks was quite strong.¹⁰ A qualitative analysis of the plots suggests that the trends in the LLI and HYI more closely match the trends in the private credit strategies. The CDLI appears unrealistically stable especially during the financial crisis. In contrast, the BDC index appears to be substantially more volatile than the private credit strategies. These observations are consistent with the statistics reported in Panel A of Table 7.

⁹ The CDLI available reported data dates back to September 2004 so we limit our analysis in this section to 2005-2016.

¹⁰ If we re-index the private credit series so that 2009=1.0 (results available on request), it is more obvious what has happened since the financial crisis. The BDC benchmark performs much better than all of the private credit indices and the Levered Loan benchmark performs somewhat worse.

Panel B of Table 7 reports pairwise correlations for all of the benchmark indices and private credit strategies. For each private credit strategy, the correlations range from around 0.6 to almost 1.0. The correlations between Direct Lending, and especially Direct Lending (excluding Mezzanine), with the other private credit strategies are lower—generally in the range of 0.3 to 0.7. This suggests that there may be significant diversification potential *inside* of private credit strategies. Examining the correlation between the benchmarks and the various private credit portfolios reveals that the correlations between the benchmarks and all of the primary private credit strategies are consistently positive and large (roughly between 0.5 and 0.9). The correlations between the benchmarks and the Direct Lending indices are notably lower (roughly between 0.2 and 0.6). This suggests both that there are diversification benefits to Direct Lending and that it is likely more difficult to benchmark. Finally, we note that the benchmarks themselves have pairwise correlations that vary from as low as 0.51 between LLI and CDLI to as high as 0.93 between BDC and HYI.

The analysis in this section suggests that there is not an obvious best benchmark for all private credit funds or any particular strategy. Qualitatively, it appears that the levered loan index and high yield index are more appropriate benchmarks than BDCs or CDLI. One caveat for HYI is that bond returns benefited from a tailwind of generally declining interest rates over our sample period.

4.3 Risk Analysis and PMEs

To better understand the relationship between returns on the private credit indices and benchmark returns we conduct a regression analysis. Specifically we estimate a modified version of the market model as described in Dimson (1979) that includes lagged benchmark returns to account for slow updating of NAVs as reported by funds. Specifically, we estimate the model

$$R_t = \alpha + \beta_t BM_t + \beta_{t-1} BM_{t-1} + \beta_{t-2} BM_{t-2} + \varepsilon_t \quad (1)$$

where the dependent variable R_t is the quarterly return on a private credit strategy, and the independent variables are the contemporaneous benchmark return, BM_t , and two lagged values of the benchmark returns. β_t is the estimated ordinary least squares coefficient for BM_t . The estimated coefficient α is a measure of quarterly excess return and ε_t is the model error. The two lags account for the possibility of stale NAVs. We estimate this model with quarterly returns for the full sample period, for all 7 private credit strategies, using all four of the benchmark indices.

Table 8 reports the findings of the regression analysis. Panel A summarizes the regression estimation of the 7 private credit strategies on the high yield index (HYI). For each of the private credit strategies there is at least one statistically positive coefficient estimate suggesting a reliable relationship between quarterly HYI returns and the private credit strategies. However, the coefficient on the contemporaneous benchmark return for both direct lending strategies are close to zero whereas for the other strategies the contemporaneous benchmark return is consistently the most important. This suggests slower updating of NAVs for direct lending funds. In fact, for all of the private credit strategies, the lagged HYI returns are a statistically reliable explanatory variable suggesting there are systematic delays in updating NAVs for all strategies.

The sum of the three benchmark coefficients (reported in the last row) is a measure of relative risk of the private credit indices compared to HYI. Interestingly the values are quite varied. For All Funds, the value is close to 1.0 (specifically, 1.03) which indicates that the riskiness of the private credit funds as a whole is very similar to the risk of HYI. However, it appears that the Distressed and Generalist strategies have risk that is notably greater than HYI whereas the other strategies, and especially both direct lending strategies, have much lower risk than HYI. The adjusted R-squareds of the regressions provide a measure of how well the model fits each private credit strategy. The values around 0.8 for the All Funds and Distressed funds suggest HYI (including lagged returns) explains well the variations in these returns. The values closer to 0.6 for Generalist and NEC & Unknown suggest a weaker fit for these strategies. The values of around 0.4 for Mezzanine and both direct lending strategies suggest that HYI explains little of these returns.¹¹ Finally, we note that the estimates of alpha for these indices vary across private credit strategy. For All Funds and Distressed funds there is no significant difference in performance relative to HYI on a risk-adjusted basis. Mezzanine and both direct lending strategies demonstrate significantly positive alpha relative to HYI. Generalist funds have a significantly negative alpha.

Panel B of Table 8 repeats the analysis using the BDC index as the benchmark. In general, the signs of coefficients are very similar to those reported in Panel A, however the magnitudes of coefficients are much lower suggesting that private credit funds have risk that is much lower than the BDC index. As previously mentioned, the BDC index is a composite of the returns on publicly traded BDCs. It is most representative of equity price movements of BDCs, and as a result has more inherent

¹¹ Note that there is a relationship between the low R-squared estimates and low sum of index coefficients which suggests the possibility of an omitted variables bias.

risk as compared to the underlying loans. This is intuitive given the results shown previously in Table 7 and Figure 5 indicating how volatile the BDC index was over 2005-2016. For example, the sum of index coefficients is only 0.400 for All Funds when using BDCs as a benchmark. Likewise, adjusted R-squareds are lower for all the indices except Mezzanine. Together these results suggest the BDC index explains less as a benchmark for private credit than the HYI.

Panel C of Table 8 repeats the regression analysis using the leveraged loan index, LLI. The results in this case look much more like those for HYI. However, the sum of the index coefficients are uniformly higher when using LLI. Likewise, the adjusted R-squareds are generally higher for LLI except for both direct lending strategies. These results suggest LLI provides a better fit as a benchmark than HYI for all strategies except Mezzanine and direct lending. Again, Mezzanine and both direct lending strategies demonstrate significantly positive alpha relative to LLI.

Panel D of Table 8 shows results using CDLI as the benchmark index. The results appear consistent with the previous concerns about the unreasonably low volatility of CDLI. In particular, the sum of index coefficients suggests that the All Funds category has risk more than twice that of the CDLI. In the case of Generalist funds, the results suggest the index is more than four times as risky as CDLI. This evidence suggests that CDLI is unlikely to explain much of the returns for All Funds, Distressed, Generalist or NEC & Unknown funds. However, the CDLI appears to provide a better fit for Mezzanine and direct lending funds, which is consistent with the objectives of its creators to define a benchmark more narrowly focused on these funds. However, the sum of index coefficients for the Mezzanine funds (1.410) is still larger than might be expected. If this value is too large, it would suggest that the negative alpha for Mezzanine is too low.

One way to evaluate which benchmark provides the best fit for each private credit strategy is to examine the Adjusted R-squareds across the different benchmarks. For 4 of the 7 private credit strategies (All Funds, Distressed, Generalist, NEC & Unknown) the LLI provides the best fit. For 2 of the strategies (Mezzanine and Direct Lending) the CDLI provides the best fit. For Direct Lending (excluding Mezzanine), the HYI provides the best fit. Consequently, it appears that LLI is the best single index, but that it should not be a default choice given differences in risk and return characteristics across the various strategies.

The final step in our analysis is to calculate public market equivalents (PMEs) for each of the private credit strategies. Unlike private equity PME that use stock indices as benchmarks, our

candidate private credit benchmarks are not all easily investible. In particular, investing in assets that would closely match the performance of the CDLI index would require a specialized (institutional) trading platform. However, investments similar to HYI, LLI and BDCs can be done through ETFs and other fairly low-cost open-ended portfolio products.

With this in mind, Panel A of Table 9 shows Kaplan and Schoar (2005) PME's using the four different benchmarks for the 7 different private credit strategies. For all of the benchmarks except LLI, and across all of the indices, the PME's are mostly close to, but less than 1.0 (0.96 and 0.99). This indicates that the returns to actual capital invested in the private credit indices perform roughly in line with the HYI, BDC, and CDLI benchmarks. In contrast the PME's relative to LLI are consistently greater than 1.0 suggesting performance from private credit funds in excess of the LLI index.

Given the previous analysis suggesting that LLI is a reasonable choice as a benchmark for private credit funds overall (although perhaps less so for Mezzanine and direct lending strategies), we also calculate PME's by vintage year using LLI and report those in Panel B of Table 9. The results indicate substantial common time-variation in PME's. Specifically, PME's for vintages prior to 2010 are less than 1.0 for All Funds except for the 2005 vintage funds. For vintage years from 2010 through 2016, PME's are 1.18 or greater. Looking at results from other strategies, we see that PME's for Mezzanine funds are greater than 1.0 in every vintage year except 2008. Distressed funds perform similarly to all funds whereas Generalist and NEC & Unknown funds have quite variable PME's across vintage years. Direct lending funds have PME's greater than 1.0 for all vintage years except 2006, but PME's for Direct Lending (excluding Mezzanine) are more variable. Overall, a dominant pattern emerges of higher and more stable PME's across all strategies for the vintage years after 2010.

Panel C of Table 9 shows PME's by geography using the LLI benchmark. The results indicate that relative performance outside of North America is roughly on par with that for North America. All of the strategies in both geographies have PME's greater than 1.0. In general, there is no clear trend towards higher performance by geography for the different strategies.

Altogether, the results in this section show that there are important differences across potential benchmarks that can affect how relative performance is evaluated. It appears that the public BDC index is too volatile to serve as the best fit as a benchmark for private credit strategies. In contrast, the CDLI benchmark probably underestimates volatility of returns in private credit, though it seems to provide the best fit versus index returns for Mezzanine and All Direct Lending funds. The High

Yield Index (HYI) adequately explains broad private credit returns, but the Leveraged Loan Index (LLI) does even better.

5. Conclusions

This paper provides the first detailed analysis of the performance of private credit funds. We find that funds on average provide mid- to high single digit returns with the top three quartiles of funds providing consistently positive returns across a range of strategies and vintage years. This performance is noteworthy given that our sample period includes the years during the global financial crisis. On an adjusted basis, we find that there is no single benchmark that is clearly preferred for calculating relative performance. This may be partially due to the evolving nature of the asset class (i.e., a relatively small number of funds before 2009 in many strategies). With just one full cycle and a limited number of funds, it is empirically difficult to identify precise risk characteristics of different private credit strategies. That said it appears that the Leveraged Loan Index provides the best fit among benchmarks we examined for most private credit strategies. Public market equivalent (PME) measures using the LLI as a benchmark suggest that private credit has generally provided superior performance. However, other benchmarks suggest average or slightly below average performance on a PME basis. Direct lending funds have relatively low beta and positive alpha compared to the leveraged loan or high yield indices. Additionally, direct lending funds' low correlation with all benchmark indices indicate they could provide diversification benefits for investor portfolios. Overall, this paper provides new insights into returns and risks of private credit funds, but a more definitive analysis will likely rely on observing an additional credit cycle where the performance of the large number of more recent funds can be observed.

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Figure 1. Growth in Private Credit

Figure 1 Panel A and B illustrate the growth in private credit over the last decade. Panel A shows growth in uncalled committed capital and unrealized value of private debt strategies, as reported for 2006 through 2016 in the 2017 Preqin Global Private Debt Report. These funds include direct lending, distressed debt, mezzanine, special situations and venture debt. Panel B reports annual commitments to private credit as reported Williamson and Jacobius (2017).

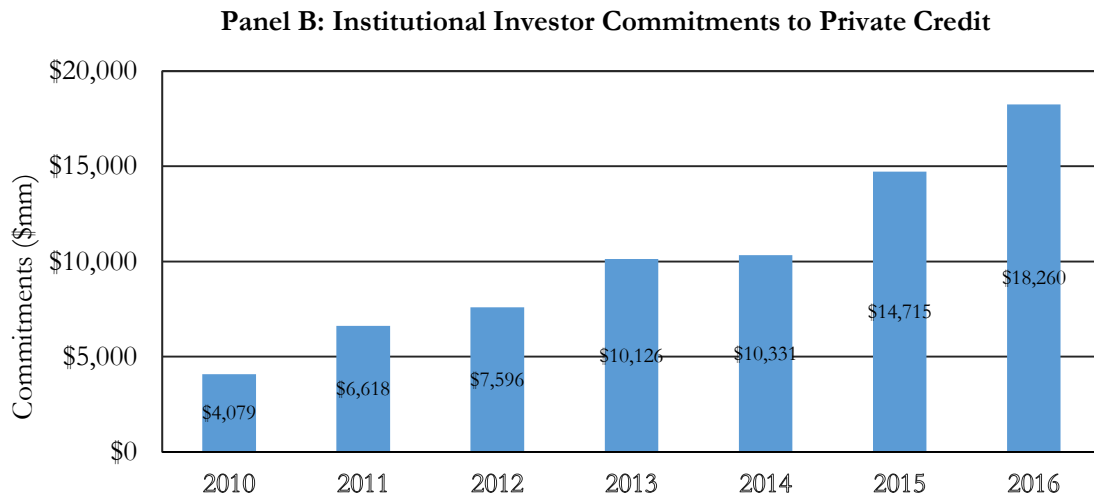
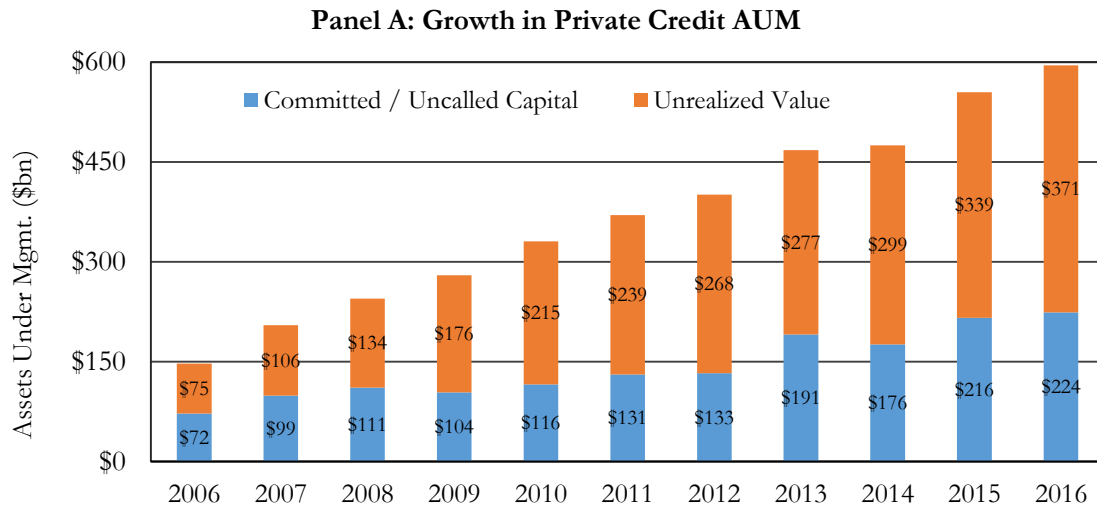


Figure 2.

This figure provides a summary of qualitative characteristics commonly attributed to direct lending.

Advantages	Risks
<ul style="list-style-type: none">• Direct access to management teams can result in more in-depth due diligence• Greater flexibility to meet borrower specific needs• Opportunity to structure more attractive terms and conditions for lenders because of lack of competition (covenants, amortization, rate)• Ability to capture origination and prepayment fees as incremental sources of return	<ul style="list-style-type: none">• Lower liquidity• Greater price uncertainty• Higher credit risk inherent in small and mid-size companies• Greater structural complexity – harder to evaluate risks• Limited observable performance track-record to evaluate managers• Fund level leverage can obfuscate asset level returns and portfolio credit risk

Figure 3. Private Credit Fund Taxonomy

The Burgiss Private Capital Classification System (“PCCS”) is the set of taxonomies used to classify private capital across all levels of investing, including funds, their underlying holdings, and direct investments. Its goal is to help bring more transparency, standardization and precision to the classification process. Detailed below is a summary of the various debt-related taxonomies which have been added to PCCS, as well as additional information on how they are applied in Burgiss’ datasets.

<p>Burgiss Private Debt Investments are loans, bonds, credit derivatives and other related securities of companies, government entities or tangible assets.</p>			
<p><u>Generalist</u> Debt investments which have less than 70% of capital invested into any single category.</p>			
<p><u>Distressed</u></p> <p>Debt investments into companies / tangible assets under stress or distress, resulting in a substantial discount to the securities’ par value.</p>	<p><u>Mezzanine</u></p> <p>Debt investments which are subordinate to other debt in the capital structure and are backed by little to no collateral. Securities are generally term loans and notes; may contain warrants / conversion rights.</p>	<p><u>Not Elsewhere Classified (NEC)</u></p> <p>Debt investments which belong to an emerging or less meaningful area of debt investing (e.g. senior debt), and are therefore not yet formally recognized as a discrete category in taxonomy structure.</p>	<p><u>Unknown</u></p> <p>Debt investments with insufficient information to be more precisely classified.</p>

Figure 4. Description of Benchmark Indices

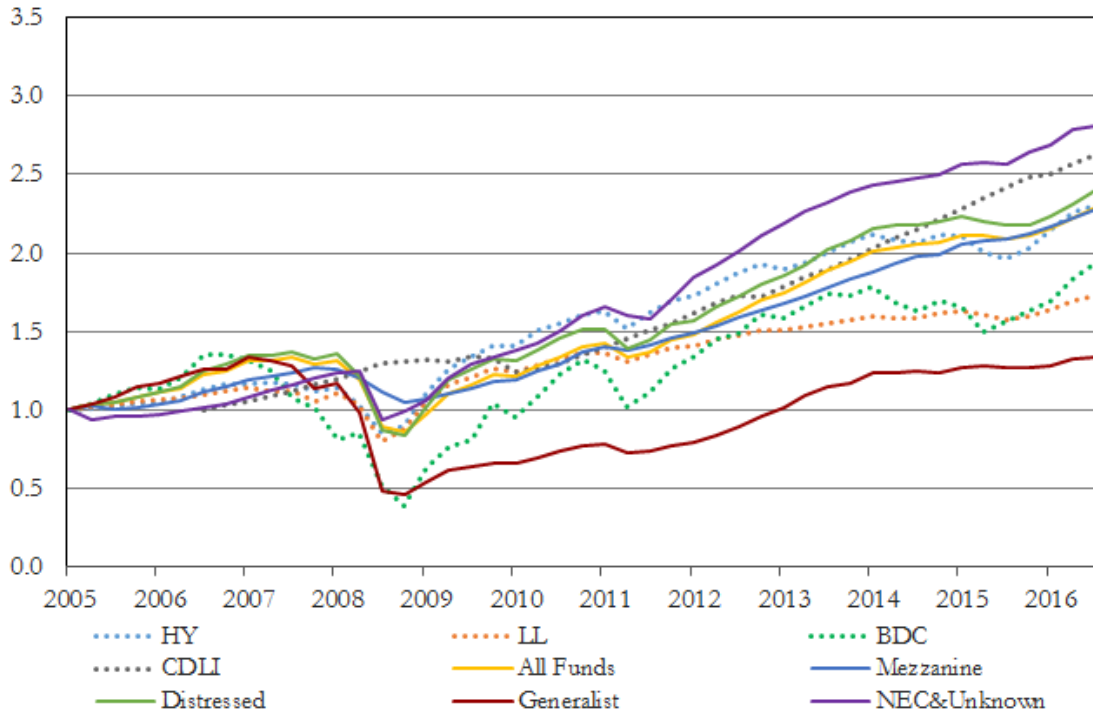
Figure 4 provides summary descriptions of benchmark indices utilized to evaluate private credit fund performance.

High Yield Index (HYI)	ICE Bank of America Merrill Lynch Global High Yield Index (HW00) tracks the performance of USD, CAD, GBP and EUR denominated below investment grade corporate debt publicly issued in the major domestic or eurobond markets. Qualifying securities must have a below investment grade rating (based on an average of Moody’s, S&P and Fitch), at least 18 months to final maturity at the time of issuance, at least one year remaining term to final maturity as of the rebalancing date, a fixed coupon schedule and a minimum amount outstanding that varies by currency. Additional details are available at: https://www.mlindex.ml.com/gispublic/bin/getdoc.asp?fn=HW40&source=indexrules
Levered Loan Index (LLI)	The S&P/LSTA U.S. Leveraged Loan 100 is designed to measure the performance of the largest segment of the U.S. syndicated leveraged loan market. The S&P/LSTA U.S. Leveraged Loan 100 is a market value-weighted index. LSTA/Thomson Reuters Mark-to-Market Pricing is used to price each loan in the index. LSTA/Thomson Reuters Mark-to-Market Pricing is based on bid/ask quotes gathered from dealers and is not based upon derived pricing models. The index uses the average bid for its market value calculation. Each loan facility’s total return is calculated by aggregating the interest return, reflecting the return due to interest paid and accrued interest, and price return, reflecting the gains or losses due to changes in end-of-day prices and principal prepayments. The return of each loan facility is weighted in the index based upon its market value outstanding. Additional details are available at: https://us.spindices.com/indices/fixed-income/sp-lsta-us-leveraged-loan-100-index
BDC Index	The S&P Net Total Return BDC Index is designed to measure the performance of Business Development Companies. Constituent companies are BDCs that trade on the major U.S. exchanges, have float-adjusted market capitalization of at least \$100 million (\$75 million for current index constituents) and have for the prior 12 months prior to the rebalancing reference date, a total value traded of at least \$50 million (35\$ million for current index constituents). Additional details are available at: https://us.spindices.com/documents/methodologies/methodology-sp-bdc-index.pdf
Cliffwater Direct Lending Index (CDLI)	The Cliffwater Direct Lending Index (CDLI) is constructed from quarterly SEC filing covering more than 60 public and private BDCs that existed during all or part of the period beginning in 2004. Those BDCs held approximately \$75 billion in assets covering more than 5,000 loans. Index reported quarterly, with 75 day lag. BDC that filed later than 75 calendar days after quarter-end or report less than 75% of their assets as direct loans are excluded. Index weighting is asset-weighted by reported “fair value”. Rebalancing is done quarterly with universe reconstitution. Additional details are available at: http://www.cliffwaterdirectlendingindex.com/

Figure 5. Private Credit Indices

This figure plots the quarterly indices of private credit funds and benchmark indices. The sample includes all private credit funds listed by Burgiss with vintage year between 2004 and 2016. Each fund is classified as Mezzanine, Distressed, Generalist, Not Elsewhere Classified or Unknown. Panel A plots the quarterly indices of traditional private credit funds with three different benchmark indices, including high yield index, BDC index and leveraged loan index; Panel B plots the quarterly indices of both direct lending strategies with benchmark indices.

Panel A: Traditional Private Credit and Benchmark Indices



Panel B: Direct Lending and Benchmark Indices

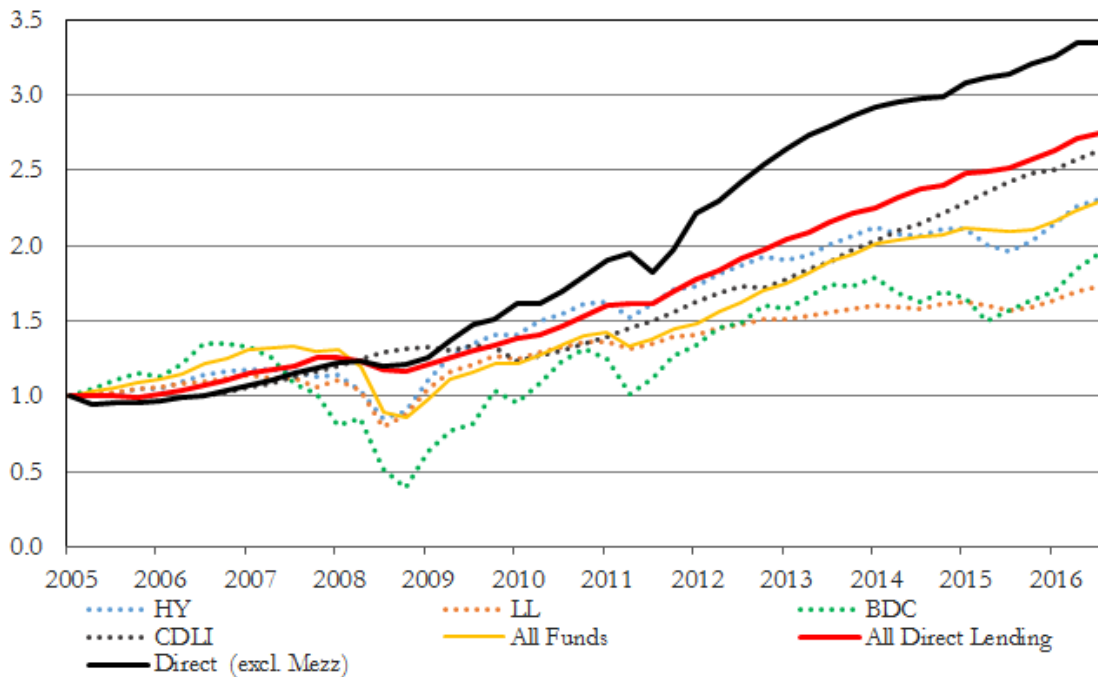


Table 1. Descriptive Statistics

This table shows the number of private credit funds and the total committed capital (millions USD) of funds in North America and the rest of world. The sample includes all private credit funds listed by Burgiss with vintage year between 2004 and 2016. Each fund is classified as mezzanine, distressed, generalist, or not elsewhere classified (NEC) and unknown. Funds doing primarily direct lending are listed separately.

	# of Funds			Committed Capital Total (\$MM)		
	Total	North America	Rest of World	Total	North America	Rest of World
All Funds	476	326	150	\$479,575	\$329,747	\$149,828
Mezzanine	153	119	34	129,645	95,863	33,782
Distressed	143	98	45	208,204	147,136	61,068
Generalist	74	45	29	57,776	38,471	19,305
NEC&Unknown	106	64	42	83,950	48,277	35,673
Direct Lending Only:						
All Direct Lending	155	120	35	\$121,375	\$89,454	\$31,921
Direct Lending (excl. Mezz)	64	47	17	55,213	37,673	17,540

Table 2. Descriptive Statistics by Vintage Year and Category

This table shows the number of private credit funds and the total committed capital (million USD) of funds by vintage year. The sample includes all private credit funds listed by Burgiss with vintage year between 2004 and 2016. Each fund is sub-classified as mezzanine, distressed, generalist, or not elsewhere classified (NEC) & unknown. Funds doing primarily direct lending are listed separately. Panel A reports the number of funds; Panel B reports the total committed capital (million \$). Asterisks denote vintage years with fewer than 5 funds.

Panel A: Number of Funds

	Year													
	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	
All Funds	21	23	27	28	50	14	33	35	31	46	57	64	47	
Mezzanine	6	16	13	10	18	*	12	12	11	9	15	14	14	
Distressed	7	5	10	12	22	6	13	12	6	14	13	19	*	
Generalist	6	*	*	*	*	*	5	*	*	13	9	10	10	
NEC&Unknown	*	*	*	*	7	*	*	7	10	10	20	21	19	
Direct Lending Only:														
All Direct Lending	8	10	7	8	17	*	12	12	13	17	19	16	13	
Direct Lending (excl. Mezz)	*	*	*	*	*	*	*	5	6	11	9	11	7	

Panel B: Committed Capital Total (Million USD)

	Year													
	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	
All Funds	\$9,200	\$13,621	\$26,824	\$45,333	\$65,883	\$13,421	\$25,743	\$35,341	\$34,219	\$50,592	\$51,101	\$60,919	\$47,378	
Mezzanine	1,508	8,686	9,617	12,183	13,028	*	6,604	11,663	14,851	6,667	14,018	9,578	19,303	
Distressed	4,293	4,282	12,250	25,489	37,274	8,914	16,587	13,771	13,502	23,044	17,390	24,777	*	
Generalist	2,547	*	*	*	*	*	1,494	*	*	12,300	4,946	8,340	8,503	
NEC&Unknown	*	*	*	*	13,929	*	*	4,025	4,639	8,581	14,747	18,224	12,941	
Direct Lending Only:														
All Direct Lending	\$2,266	\$3,827	\$4,625	\$3,154	\$21,965	*	\$5,971	\$9,927	\$13,479	\$12,985	\$10,362	\$14,181	\$17,414	
Direct Lending (excl. Mezz)	*	*	*	*	*	*	*	2,332	2,861	9,822	6,499	11,109	7,572	

Table 3. IRR and MOIC by Vintage Year

This table shows the pooled internal rate of return (IRR) and multiple of invested capital (MOIC) of private credit funds by vintage year. The sample includes all private credit funds listed by Burgiss with vintage year between 2004 and 2016. Each fund is sub-classified as mezzanine, distressed, generalist, or not elsewhere classified (NEC) & unknown. Funds doing primarily direct lending are listed separately. Panel A reports pooled IRR of all funds in each group by vintage year; Panel B reports pooled MOIC.

Panel A: Pooled IRR

	Year													
	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	
All Funds	1.2%	5.3%	3.5%	5.2%	13.0%	10.1%	10.1%	14.2%	7.8%	6.1%	9.1%	11.7%	5.8%	
Mezzanine	5.7%	5.2%	5.3%	8.0%	9.7%	*	10.9%	10.1%	7.9%	7.2%	11.2%	7.2%	9.6%	
Distressed	0.8%	5.3%	6.9%	5.8%	13.2%	10.6%	9.8%	11.7%	7.4%	7.2%	12.3%	16.2%	*	
Generalist	-2.4%	*	*	*	*	*	11.2%	*	*	4.6%	5.2%	7.8%	-2.7%	
NEC&Unknown	*	*	*	*	15.6%	*	*	10.5%	8.0%	4.2%	5.7%	8.5%	13.8%	
Direct Lending Only:														
All Direct Lending	5.0%	6.6%	5.6%	5.9%	13.7%	14.7%	10.3%	10.9%	10.1%	4.4%	9.8%	7.8%	19.4%	
Direct Lending (excl. Mezz)	*	*	*	*	*	*	9.6%	8.6%	8.6%	4.7%	8.1%	7.6%	29.3%	

Panel B: Pooled MOIC

	Year													
	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	
All Funds	1.05	1.29	1.17	1.22	1.48	1.36	1.37	1.37	1.17	1.13	1.12	1.10	1.02	
Mezzanine	1.28	1.27	1.22	1.29	1.37	*	1.33	1.21	1.16	1.11	1.14	1.06	1.03	
Distressed	1.04	1.32	1.36	1.26	1.51	1.41	1.39	1.42	1.17	1.18	1.18	1.15	*	
Generalist	0.89	*	*	*	*	*	1.28	*	*	1.08	1.07	1.08	0.99	
NEC&Unknown	*	*	*	*	1.54	*	*	1.27	1.19	1.09	1.07	1.06	1.04	
Direct Lending Only:														
All Direct Lending	1.20	1.38	1.21	1.26	1.46	*	1.33	1.22	1.21	1.08	1.13	1.07	1.06	
Direct Lending (excl. Mezz)	*	*	*	*	*	*	1.28	1.16	1.17	1.09	1.10	1.06	1.10	

Table 4. IRR by Quartiles

This table details pooled IRRs of private credit funds by quartiles. The sample includes all private credit funds listed by Burgiss with vintage years between 2004 and 2016. Each fund is classified as mezzanine, distressed, generalist, not elsewhere classified or unknown. Funds doing primarily direct lending are listed separately.

	Pooled	Quartiles			
		4	3	2	1
All Funds	8.1%	-1.8%	6.1%	9.9%	17.0%
Mezzanine	7.7%	0.4%	7.1%	9.9%	15.5%
Distressed	8.9%	0.2%	6.5%	10.5%	16.9%
Generalist	2.9%	-6.9%	4.7%	9.0%	27.7%
NEC&Unknown	10.7%	-2.0%	4.9%	9.7%	16.3%
Direct Lending Only:					
All Direct Lending	9.7%	0.4%	7.5%	10.0%	16.4%
Direct Lending (excl. Mezz)	11.8%	0.5%	7.1%	10.7%	16.7%

Table 5. IRR by Vintage Year

This table details pooled IRRs of private credit funds by vintage. The sample includes all private credit funds listed by Bugiss with vintage year between 2004 and 2016 with the sample split into pre-crisis (2004-2008) and post-crisis (2009-2016) sub-periods. Each fund is classified as mezzanine, distressed, generalist, not elsewhere classified or unknown. Funds doing primarily direct lending are listed separately.

	2004-2008					2009-2016				
	Pooled	Quartiles				Pooled	Quartiles			
		4	3	2	1		4	3	2	1
All Funds	7.8%	-1.4%	5.8%	8.9%	15.0%	9.8%	-0.3%	6.9%	10.4%	19.9%
Mezzanine	7.0%	1.5%	7.0%	8.8%	12.3%	9.6%	-1.2%	8.0%	10.5%	16.4%
Distressed	8.9%	-0.3%	5.3%	9.3%	15.7%	9.9%	2.7%	8.2%	11.6%	21.4%
Generalist	-4.7%	-15.7%	-4.5%	5.4%	10.4%	12.9%	-2.8%	6.5%	10.1%	36.5%
NEC&Unknown	13.2%	3.6%	8.9%	13.3%	17.0%	7.1%	-3.1%	4.5%	9.3%	14.5%
Direct Lending Only:										
All Direct Lending	10.3%	2.7%	7.4%	9.6%	16.1%	9.3%	-0.4%	7.8%	10.1%	15.7%
Direct Lending (excl. Mezz)	15.2%	4.9%	6.3%	11.1%	16.8%	7.4%	0.0%	7.4%	10.7%	15.3%

Table 6. Risk Measures

This table shows the pooled excess returns (calculated as annualized returns less the risk free rate per unit of volatility), standard deviation, Sharpe ratio, autocorrelation adjusted standard deviation, and autocorrelation adjusted Sharpe ratio for each private credit fund category. The sample includes all private credit funds listed by Burgiss with vintage year between 2004 and 2016. Each fund is classified as mezzanine, distressed, generalist, not elsewhere classified or unknown. Funds doing primarily direct lending are listed separately.

	Excess Return	Standard Deviation	Sharpe Ratio	Adjusted Standard Deviation	Adjusted Sharpe Ratio
All Funds	6.2%	11.2%	0.56	13.4%	0.47
Mezzanine	6.2%	5.1%	1.23	7.4%	0.84
Distressed	6.7%	13.5%	0.50	15.3%	0.44
Generalist	1.4%	19.2%	0.07	22.6%	0.06
NEC&Unknown	9.4%	10.2%	0.92	10.2%	0.92
Direct Lending Only:					
All Direct Lending	8.0%	3.9%	2.02	5.1%	1.55
Direct Lending (excl. Mezz)	9.8%	6.7%	1.46	7.4%	1.33

Table 7. Correlations

This table reports summary statistics and correlations for benchmark indices and private credit indices. Panel A provides statistics based on quarterly total returns of the indices described in Figure 4. Panel B provides correlations between quarterly returns of benchmark indices and private credit indices. Data are quarterly from 2005:Q3 through 2016:Q2.

Panel A: Benchmark Indices Summary Statistics (based on quarterly returns)

	Mean (quarterly)	Mean (annualized)	Std.Dev (annualized)	Skewness	Min	Max
High Yield Index	1.99%	8.22%	11.53%	0.21	-17.6%	23.2%
BDC Index	2.50%	10.37%	29.82%	0.96	-39.5%	64.6%
Leveraged Loan Index	1.35%	5.52%	10.99%	-0.96	-22.9%	20.4%
Cliffwater Direct Lending Index	2.39%	9.91%	3.79%	-2.76	-6.7%	4.4%

Panel B: Fund and Benchmark Indices Correlations

	All Funds	Mezzanine	Distressed	Generalist	NEC & Unknown	All Direct Lending	Direct Lending (excl. Mezz)	High Yield Index	BDC Index	Leveraged Loan Index	Cliffwater Direct Lending Index
All Funds	1.00										
Mezzanine	0.80	1.00									
Distressed	0.99	0.74	1.00								
Generalist	0.96	0.72	0.92	1.00							
NEC & Unknown	0.80	0.59	0.77	0.80	1.00						
Direct Lending Only	0.68	0.81	0.63	0.60	0.74	1.00					
Direct Lending (excl. Mezz)	0.37	0.31	0.34	0.34	0.69	0.71	1.00				
High Yield Index	0.86	0.52	0.91	0.79	0.69	0.48	0.28	1.00			
BDC Index	0.86	0.45	0.89	0.86	0.75	0.42	0.27	0.93	1.00		
Leveraged Loan Index	0.74	0.52	0.79	0.65	0.51	0.45	0.18	0.78	0.69	1.00	
Cliffwater Direct Lending Index	0.86	0.72	0.82	0.88	0.73	0.59	0.32	0.72	0.76	0.51	1.00

Table 8. Benchmark-Model Regressions

This table shows results of market-model style regressions to estimate risk levels of private credit funds relative to various benchmarks. The sample includes all private credit funds listed by Burgiss with vintage year between 2005 and 2016. Each fund is classified as mezzanine, distressed, generalist, or not elsewhere classified (NEC) & unknown. Funds doing primarily direct lending are listed separately. Data are quarterly from 2005:Q3 through 2016:Q2. Regressions include 2 lagged values of the benchmark returns to account for lagged reporting of changes in fund NAVs (as in Dimson, 1979). *, **, *** denote statistical significance at the 95%, 99%, and

Panel A: High Yield Index

VARIABLES	All Funds	Mezzanine	Distressed	Generalist	NEC & Unknown	All Direct Lending	Direct Lending (excl. Mezz)
High Yield Index (t)	0.753*** (0.080)	0.203*** (0.060)	0.936*** (0.082)	1.266*** (0.189)	0.504*** (0.109)	0.095* (0.047)	0.002 (0.081)
High Yield Index (t-1)	0.233** (0.087)	0.109 (0.065)	0.285*** (0.089)	0.193 (0.205)	0.249** (0.118)	0.161*** (0.051)	0.354*** (0.088)
High Yield Index (t-2)	0.059 (0.081)	0.123** (0.061)	-0.014 (0.082)	0.131 (0.190)	0.024 (0.109)	0.014 (0.048)	-0.038 (0.081)
Constant (alpha)	-0.002 (0.004)	0.010*** (0.003)	-0.003 (0.004)	-0.021** (0.010)	0.010* (0.006)	0.018*** (0.003)	0.023*** (0.004)
Observations	44	44	44	44	44	44	44
Adjusted R-squared	0.804	0.442	0.861	0.633	0.542	0.413	0.355
Sum of Index Coefficient	1.030	0.420	1.210	1.580	0.760	0.260	0.350

Panel B: BDC Index

VARIABLES	All Funds	Mezzanine	Distressed	Generalist	NEC & Unknown	All Direct Lending	Direct Lending (excl. Mezz)
BDC (t)	0.279*** (0.037)	0.092*** (0.019)	0.351*** (0.042)	0.431*** (0.075)	0.180*** (0.042)	0.060*** (0.016)	0.036 (0.027)
BDC (t-1)	0.082** (0.037)	0.052*** (0.019)	0.082* (0.042)	0.066 (0.074)	0.064 (0.042)	0.045*** (0.016)	0.114*** (0.027)
BDC (t-2)	0.051 (0.037)	0.054*** (0.019)	0.026 (0.042)	0.127* (0.075)	0.067 (0.042)	0.031* (0.016)	0.017 (0.027)
Constant (alpha)	0.010* (0.006)	0.014*** (0.003)	0.011 (0.007)	-0.004 (0.011)	0.019*** (0.007)	0.020*** (0.002)	0.025*** (0.004)
Observations	44	44	44	44	44	44	44
Adjusted R-squared	0.598	0.470	0.633	0.439	0.322	0.375	0.307
Sum of Index Coefficient	0.400	0.190	0.450	0.610	0.300	0.130	0.150

Table 8 (continued)
Panel C: Leveraged Loan Index

VARIABLES	All Funds	Mezzanine	Distressed	Generalist	NEC & Unknown	All Direct Lending	Direct Lending (excl. Mezz)
Leveraged Loan Index (t)	0.846*** (0.067)	0.209*** (0.059)	1.018*** (0.070)	1.500*** (0.141)	0.706*** (0.089)	0.127** (0.047)	0.130 (0.083)
Leveraged Loan Index (t-1)	0.297*** (0.065)	0.154** (0.058)	0.379*** (0.068)	0.286** (0.138)	0.174* (0.087)	0.149*** (0.046)	0.243*** (0.081)
Leveraged Loan Index (t-2)	0.138** (0.067)	0.126** (0.059)	0.065 (0.070)	0.229 (0.141)	0.160* (0.089)	0.036 (0.047)	0.078 (0.083)
Constant (alpha)	0.002 (0.004)	0.013*** (0.003)	0.002 (0.004)	-0.016** (0.008)	0.012** (0.005)	0.019*** (0.003)	0.023*** (0.004)
Observations	44	44	44	44	44	44	44
Adjusted R-squared	0.853	0.407	0.888	0.775	0.664	0.358	0.263
Sum of Index Coefficient	1.260	0.470	1.440	2.000	1.030	0.290	0.440

Panel D: Cliffwater Direct Lending Index

VARIABLES	All Funds	Mezzanine	Distressed	Generalist	NEC & Unknown	All Direct Lending	Direct Lending (excl. Mezz)
Cliffwater Index (t)	2.360*** (0.226)	0.749*** (0.116)	2.731*** (0.297)	4.266*** (0.387)	1.929*** (0.277)	0.446*** (0.114)	0.369 (0.245)
Cliffwater Index (t-1)	0.640** (0.243)	0.545*** (0.124)	0.733** (0.319)	0.688 (0.416)	0.283 (0.298)	0.486*** (0.123)	0.629** (0.263)
Cliffwater Index (t-2)	-0.691*** (0.226)	0.133 (0.116)	-1.150*** (0.297)	-0.948** (0.387)	-0.569** (0.277)	-0.111 (0.114)	-0.188 (0.245)
Constant (alpha)	-0.035*** (0.008)	-0.015*** (0.004)	-0.034*** (0.010)	-0.084*** (0.014)	-0.013 (0.010)	0.004 (0.004)	0.010 (0.009)
Observations	44	44	44	44	44	44	44
Adjusted R-squared	0.784	0.715	0.744	0.760	0.588	0.524	0.182
Sum of Index Coefficient	2.400	1.410	2.360	4.040	1.700	0.820	0.880

Table 9. Public Market Equivalents

This table shows the public market equivalent (PME) of private credit funds. The sample includes all private credit funds listed by Burgiss with vintage year between 2004 and 2016. Each fund is classified as mezzanine, distressed, generalist, not elsewhere classified or unknown. Funds doing primarily direct lending are listed separately. Panel A reports PME with three different indices, including high yield index, BDC index and leveraged loan index; Panel B reports PME by different vintages with leveraged loan index; Panel C reports PME by different areas with leveraged loan index. Data are quarterly from 2005:Q3 through 2016:Q2

Panel A: PME by Different Indices

	PME - High Yield	PME - BDC Index	PME - LevLoa n Index	PME - CDLI Index
All Funds	0.98	0.96	1.14	0.96
Mezzanine	0.99	0.98	1.15	0.96
Distressed	0.99	0.96	1.13	0.96
Generalist	0.93	0.91	1.10	0.91
NEC&Unknown	0.99	0.95	1.16	0.97
Direct Lending Only:				
All Direct Lending	1.00	0.97	1.16	0.96
Direct Lending (excl. Mezz)	1.00	0.96	1.17	0.97

Panel B: PME by Different Vintages with Leveraged Loan Index

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
All Funds	0.99	1.11	0.95	0.93	0.91	0.99	1.18	1.35	1.25	1.29	1.20	1.18	1.19
Mezzanine	1.08	1.13	1.04	1.04	0.96	*	1.31	1.37	1.21	1.25	1.19	1.13	1.16
Distressed	0.99	1.10	1.05	0.91	0.89	0.93	1.12	1.43	1.28	1.30	1.27	1.24	*
Generalist	0.84	*	*	*	*	*	1.19	*	*	1.32	1.19	1.19	1.19
NEC&Unknown	*	*	*	*	0.95	*	*	1.19	1.28	1.27	1.18	1.16	1.20
Direct Lending Only:													
All Direct Lending	1.02	1.07	0.91	1.06	1.01	*	1.24	1.27	1.26	1.26	1.20	1.17	1.16
Direct Lending (excl. Mezz)	*	*	*	*	*	*	0.96	1.15	1.27	1.28	1.21	1.18	1.25

Panel C: PME by Geography with LL Index

	North Amer.	Rest of World
All Funds	1.13	1.15
Mezzanine	1.16	1.13
Distressed	1.12	1.15
Generalist	1.05	1.18
NEC&Unknown	1.16	1.15
Direct Lending Only:		
All Direct Lending	1.17	1.14
Direct Lending (excl. Mezz)	1.17	1.20