

Bank Capital and the Growth of Private Credit^{*}

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Abstract

We show that business development companies – a type of private credit fund – are very well capitalized according to bank capital frameworks. The median BDC has a risk-based capital ratio of 36%; term non-traded BDCs, which are structurally most similar to other private credit funds, have a risk-based capital ratio of 48%. Our evidence thus cuts against the view that private credit has grown because nonbank financial intermediaries have less capital than banks. Instead, we argue that, for plausible parameters, banks find lending to private credit funds more attractive than direct middle market lending. This is, in part, because overcollateralized loans to private credit funds get favorable capital treatment, enabling banks to exploit their low-cost funding. We also present a model explaining banks' observed preference for making middle market loans via affiliated private credit funds rather than on the bank's balance sheet. For plausible parameters, banks choose to forgo less expensive balance sheet funding to avoid the extra regulatory and supervisory costs of managing a risky loan portfolio on the bank's balance sheet.

Keywords: private credit, middle market lending, business development companies, bank capital requirements, stress tests, regulatory arbitrage

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1 Introduction

Since the Global Financial Crisis (GFC), lending by nonbank financial intermediaries to the corporate sector has grown substantially. This kind of lending — often referred to as private credit — grew to \$1.70 trillion in 2023 and is expected to exceed \$2.75 trillion by 2028 (J.P. Morgan Asset Management, 2024). Although the rise of private credit is well documented and receives considerable attention from the business press and policymakers, the source of this growth is less well understood. In particular, there is still no consensus as to why this form of credit — much of which is used to fund middle market private equity transactions — has grown so much outside the banking sector. One common explanation is that the growth of private credit — and other forms of nonbank credit — was driven by the increase in bank capital requirements following the GFC. According to this narrative, banks would have to finance loans to middle market businesses with more capital than nonbanks, making this form of lending less attractive. Thus, lending activity flowed to less regulated nonbanks, or the so-called “shadow banking” sector, which was able to use more leverage to finance its lending activity.

In this paper, we present evidence that calls into question the relevance of this form of regulatory capital arbitrage for understanding the growth of private credit. The evidence comes from a detailed analysis of business development companies (BDCs), which are investment funds that typically make loans to middle market firms sponsored by private equity (“middle market loans”), a form of private credit often referred to as direct lending.¹ We focus on BDCs both because they are an important type of nonbank lender, with aggregate assets of approximately \$441 billion across more than 150 entities at year-end 2024, and because they are required to provide a wealth of information on their portfolio investments and financing in quarterly filings with the Securities and Exchange Commission (SEC). However, our conclusions from examining BDC data very likely apply to other types of private credit funds given their similar portfolio holdings and financing.² Section 2 provides background on BDCs and describes our data sources. Section 3 presents summary statistics on the BDCs in our sample.

Analysis of these filings reveals that BDCs are extremely well capitalized according to capital requirement methodologies that would be applied to banks. In particular, if a BDC were a bank, the most basic type of bank capital requirement, which is based on the so-called standardized approach, suggests that BDCs have equity capital of about 36% of risk-weighted assets, well above the capital levels required and observed in banks. Furthermore, BDCs have more capital than would be required of banks if we apply the Fed’s bank stress test methodology to BDCs. Our estimates indicate that in the severely adverse scenario, BDCs suffer mean credit losses of about

¹ As a shorthand, we will refer to these loans as “middle market loans” although BDCs and private credit funds typically skew their lending to riskier middle market loans used to finance private equity buyouts and follow-on transactions by those firms.

² We discuss leverage and debt structure of different types of funds in Sections 2 and 3. We provide more systematic evidence on the similarity in holdings of different types of affiliated funds in the Internet Appendix.

16.6% of assets, offset by mean net revenue of 8.3%, resulting in mean estimated net losses of about 8.3% of assets. The average stressed capital ratio is 30.4%, and only one BDC has a stressed capital ratio below 4.5%. Given their high initial capital ratios, the vast majority of BDCs far exceed stressed minimum capital ratios despite holding fairly risky portfolios, with all but four BDCs having stressed capital ratios in excess of 15%. By contrast, in the 2024 stress tests, the average bank had a stressed capital ratio of 9.9%, well below the average stressed minimums of BDCs ([Board of Governors of the Federal Reserve System, 2024](#)).

If private credit funds are much better capitalized than banks, why has direct lending grown so much in recent years? Why are banks, which generally have lower funding costs, not originating and holding middle market loans on their balance sheets? Why are they instead more prone to lend to middle market *lenders* rather than make loans to middle market *firms*? And to the extent that banking organizations originate middle market loans, why are they doing so through off-balance-sheet private credit funds (including BDCs) that they establish and manage?

We offer a number of answers in Section 5. We start by showing that given bank capital regulations, observed credit spreads, and funding costs, it is arguably more profitable for banks to lend to private credit funds than to riskier middle market firms. Because banks typically lend to private credit funds via wholly owned, bankruptcy-remote special purpose vehicles (SPVs) that are overcollateralized, these loans qualify as securitizations for the purpose of capital regulation. With enough overcollateralization, this structure enables banks to use a 20% risk weight on their loans to the SPVs when calculating capital requirements, as opposed to the 100% risk weight that would be required for direct loans to middle market firms (i.e., the underlying collateral of the SPVs). While effective credit spreads on middle market loans averaged about 650 bps in recent periods, effective spreads on bank loans to BDCs averaged about 265 bps. However, a combination of factors tend to increase the return on equity (ROE) of a loan to a private credit fund (or more precisely, the SPV) relative to a loan to a middle market borrower. One factor is that the lower risk weight on loans to private credit funds means that banks can use more leverage to fund these loans. Another factor is that given the lower risk of overcollateralized loans to private credit funds, expected losses are lower than they are for middle market loans. Finally, loans to private credit funds are considerably larger than typical middle market loans. Given the fixed costs of originating, underwriting and servicing loans, the operating expense of a portfolio of loans to private credit funds is likely to be considerably lower than that of a comparably sized portfolio of middle market loans. For plausible parameters, the ROE of a loan to a private credit fund well exceeds that of a middle market loan made by a bank.

The broader point of this analysis is that large banks with low funding costs are better off making relatively safe loans that require less capital than making riskier, high-cost loans that require a lot of capital. This is related to the point made by [Diamond \(2020\)](#), which presents a model of why it is optimal for banks – financial intermediaries that are uniquely positioned to issue safe money-like claims – to hold safe assets to back those claims. To the extent that banks hold risky assets, it

limits their ability to issue safe money-like claims on which they earn a “money premium.” One can apply this insight to argue that, rather than holding risky middle market loans, banks are better off holding senior claims on those middle market loans in the form of overcollateralized credit facilities.

These observations may also help explain the broader growth of nonbank financial intermediation, which has been facilitated by bank loans to nonbank financial intermediaries (“NBFIs”) such as private credit funds, mortgage companies, and fintech lenders. This point has been documented by [Acharya, Cetorelli, and Tuckman \(2024\)](#), which also studies the financial stability implications of this shift. It also helps to explain the significant shift in the past 25 years in the asset holdings of banks from risky loans to relatively safe securities, as documented and examined by [Hanson et al. \(2024\)](#) and [Buchak et al. \(2024\)](#).

In [Section 5.2](#), we present a simple model to explain why it can make sense for banks to engage in middle market sponsored lending through private credit funds rather than on balance sheet. In the model, banks compare the value of balance sheet lending to the value of fee income from the management of a private credit fund. We assume that asset managers can charge fees that extract all the alpha from private credit — as suggested theoretically by [Berk and Green \(2004\)](#) and documented for private credit funds by [Erel, Flanagan, and Weisbach \(2024\)](#) and [Suhonen \(2024\)](#). The benefit of bank balance sheet lending is that banks have lower funding costs than private credit funds. However, balance sheet lending is relatively tax-disadvantaged because only the portion of lending funded by debt can be shielded from taxes, whereas private credit funds, by avoiding taxation at the entity level, can shield more of their income from taxes. Moreover, banks may have greater operating expenses than private credit funds because it is more costly to originate, underwrite and service a risky loan portfolio under the regulatory and supervisory oversight of multiple bank regulators. They may also be restricted in the types of loans they can make.

We examine whether the tax and operating expense disadvantages of balance sheet lending are plausibly large enough relative to their funding cost advantage to explain why balance sheet lending to middle market borrowers is less profitable than management of a private credit fund. For a relatively low or modest funding cost disadvantage of 50–100 bps, the operating expense advantage of private credit funds has to be between about 3 and 43 bps of the loan portfolio to make private credit more profitable. Given estimated operating expenses of private credit of about 138 basis points, this differential cost seems plausible. However, if private credit funds have a 155 bps funding disadvantage — at the upper end of a plausible funding cost disadvantage — their operating expense advantage would need to be at least 87 bps, meaning that bank operating expenses would have to be at least 63% higher than they are for private credit funds. If this differential is implausibly high, there would have to be other advantages of direct lending. One possibility is that there is an additional “shadow cost” of holding risky middle market loans on a bank’s balance sheet due to interagency supervisory leveraged loan guidance around the management of such loans ([Chernenko, Erel, and Prilmeier, 2022](#)). Thus, while the model assumes that there is no difference between the

loan portfolios that banks and private credit funds can hold, in practice this guidance may have discouraged banks from holding valuable loans that private credit funds hold. Another possibility is that our model understates the fees that private credit funds are able to charge if investors overestimate pre-fee alpha, particularly in recent years when there has been such significant growth in private credit. A combination of lower operating expenses, leveraged loan guidance, and excessive fees could explain private credit even if banks have a very significant funding cost advantage.

Our paper is related to a growing literature on private credit. [Davydiuk, Marchuk, and Rosen \(2024\)](#) present evidence that direct lending by BDCs substitutes for bank lending, in part as a response to stricter bank regulation. [Davydiuk, Marchuk, and Rosen \(2023\)](#) argue that following an increase in the cost of raising external equity, BDCs reduced the riskiness of their loan portfolios. [Haque, Mayer, and Stefanescu \(2024\)](#) document the fact that banks provide credit lines to firms alongside direct term loans provided by private credit funds and BDCs. [Jang \(2024\)](#) shows that private credit funds behave like relationship lenders, even more so than banks. In a survey of private debt funds in the U.S. and Europe, [Block et al. \(2024\)](#) document the important role they play in providing debt financing for private equity transactions, particularly in the United States. They also report survey evidence indicating that private debt funds, including BDCs, use less leverage than banks, although these leverage measures are not risk adjusted. None of these papers explores the role that banks play in providing financing to private credit funds. Furthermore, while these papers claim that an increase in bank capital requirements led to the growth of direct lending, they do not explain why this type of lending has migrated to intermediaries that we show are *better* capitalized than banks.

2 BDC Background and Data

BDCs are actively managed investment funds registered as such under the Investment Company Act of 1940.³ They are required to make at least 70% of their investments in U.S.-based private companies or public companies with equity values below \$250 million. BDCs are treated as registered investment companies (RICs), which means they are pass-through entities for tax purposes. As such, they are required to distribute 90% of income as dividends, which are taxed as ordinary income to shareholders. BDCs can be internally managed, meaning the BDC directly employs a team responsible for managing the BDC's assets, or externally managed, in which a separate entity is tasked with managing the BDC's investment portfolio, arranging financing, and administering all other aspects of the fund. Most BDCs are managed externally. BDCs can also be organized as traded or non-traded entities, depending on whether their stock trades on an organized exchange. Whether traded or not, all BDCs are required to present financial statements and schedules of investments in quarterly filings with the SEC.

³ [Cai and Haque \(2024\)](#) provide an overview of private credit and BDCs.

Most BDCs describe themselves as “direct lenders” or “middle market lenders” in their regulatory filings, with many of the remaining entities operating as venture capital funds or real estate investment trusts (REITs). BDCs engaged in direct lending manage nearly all BDC assets, as those that do not engage in direct lending are typically very small.

2.1 Types of BDCs

BDCs can generally be classified into one of three types: publicly traded, perpetual non-traded, and term non-traded. Because publicly traded BDCs are listed on a stock exchange, investors can obtain liquidity in the secondary market. Historically, most BDC assets were in publicly traded BDCs, but recently the number of non-traded BDCs and the assets they manage have significantly exceeded those of publicly traded BDCs (Figure 1).

Perpetual non-traded BDCs, also known as evergreen BDCs, are not listed on a stock exchange, have indefinite life, and have no intention of pursuing a liquidity event through a public listing or sale to another BDC. Perpetual non-traded BDCs aim to provide liquidity to their investors through periodic, generally quarterly, offers to redeem shares at their net asset value (NAV). Such redemptions are typically limited to 5% of outstanding shares and are at the discretion of the BDC’s board of directors, who may suspend or terminate the repurchase program at any time.

Term non-traded BDCs closely resemble the structure of drawdown private credit funds. After launch, they gradually draw down capital commitments from their investors, and they generally have a limited term to either wind down or pursue a liquidity event. Some term non-traded BDCs however have an option to extend the term of the fund if their board determines that this is in the best interest of their shareholders. Given their close similarity to other private credit funds that are not registered as BDCs, term non-traded BDCs provide a view into the behavior of other private credit funds.

2.2 Leverage

BDCs are limited in the amount of leverage they can employ. BDCs cannot issue new debt or pay dividends if the post-issuance asset coverage ratio (ACR) is less than 200%. ACR is defined as the ratio of total assets net of non-debt liabilities relative to total debt. However, since 2018, BDCs meeting certain conditions can choose to operate with an asset coverage ratio of no less than 150%, and most BDCs have adopted this provision.

Although other types of private credit funds are not subject to the 1940 Act’s restrictions on leverage, their leverage is limited by the advance rates and financial covenants specified in their credit agreements with banks. Advance rates for performing first-lien middle market loans are typically 65% of fair value, are lower for second-lien and payment-in-kind (PIK) loans, and are typically zero for non-performing loans. This means that bank lines of credit tend to impose similar

or even more binding constraints on leverage than the 1940 Act.⁴ Finally, we note that while there is no systematic fund-level data on the leverage of other types private credit funds, in the survey of private credit managers conducted by Block et al. (2024), BDCs and non-BDC private credit funds report having similar leverage.

2.3 Population of BDCs

An entity electing to be treated as a BDC is required to file form N-54A with the SEC. When an entity decides to stop being treated as a BDC, it files form N-54C.⁵ We use these filings to assemble the population of BDCs that were active over the 1996–2024 period. We separately add two BDCs that were launched prior to the availability of the SEC’s EDGAR system: Capital Southwest Corp (CIK 17313) and Equus Total Return Inc (CIK 878932). We consider a BDC to be active in a given quarter if it files a 10-Q or 10-K in that quarter.

In 2024Q4, there were 164 active BDCs with aggregate assets of \$441 billion. While BDCs comprise about a fifth of the burgeoning private credit industry and remain small relative to banks, they have grown into particularly important providers of credit to middle market firms.

2.4 Financial Statements

We gather basic financial data from a number of sources. For publicly traded BDCs, our primary source is Capital IQ. Starting February 1, 2023, all BDCs are required to use XBRL for their financial statements, which greatly facilitates the extraction of data for non-traded BDCs.⁶ Prior to the availability of XBRL filings, we use the SEC API to extract and standardize financial information from 10-Q and 10-K filings.⁷

2.5 Portfolio Holdings

Our data on BDC portfolio holdings come from PitchBook. For 2024Q4, PitchBook reports portfolio holdings for 148 BDCs and 10 joint ventures of BDCs with other entities. For each asset holding, the PitchBook database includes issuer name, industry, fair value, amortized cost, principal or number of shares, and maturity date. It also provides information about a loan’s terms, including whether it is fixed or variable rate, its spread over SOFR or LIBOR, and whether the loan includes additional features such as an interest rate floor.

⁴ A 65% advance rate corresponds to overcollateralization by 153% on first-lien loans and even more overcollateralization for riskier loans.

⁵ BDCs can go out of business without filing form N-54C.

⁶ Some larger BDCs started using XBRL before February 1, 2023.

⁷ <https://sec-api.io>

We use instrument description along with issuer name and industry information to classify investments into the following asset classes: joint ventures (JVs), collateralized loan obligations (CLOs), equity (other than JVs and CLOs), first-lien loans, second-lien loans, unitranche loans, senior secured loans, unsecured loans, other debt, and other investments.

2.6 Financing

We gather instrument-level debt structure data from S&P Capital IQ and from the 10-Q/10-K filings. S&P Capital IQ has consistent coverage of debt structure for publicly traded BDCs. For non-traded BDCs we use XBRL tags to extract the debt footnote and direct Claude AI to parse it for information on the type of debt instrument.

3 Summary Statistics

In this section, we provide summary statistics for the sample of BDCs in our study. To begin, Figure 1 reports the number of active BDCs and the aggregate assets managed in each quarter during the 2000–2024 period. We separately report the number of publicly traded and non-traded BDCs. The number of traded BDCs peaks at 51 in 2015 and decreases slightly over the rest of the sample period. The number of non-traded BDCs fluctuates over time and starts to increase rapidly in 2021. In 2024Q4, there were 46 publicly traded BDCs, with aggregate assets of \$150 billion, and 118 non-traded BDCs, with aggregate assets of \$291 billion.

Figure 1
Number and Aggregate Assets of BDCs

This figure plots the number and aggregate assets of active BDCs from 2000Q1 to 2024Q4. We separately report the number and total assets of publicly traded versus non-traded BDCs.

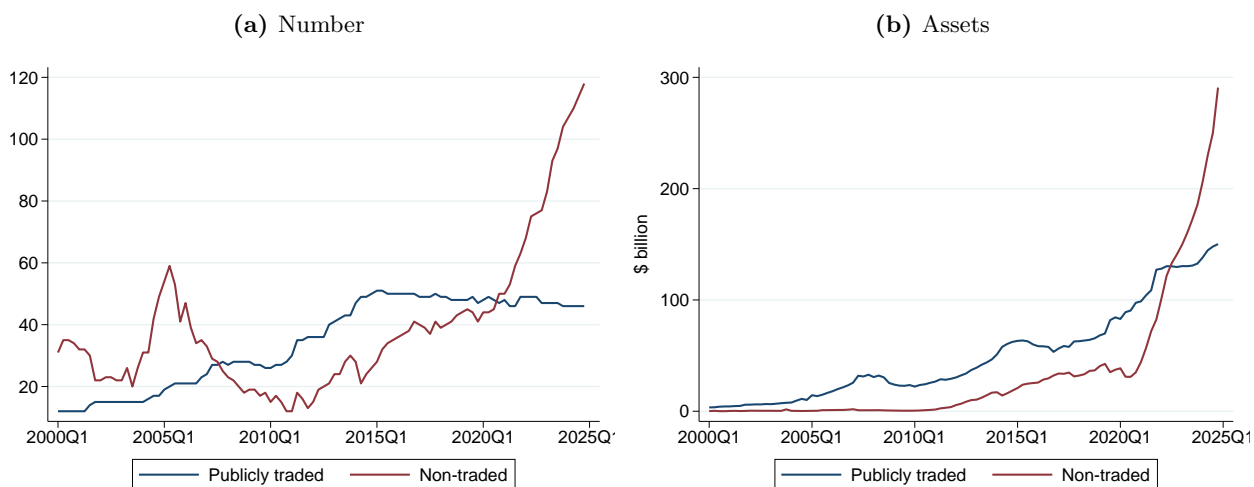


Table 1 reports summary statistics, as of 2024Q4, for the sample of 111 BDCs meeting the

following criteria: at least \$100 million in assets; data available on portfolio holdings; the share of loans relative to total assets of at least 50%; debt-to-assets of at least 10%; at least one year since the entity elected to be treated as a BDC.⁸ The median (mean) BDC has \$2.1 (\$4.1) billion in assets. The largest BDC, Blackstone Private Credit Fund, has assets of \$71.3 billion.

Table 1
Summary Statistics

This table reports summary statistics for the sample of 111 BDCs with at least \$100 million in assets, data on portfolio holdings, and with the share of loans relative to total assets of at least 50%. Data are as of 2024Q4. Bank debt refers to drawn lines of credit. Financing spread is the weighted average spread on each BDC's lines of credit. Industry default beta is the slope from the annual regression of industry default rate on the aggregate default rate. Annual default rates for 35 industries over 1970–2024 are from Exhibit 44 in [Moody's Annual Default Study](#).

	Mean	SD	Min	Percentile			Max
				25th	50th	75th	
Assets	3715.36	8052.99	102.92	691.40	1486.87	3328.42	71283.57
Asset shares (%)							
Loans	84.12	14.09	22.34	77.12	88.37	93.27	128.42
Equity	6.55	8.04	0.00	0.96	3.07	9.00	33.28
CLO equity	0.72	3.52	0.00	0.00	0.00	0.01	33.48
JVs	0.67	2.60	0.00	0.00	0.00	0.00	15.83
Cash	3.40	3.75	0.00	1.28	2.30	3.77	21.06
Commitments to lend	12.33	7.84	0.00	6.39	12.34	16.82	39.74
Loan characteristics							
Loan size (\$ mil)	30.95	44.54	0.82	9.94	19.52	33.08	381.68
Loan spread (bps)	601.42	99.72	330.03	544.60	581.63	643.08	922.64
Maturity (years)	3.92	0.99	1.15	3.15	3.90	4.74	5.77
Industry default beta	1.11	0.18	0.75	0.99	1.09	1.20	1.82
Portfolio HHI across borrowers	229.47	247.27	42.37	103.03	160.70	276.41	2194.26
Debt/Assets	0.46	0.10	0.12	0.41	0.48	0.52	0.68
Debt shares (%)							
Lines of credit	67.14	33.05	0.00	39.23	67.67	100.00	100.00
Unsecured notes	25.17	28.50	0.00	0.00	11.90	48.04	100.00
CLOs	3.39	12.47	0.00	0.00	0.00	0.00	79.06
SBA debentures	1.63	7.50	0.00	0.00	0.00	0.00	54.18
Other	2.67	9.97	0.00	0.00	0.00	0.00	72.36
Financing spread (bps)	233.53	38.86	112.50	215.00	225.00	250.00	360.00

BDCs invest predominantly in loans. The median (mean) share of loans is 84% (82%). Most of the rest is equity in portfolio firms. CLO equity and equity in JVs are on average 1% and 2% of assets. Cash buffers are just 2–3% of assets.

The next set of variables reports the characteristics of portfolio loans. The median loan holding is a bit less than \$5 million. Because asset managers can allocate a single loan across multiple funds under management and there can be multiple asset managers who participate in a loan, the

⁸ We exclude Silver Capital Holdings LLC which, because of a merger that closed on December 17, 2024, has a mismatch between holdings as reported in PitchBook and gross assets.

aggregate size of the loan to a middle market firm is much larger than \$5 million. The median loan has a spread of 582 basis points. The interquartile range is 545–643 basis points. Finally, we report the distribution of the industry default beta. Industry default beta is the slope from the annual regression of industry default rate on the aggregate default rate. Annual default rates for 35 industries over 1970–2024 are from Exhibit 44 in [Moody’s Annual Default Study](#).⁹

The median BDC has a debt-to-assets ratio of 48%, and the interquartile range is 41–52%.¹⁰ For the average BDC, 67% of its debt obligations are drawn bank lines of credit and 25% are unsecured notes. The rest are mostly secured bonds, including CLOs and SBA debentures. Finally, Table 1 reports the financing spread on bank lines of credit. The median spread is 225 basis points.

3.1 Summary Statistics by BDC Type

Table 2 reports summary statistics for different types of BDCs: perpetual non-traded, term non-traded, and publicly traded BDCs.

Perpetual and publicly traded BDCs are similar in size, with median assets of about \$1.9–2.0 billion. However, perpetual BDCs have a longer right tail and include the largest BDC — Blackstone Private Credit Fund (BCRED) with \$71.3 billion in assets. The size difference between BCRED and the largest publicly traded BDC — Ares Capital, with \$28.3 billion in assets — explains most of the difference in aggregate assets of perpetual non-traded BDCs and publicly traded BDCs. Term non-traded BDC tend to be significantly smaller. The median term non-traded BDC has just under \$900 million in assets.

Perpetual and term non-traded BDCs are more similar to each other in terms of asset shares. Both have more than 91% of their assets in loans, with commitments to lend being 12–14% of assets. The median cash buffer is around 2.5%.

Compared to non-traded BDCs, publicly traded BDCs allocate a significantly larger share of their assets to equity: almost 10% for the median publicly traded BDC. The median share of loans for publicly traded BDC is 76%. Publicly traded BDCs are also more likely to invest in JVs or CLO equity. However, they have smaller commitments to lend as a share of assets.

There are subtle differences in the loan portfolios of different types of BDCs. Although they have broadly similar industry default beta, loans of publicly traded BDCs tend to have higher spreads: a median spread of 646 bps for publicly traded BDCs versus 544 bps for perpetual BDCs

⁹ Internet Appendix Table IA1 reports industry default beta, its standard error, and the root MSE from the regression of the annual industry default rate on the aggregate default rate. Industries with the lowest default beta are Insurance (0.01), Utilities: Electric (0.09), Utilities: Oil & Gas (0.11), and Utilities: Water (0.22). Industries with the highest default beta are Media: Advertising, Printing & Publishing (3.59), Hotel, Gaming, & Leisure (3.19), and Consumer Goods: Durable (2.76).

¹⁰ Because the SEC has granted exemptive relief to allow BDCs to exclude SBA debentures from the definition of senior securities, one BDC has a 68% debt-to-assets ratio, which nevertheless complies with the 150% ACR requirement.

Table 2

Summary Statistics by BDC Type

This table reports summary statistics for different types of BDCs in the sample of 111 BDCs. Data are as of 2024Q4. Characteristics of loan portfolio are value-weighted averages across all loans in a BDC's portfolio. The spread on BDC credit facilities from banks is value-weighted average across all of a BDC's facilities, weighted by the committed amount.

	Perpetual non-traded ($N = 37$) Assets = \$215 billion			Term non-traded ($N = 35$) Assets = \$51 billion			Publicly traded ($N = 39$) Assets = \$147 billion		
	Median	Mean	SD	Median	Mean	SD	Median	Mean	SD
Assets	2,003.84	5,803.24	12,431.11	892.60	1,449.72	1,790.12	1,925.99	3,767.81	5,429.90
Asset shares (%)									
Loans	91.46	90.49	8.71	90.82	86.16	15.75	75.67	76.26	13.20
Equity	1.15	2.79	4.17	2.00	3.47	4.81	9.87	12.89	9.30
CLO equity	0.00	0.53	1.03	0.00	0.11	0.41	0.00	1.45	5.81
JVs	0.00	0.11	0.47	0.00	0.19	1.12	0.00	1.64	4.09
Cash	2.54	2.95	3.02	2.30	4.07	4.48	2.01	3.23	3.66
Commitments to lend	14.24	14.92	6.98	12.34	12.12	8.90	9.58	10.05	6.98
Characteristics of loan portfolio									
Loan size (\$ mil)	18.03	35.97	65.32	14.59	24.43	28.05	22.54	32.02	30.52
Loan spread (bps)	544.48	538.71	68.97	591.28	605.84	89.42	646.35	657.18	99.92
Maturity (years)	4.67	4.49	0.64	4.18	3.99	1.27	3.23	3.32	0.59
Share of syndicated loans	2.90	3.68	3.85	0.97	1.56	2.16	0.00	0.70	1.39
Industry default beta	1.09	1.10	0.12	1.13	1.16	0.24	1.07	1.08	0.15
Portfolio HHI across borrowers	103.03	138.72	102.64	226.67	325.30	378.38	163.04	229.55	149.78
Debt/Assets	0.43	0.44	0.08	0.45	0.42	0.10	0.53	0.52	0.07
Debt shares (%)									
Line of credit	75.99	73.81	27.26	100.00	88.35	23.67	31.73	34.65	20.90
Unsecured notes	0.00	17.35	22.09	0.00	6.21	14.02	59.01	57.75	19.94
CLOs	0.00	5.48	14.35	0.00	3.28	14.61	0.00	1.22	5.09
SBA debentures	0.00	0.00	0.00	0.00	0.94	6.73	0.00	4.34	11.30
Other	0.00	3.36	12.01	0.00	1.22	4.85	0.00	2.04	5.79
Financing spread (bps)	222.53	225.86	39.24	227.49	233.19	38.84	226.24	242.64	37.90

and 591 bps for term non-traded BDCs. However, loans of publicly traded BDCs tend to have shorter remaining maturity: 3.23 years versus 4.67 years for perpetual non-traded BDCs and 4.18 years for term non-traded BDCs. These differences could be due to differences in portfolio age. Since publicly traded BDCs have been around for longer, loans on their balance sheet may be older and thus have shorter remaining maturity. Given the trend down in spreads, older loans are also likely to have higher spreads. Since portfolios of non-traded BDCs may be tilted towards loans that were originated more recently, their loans are likely to have lower spreads and longer remaining maturity. Finally, it is worth noting that term non-traded BDCs have somewhat more concentrated loan portfolios. The median HHI is 227 for term non-traded BDCs versus 163 for publicly traded BDCs and 103 for perpetual non-traded BDCs. By way of comparison, the HHI for S&P 500 is about 200.

The last section of Table 2 reports statistics on leverage. Publicly traded BDCs have somewhat higher leverage than non-traded BDCs: the debt-to-assets ratio for publicly traded BDCs is 53%, while it is 43% for perpetual non-traded BDCs and 45% for term non-traded BDCs. Overall, publicly traded BDCs appear to be riskier than non-traded BDCs both in their leverage and portfolio holdings.

There are noticeable differences in the debt structure across BDC types. Publicly traded BDCs rely much less on lines of credit than non-traded BDCs. The median share of drawn lines of credit is 32% for publicly-traded BDCs, 76% for perpetual non-traded BDCs, and 100% for term non-traded BDCs. Publicly traded BDCs, however, rely much more on unsecured notes.

Finally, despite differences in size, debt structure, and portfolio composition, spreads on credit facilities from banks are quite similar across different types of BDCs: 223 bps for perpetual non-traded BDCs, 227 bps for term non-traded BDCs, and 226 bps for publicly traded BDCs.

4 Application of Bank Capital Framework to BDCs

A commonly proposed explanation for the growth of nonbank middle market lending is that banks are subject to strict capital requirements and that the increase in capital requirements after the GFC shifted more middle market lending to the nonbank sector. This explanation is hard to square with the fact that BDCs operate with significantly more equity capital than banks — generally a 1-1 debt-to-equity ratio. However, such simple comparisons may be misleading because they do not account for the riskiness of BDC assets, which, as shown in Table 1, include equity in portfolio companies, joint ventures, and CLOs. To make a true apples-to-apples comparison between BDCs and banks, this section applies bank capital requirements and stress tests to BDCs.

4.1 BDC Capital Based on the Standardized Approach

We start by calculating the risk-weighted assets and capital ratios for all direct lending BDCs in our data as of 2024Q4. Following Basel III, we apply the following risk weights to portfolio securities:

- 100% weight on loans to portfolio companies.
- 400% weight on equity positions other than holdings of CLOs, but including equity in joint ventures.
- 1,250% weight on holdings of CLO equity.
- 50% conversion factor for loan commitments, including both revolving credit and delayed draw loans.

We apply these risk weights to each position’s amortized cost.

To calculate risk-based capital ratios, we make two adjustments to net assets to reflect differences in accounting between banks and BDCs. First, we subtract the difference between the fair value and the amortized cost of portfolio holdings. This accounts for the fact that BDCs report net assets at fair value while banks use historical cost accounting for most of their assets. Second, we create an allowance for credit losses, which we conservatively estimate as 2% of the amortized cost of portfolio loans.¹¹

Figure 2 reports the distribution of risk-weighted capital ratios for the BDCs in our sample. The sample consists of BDCs with at least \$100 million in assets and loan portfolio share of at least 50%. We sort BDCs into 5-percentage-point-wide bins and use dots to represent the number of BDCs in each bin, plotted at its midpoint. The median BDC has a capital ratio of 36%. The interquartile range is 30–42%. There are a few outliers. The three BDCs in the left tail with capital ratios around 10% — OFS Capital Corp, Prospect Capital Corp, and Oxford Square Capital Corp — have large holdings of CLOs, which are subject to a 1,250% risk weight. BDCs in the right tail are non-traded BDCs with low leverage ratios. By contrast, in 2024Q4, banks subject to Federal Reserve stress testing had a median common equity tier 1 risk-weighted capital ratio of 13.0% (Board of Governors of the Federal Reserve System, 2025). Thus, BDC capital ratios significantly exceed those of large banks that could engage in middle market lending.

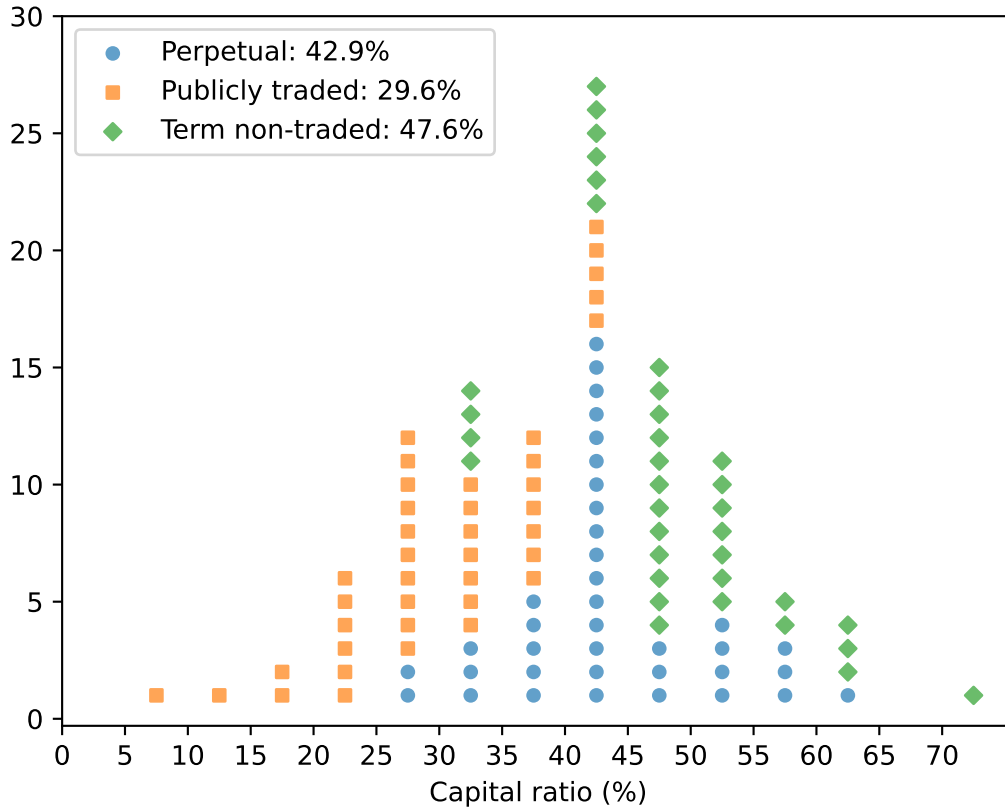
4.2 BDC Capital Based on Stress Tests

The calculation of risk-weighted capital ratios in Figure 2 suggests that BDCs have much more capital than would be required of banks investing in a similar portfolio of assets. However, BDCs have riskier loan portfolios than those of banks, and it is possible that BDCs would perform poorly

¹¹ In Section 5 we estimate the expected loss on loans to middle market firms at around 1.6%.

Figure 2
Risk-Weighted Capital Ratios

This figure plots the distribution of the risk-weighted capital ratios as of 2024Q4. We report the number of BDCs in each bin of five percentage points. For example there is one BDC with capital ratio in the 5–10% range. The sample consists of 39 publicly-traded, 37 perpetual non-traded, and 35 term non-traded BDCs with at least \$100 million in assets, at least 50% of assets in loans, and debt-to-assets ratio of at least 10%. The text box reports the median risk-weighted capital ratios for different types of BDCs.



under the Federal Reserve’s stress tests, which help determine the capital requirements for the large banks that are subject to these stress tests.

To evaluate this possibility, we perform a stress test of BDC performance in a severely adverse scenario. Our stress test is intended to mirror the stress tests conducted by bank regulators. We use the parameters from the 2023 severely adverse scenario as outlined in the Federal Reserve’s 2023 Stress Test Methodology document.¹² In particular, we follow the Fed’s approach in assuming that SOFR drops to 0.25% while stock prices fall by 45%. The main difference relative to the bank stress tests is that data limitations prevent us from modeling the dynamics of credit losses over time, but instead simply focus on losses over a two-year period, the horizon of the severely adverse scenario.

¹² <https://www.federalreserve.gov/publications/files/2023-june-supervisory-stress-test-methodology.pdf>

The stress test consists of two main pieces: portfolio losses and pre-provision net revenue. We discuss these in turn.

4.2.1 Portfolio Losses

We separately estimate losses on holdings of i) portfolio loans, ii) equity in CLOs, iii) equity in joint ventures, and iv) other equity instruments.

Our starting point for estimating losses on portfolio loans is the estimated losses on commercial and industrial (C&I) loans in the 2023 bank stress test. To account for the fact that BDC loans are riskier than the average C&I loan held on bank balance sheets, we use the 75th percentile loss rate on secured loans, namely 15.3%. This forms our estimate of the baseline loss rate on first-lien loans. The assumed loss rate on unsecured loans is 19.7%. Bank stress test results do not separately report losses on second-lien loans, which are rare in bank portfolios. As an estimate of the losses on second-lien loans, we take the average between the assumed loss rates on first-lien and unsecured loans. Finally, we assume a 40% loss rate on non-accruing loans. This conservatively assumes that none of these loans reverts to accruing status and all of them default with a recovery rate of 60%.

To account for differences across BDCs in their exposure to more or less cyclical industries, we use portfolio-level industry default betas. As of 2024Q4, portfolio-level default beta varies from 0.75 to 1.82, with a median of 1.09. We use this beta to scale the baseline estimates of the loss rates on performing loans.¹³

For holdings of CLO equity, we assume a loss rate of 41.75% based on the estimates in the “[Residual tranche risk analysis](#)” study conducted by Oliver Wyman. Oliver Wyman conducted an analysis of losses on the residual tranches of different types of asset-backed securities — middle market CLOs, broadly syndicated loan CLOs, prime auto loan ABS, subprime auto loan ABS, and private student loan ABS — under an adverse scenario calibrated to the 95th percentile of Value at Risk. The estimated losses on the residual tranches of broadly syndicated loan CLOs and middle market CLOs were 43.5% and 26%, respectively. In the absence of a reliable classification of the CLOs held by BDCs in our sample, we take a value-weighted average, with BSL CLOs accounting for about 90% of the market. This is a conservative estimate that probably overstates losses on their CLO holdings.

To estimate losses on investments in joint ventures, we look through to the holdings of each JV.¹⁴ We first use the same approach as above to estimate losses on each JV’s loan portfolio. We then use data on JV shares and capital structure to calculate the loss on a BDC’s investment in a JV. For a few JVs for which we do not have portfolio holdings data, we use the average loss rate

¹³ The loss rate on non-accrual loans is not adjusted for industry default beta.

¹⁴ PitchBook includes holdings data for some but not all of the JVs. We supplement PitchBook data with 2024Q4 holdings data extracted from the 10-Q/K filings.

across all JVs with holdings data.¹⁵ The average loss rate on investments in JVs is 34%.¹⁶

The loss rates on warrants and on all other equity investments are assumed to be 100% and 45%, respectively. We assume that warrants expire worthless, while other equities experience the same 45% drop as the overall stock market drop under the 2023 severely adverse scenario.¹⁷

4.2.2 Pre-Provision Net Revenue

Pre-provision net revenue (PPNR) is defined as net interest income plus noninterest income minus noninterest expense.

To estimate interest income, we use the reported spreads of portfolio loans along with a 0.25% benchmark SOFR rate. Whenever possible, we account for the floors on the base and/or overall rates. For fixed-rate debt instruments, we use the stated interest rate.

To estimate interest expense, we use data on each BDC's debt structure. We also collect information on unused facility fees. Finally, we account for the effects of interest rate swaps outstanding in 2024Q4.¹⁸

To estimate noninterest income, we collect data from 10-Q and 10-K filings on dividend and other noninterest income.¹⁹ We assume that noninterest and nondividend income stay flat. Dividend income from JVs is calculated using information on JV holdings and capital structure, assuming that all income is distributed pro rata to JV partners. Dividend income that is not attributable to JVs is assumed to drop by half of the decrease in the value of equities, i.e., 22.5%. This assumption is meant to reflect the stickiness of dividends and the increase in dividend yields during periods of market stress.

Noninterest expense under the stress scenario is assumed to stay at its 2024Q4 value except that the incentive fee expense is assumed to fall to zero.

¹⁵ BDCs may not report in their SEC filings portfolio holdings of JVs that account for a small share of the BDC's assets.

¹⁶ JVs hold similar loan portfolios to their parent BDCs. Adjusting for industry default beta, JVs suffer about a 13.6% loss on their portfolios. This translates into about a 34% loss on equity given average JV debt-to-assets ratio of about 60%.

¹⁷ We tried estimating the implied beta of equities held by BDCs. We did this by first unlevering the observed equity betas of publicly traded BDCs and then running a regression of the unlevered beta on the portfolio shares of instrument types. The coefficient on the equity share should capture the average beta of the equity instruments held by BDCs. The estimated equity beta is around 0.8. This is low considering that portfolio firms have above-average leverage. However, BDCs do tend to target less cyclical firms. Given the limitations of this analysis and to be conservative, we assume a beta of one.

¹⁸ Interest rate swaps data are extracted from 10-Q filings. As of 2024Q4, 13 BDCs had interest rate swaps. All of these were fixed-to-floating swaps, which attempt to convert the BDC's fixed rate notes into floating rates so as to match the interest rate exposure of the floating-rate loans in the BDC's portfolio.

¹⁹ For BDCs reporting quarterly instead of annual data, we annualize the reported value.

4.2.3 Results

Figure 3 reports the results of the stress tests. Subfigure (a) shows the distribution of portfolio losses. Loss rates vary from 9.7% to 39.1%, but the interquartile range is much narrower at 13.0–19.3%. The median loss rate is 16.0%. Outlier BDCs with large loss rates are those with significant holdings of CLOs, equities, or joint ventures.

Subfigure (b) reports the distribution of pre-provision net revenue (PPNR) over the two-year stressed period relative to assets. PPNR varies from 2.5% to 22.5%. The interquartile range is 6.5–9.9%. The median PPNR is 8.1%. The outlier with 22.5% PPNR is Venture Lending & Leasing IX Inc. This BDC extends fixed-rate loans, but has floating-rate liabilities under a line of credit. As a result, large declines in interest rates under the severely adverse scenario result in high PPNR for this BDC.

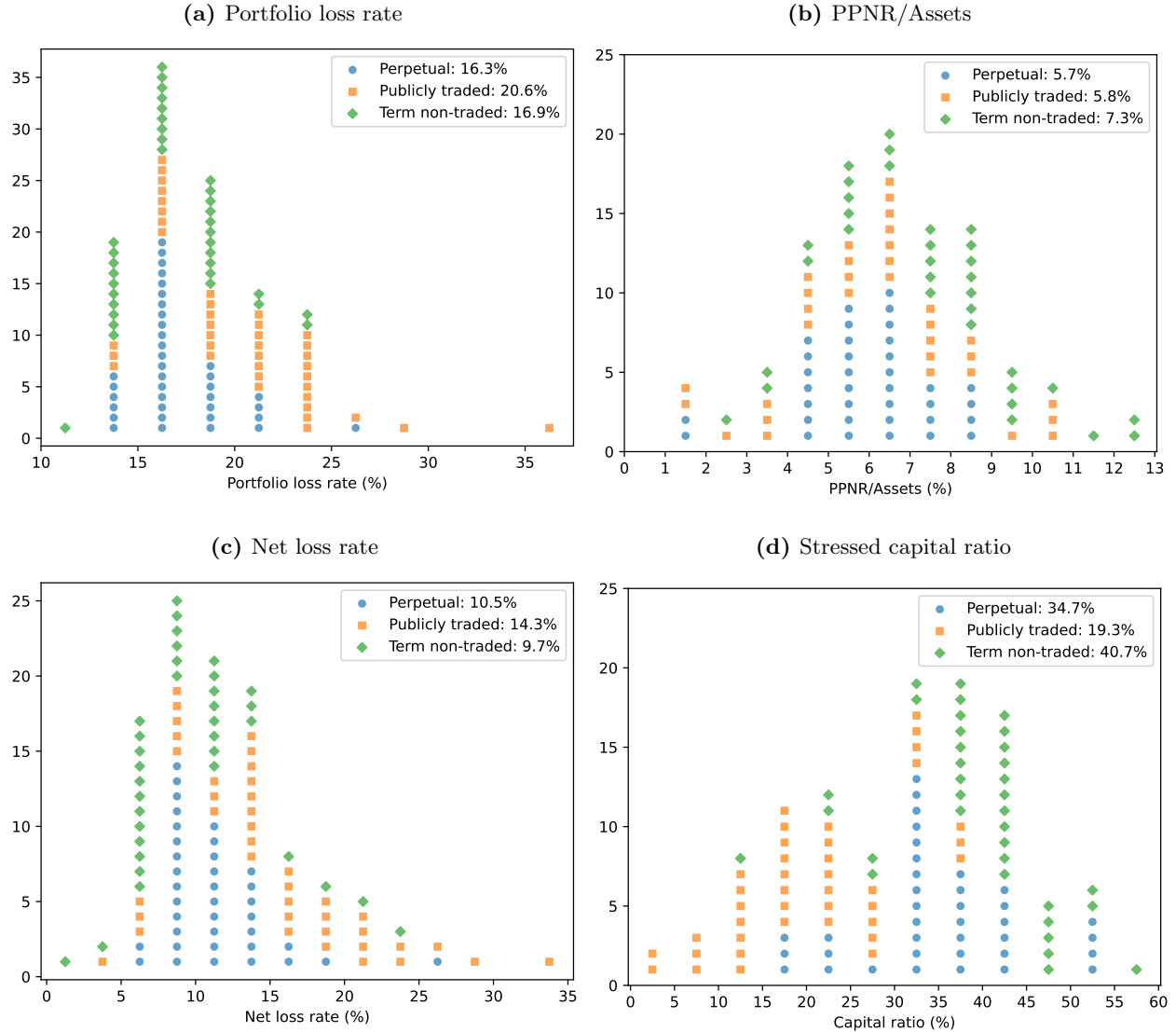
Subfigure (c) reports the distribution of the net loss rate, the difference between portfolio losses and PPNR, scaled by total assets. The median net loss is around 7.2% and the interquartile range is 4.2–10.6%.

Finally, subfigure (d) of Figure 3 reports the distribution of the stressed capital ratio. In this subfigure, BDCs are sorted into bins that are 5 percentage points wide; the x-axis plots the mid point of each bin. Stressed capital ratios vary from 3.0% to 62.0%, and the interquartile range is 19.7–40.8%. Only one BDC has a stressed capital ratio below 4.5%, the minimum capital ratio that banks are supposed to have in a severely adverse scenario. Another three BDCs have stressed capital ratios of around 10%. All of these outlier BDCs have significant holdings of the residual tranches of CLOs.

This analysis has implications for the amount of capital a BDC would need to have if it were regulated as a large bank subject to the stress tests. The required common equity tier 1 ratio (CET1 ratio) is given by the minimum CET1 ratio of 4.5% plus the stress capital buffer plus a G-SIB surcharge, applicable to the eight G-SIBs in the U.S. The stress capital buffer (SCB) is the greater of (i) 2.5% and (ii) the change in the CET1 ratio from its initial level to the minimum CET1 ratio during the stress period plus an adjustment for dividends paid for a portion of the stress period. We cannot calculate the exact SCB because we calculate the change in the CET1 ratio at the beginning and end of the period. The median decrease in the CET1 ratio is 5.5%, with an interquartile range of 2.8%–7.9%. Ignoring dividends and a G-SIB surcharge, this implies a median CET1 requirement of 10%, with an interquartile range of 7.3% - 12.4%. Every BDC except one has a capital ratio in excess of the required amount; the median excess is 25.7 percentage points. Thus, on both the standardized approach and the stress test approach, BDCs are much better capitalized than banks would likely be if their portfolios were similar to those of BDCs.

Figure 3 Stress Test

This figure reports the results of the stress test described in Section 4.2. Subfigure (a) reports the distribution of the estimated portfolio loss rates. Subfigure (b) reports the distribution of the pre-provision net revenue (PPNR). Subfigure (c) reports the distribution of the net loss rate — the difference between PPNR and portfolio losses. Portfolio losses, PPNR, and net losses are scaled by total assets. Subfigure (d) reports the distribution of the stressed capital ratio. The numerator is calculated as initial net assets minus portfolio losses plus pre-provision net revenue. The denominator is risk-weighted assets, which following the bank stress test methodology are assumed to stay constant. BDCs are sorted into bins of 1 percentage point in subfigure (b) and bins of 2.5 percentage points in all other subfigures. The x-axis plots the mid point of each bin.



5 Three Models of Bank Lending to Middle Market Firms: Balance Sheet Lending, Lending to Private Credit Funds, and Managing Private Credit Funds

This section starts with the observation that banks do not generally originate, underwrite and hold loans used to finance buyouts of middle market firms — the bread and butter of the private credit market.²⁰ Banks do, however, participate in this market in two important ways. First, they lend to private credit funds, including both BDCs and other types of private credit funds. In our data, about two-thirds of the outstanding debt of the median BDC is in the form of credit lines provided by banks.²¹ Second, to the extent that banks are involved in originating and underwriting middle market buyout loans, they do so through their asset management arms as sponsors of private credit funds. For example, Goldman Sachs and Morgan Stanley sponsor and manage BDCs and numerous other types of private credit funds through their asset management divisions. JP Morgan also sponsors and manages private credit funds. Citigroup and Wells Fargo have recently announced partnerships with asset management firms (Apollo and Centerbridge, respectively) to make middle market loans through private credit funds.

We try to explain this pattern by addressing two questions: (1) When is it more profitable for a bank to use its own balance sheet to lend to private credit funds than to lend directly to middle market firms? (2) When is it more profitable for a bank to originate, underwrite, and manage the assets of a private credit fund than it is to make loans to middle market firms on the bank’s own balance sheet? We now consider these questions in turn.

5.1 Middle Market Lending vs. Lending to Private Credit Funds

To compare middle market lending with lending to private credit funds, we calculate the return on equity (ROE) of these two lending activities. We use ROE because it is the main measure banks use to evaluate lending opportunities. We compare lending to private credit funds with “plain vanilla” middle market lending, by which we mean investing in first-lien middle market loans, not the equity of portfolio companies or CLO equity. ROE_i of a loan to borrower type i , where i could be a middle market loan (MM) or a loan to a private credit fund (PCF), is as follows:

$$ROE^i = \frac{1 - \tau}{E^i} \left(R_L^i - Losses^i - OpEx^i - (1 - E^i)R_D \right). \quad (1)$$

²⁰ Haque, Mayer, and Stefanescu (2024) present evidence that banks continue to lend to firms that borrow from private credit funds, primarily through lines of credit. However, according to numerous industry participants, banks generally do not originate term loans to fund buyouts of middle market firms.

²¹ This does not account for the undrawn portion of the credit facilities from banks.

E^i stands for the equity to be invested as a share of the loans made, which will be determined by the regulatory capital treatment of MM and PCF loans as well as the bank’s target capital ratio. Banks earn interest income on their loans to borrower type i , R_L^i , which is a spread over SOFR, $SOFR + Spread_L^i$. Against this interest income, banks subtract expected losses, $Losses^i$, operating expenses, $OpEx^i$, and debt funding costs, $(1 - E^i)R_D = (1 - E^i)(SOFR + Spread_D)$. To get ROE^i , we multiply this quantity by one minus the tax rate, τ , and divide by equity, E^i .

Table 3 provides illustrative ROE calculations. We use the value of the 30-day SOFR as of late 2024 of 4.53%. The effective spread on middle market loans ($Spread_L^{MM}$) of 6.50% is the sum of i) the stated spread relative to SOFR of 6.00% (just short of the mean in Table 1), and ii) amortization of the original issue discount (OID) and origination fees of around 0.50%.²² Similarly, the effective spread on PCF loans ($Spread_L^{PC}$) of 2.65% is the sum of i) the stated spread relative to SOFR of around 2.15%,²³ and ii) 0.50% in amortization of deferred financing costs.²⁴ Our calculation of ROE on PCF loans does not include commitment fees as our aim is to compare fully drawn facilities across the two lending opportunities.

To calculate the expected losses on MM loans, we start by assuming a default rate of 4% to reflect the typical 1-year default rate on B- and CCC-rated loans.²⁵ Since most BDCs with bond ratings (those holding the bulk of BDC assets) have a BBB issuer rating, the default rate on PCF loans of 0.25% is set to approximate the typical 1-year default rate on BBB-rated securities.²⁶ This

²² Our estimate of the effect of OID and fees on the effective spread is based on three pieces of evidence. First, conversations with industry practitioners indicate that private credit loans tend to be issued at 98 cents on the dollar. Given typical maturity of about four years, this translates into about 50 basis points increase in the effective spread. Second, annual reports of some BDCs explicitly discuss the effect of fees and OID on the effective spread. Audax Credit BDC Inc, for example, states in its 2024 10-K that “market rates for fees or OID enhanced the annual rate of return on a loan over its stated interest rate by 0.50%.” Third, we confirm these estimates using data from the cash flow statements on the accretion of original issue discount (XBRL item `gaap:AccretionAmortizationOfDiscountsAndPremiumsInvestments`) on portfolio loans, which we scale by the average of 2023 and 2024 assets. The median across 68 BDCs for which we are able to calculate this ratio is 40 basis points. This estimate is likely biased down because the denominator uses total assets rather than loans and because the numerator does not capture all fees.

²³ We calculate the value-weighted average using committed amounts as weights. The value-weighted average is slightly lower than the median of 2.25% and equal-weighted average of 2.34% reported in Table 1.

²⁴ We estimate this using data from annual reports on the amortization of deferred financing costs relative to the average outstanding amount. Because BDCs tend to report amortization of deferred financing costs on all of their debt, without breaking out credit facilities versus notes, we focus on BDCs with only bank loans. These tend to be smaller BDCs. To the extent that larger BDCs pay smaller fees, our estimates may slightly overstate the average effective spread.

²⁵ According to Moody’s Annual Default Study, over 1983–2023, the 1-year default rate for B1, B2, B3, Caa1, Caa2, and Caa3 rated issuers were 1.76%, 2.74%, 4.23%, 3.78%, 6.49%, and 15.82%. Although we do not observe the full distribution of credit ratings, with many borrowers not rated, reports from [Kroll Bond Rating Agency](#) suggest that 11.6% of BDC portfolio firms received an assessment of b+ or higher, 19.5% are assessed b, 40.9% are assessed b-, and 28.0% are assessed ccc+ or lower. Using these weights and assuming that most of the firms with a score of ccc+ or lower have a ccc+ or ccc score results in a weighted average default rate of around 4%.

²⁶ According to Moody’s Annual Default Study, 1-year default rates for Baa1, Baa2, and Baa3 ratings were 0.09%, 0.16%, and 0.26%.

Table 3
Bank Lending to Middle-Market Firms vs Private Credit Funds

This table provides illustrative calculations of the economics of bank lending to middle-market firms (MM loans) versus lending to private credit funds (PCF loans) for different values of the target capital ratio. The default rate on MM loans is meant to approximate the average 1-year default rates on B and CCC-rated loans. The default rate on PCF loans is meant to approximate the average 1-year default rate on BBB-rated loans. Recovery rate on MM loans approximates the average recovery rate on first-lien loans. Recovery rate on PCF loans is meant to reflect the high overcollateralization of these loans. Spread on debt funding reflects the typical rate on wholesale deposits. Operating expenses for MM loans are estimated using data on the expenses of Ares Management Corporation and Blue Owl Capital Inc — two large publicly-traded asset managers specializing in private credit. Details of the estimation of operating expenses are provided in the Internet Appendix. Operating expenses for PCF loans are assumed to be significantly lower to reflect the much larger size of the loans and lower screening and monitoring costs.

	MM loans		PCF loans	
	20% of RWA	20% of RWA	12% of RWA	5% of assets
SOFR	4.53%	4.53%	4.53%	4.53%
Effective spread	6.50%	2.65%	2.65%	2.65%
Default rate	4.00%	0.25%	0.25%	0.25%
Recovery rate	60%	95%	95%	95%
Expected loss	1.60%	0.0125%	0.0125%	0.0125%
Spread on debt funding	1.10%	1.10%	1.10%	1.10%
Tax rate	25%	25%	25%	25%
Operating expenses	1.38%	0.20%	0.20%	0.20%
Risk weight	100%	20%	20%	20%
Capital (% of assets)	20.0%	4.0%	2.4%	5.0%
ROE	13.30%	29.30%	46.02%	24.29%

is likely to be an upper bound on the default rate of loans to private credit funds, as they are structured as securitizations and are senior to any bonds.

We assume a 60% recovery rate on defaulted MM loans and a 95% recovery rate on defaulted PCF loans. The assumed recovery rate for MM loans is based on the average recovery rate for first-lien loans. For PCF loans, we assume a 95% recovery rate to reflect the fact that these credit facilities are overcollateralized with typical advance rates of around 65% for first-lien performing loans.

These assumptions generate expected losses of 1.60% and 0.0125% on MM and PCF loans, respectively. The estimated loss rate on MM loans is comparable to the historical loss rate on MM loans made by BDCs. Using BDC schedules of investment included in their SEC filings, Cliffwater tracks the performance of direct lending and constructs the Cliffwater Direct Lending Index (CDLI).²⁷ Since its inception in September 2004, the index has a net realized loss of 1.04% and net unrealized loss of 0.26% per year.

Consistent with industry practice, we assume that in assessing the funding costs of the loans they make, banks use their wholesale funding cost. This is the appropriate measure, not the average

²⁷ [2023 Q3 Report on U.S. Direct Lending](#)

deposit costs, because it is the marginal source of funds. Our estimate of the wholesale funding cost is a spread of 110 bps over SOFR. This estimate is based on the at-issuance spread on variable-rate, SOFR-based, senior unsecured notes issued by the 20 banks subject to annual stress tests.²⁸ The assumed tax rate is 25%.

We assume that MM lending comes with operating expenses of about 1.38% of assets. This estimate is based on the reported expenses of two publicly traded asset managers that specialize in private credit: [Ares Management Corporation](#) and [Blue Owl Capital](#). We estimate their operating expenses as GAAP expenses, to which we add back depreciation and amortization, which mainly reflect amortization of intangible assets from acquisitions. GAAP expenses include equity and performance-based compensation, i.e. allocation of carried interest. Asset managers' expenses do not include various professional fees and other administrative expenses incurred by their funds. We estimate these separately using data on the BDCs managed by Ares and Blue Owl. The [Internet Appendix](#) provides more details on the estimation of the operating expense ratio.

Given the regulatory compliance costs and other costs of supervision, the operating expenses of middle market lending for banks could well be greater than the 1.38% estimate derived from data on private credit managers. We will return to this issue in the next subsection when we compare the value to a bank of middle market lending on its balance sheet to the value of middle market lending conducted as an asset manager of a private credit fund.

Because loans to private credit funds are much larger and require much less screening and monitoring, we assume operating expenses of about 20 basis points. Since asset managers allocate originated loans to multiple funds under management, a bank lending to different funds managed by the same investment adviser mostly needs to evaluate the adviser's loan origination platform and workout capabilities. Once this evaluation has been performed, the incremental costs of screening and monitoring a new fund are likely to be low.²⁹

Finally, for E^i , we use a 100% risk weight for MM loans and 20% risk weight for loans to private credit funds. The risk weight for PCF loans is typically only 20% because most loans are extended to wholly owned special purpose vehicles (SPVs) of private credit funds. These loans are structured and overcollateralized, so they qualify to be treated as "securitization exposures"

²⁸ We use Capital IQ Pro to screen for notes issued by entities whose ultimate parent is one of the banks that as of 2025 were subject to annual stress tests. We limit the sample to USD-denominated notes issued between January 1, 2021 and October 31, 2025 and having original maturity between four and six years. The value-weighted average across all issues is 100 basis points. To account for the effect of underwriting spread, we add 10 basis points to get an effective spread of 110 basis points.

²⁹ To provide empirical support for our estimate of the operating costs of PCF loans, we compared the pricing of bank credit facilities to the pricing of AAA-rated tranches of CLOs issued by BDCs. Our analysis suggests that for a given BDC, credit facilities have about a 20 basis point higher spread than AAA rated tranches of CLOs, although given the small sample of BDCs with both credit facilities and CLOs, the t-statistic of the difference is only 1.4. Since they have similar credit risk and are treated similarly for bank capital requirements, the difference in spreads should be mostly due to the higher cost of setting up, screening, and monitoring credit facilities compared to investing in AAA-rated tranches of CLOs.

under bank capital requirements. The risk weight for securitization exposures is determined by the Simplified Supervisory Formula Approach (SSFA), which in turn depends on (i) the extent of overcollateralization of the loan to the SPV, (ii) the capital requirement applicable to the underlying pool of MM loans (8%, in the case of MM loans that are not defaulted, and 12% in the case of MM loans that are defaulted), and (iii) the portion of the MM loan pool that is defaulted or seriously delinquent. The SSFA specifies a minimum risk weight of 20% for any given securitization exposure. Based on our conversations with industry professionals, most loans to SPVs have a 20% risk weight under SSFA due to the overcollateralization of such loans. Our own calculations using the SSFA worksheet published by the FDIC ³⁰ show that the 20% risk weight floor under SSFA applies to a portfolio of middle market loans with no defaults as long as the overcollateralization percentage is at least 12.19%.³¹

Column 1 reports the ROE of lending to middle market firms (loans to MM). We assume that when lending to middle market firms, banks operate with a target CET1 ratio of 20%.³² The ROE of middle market lending is 13.30%. On its own, this looks attractive, but as the next columns show, the ROE of lending to private credit funds is significantly higher.

We calculate the ROE of PCF loans under three alternative scenarios. The first scenario uses the same 20% CET1 ratio as the MM loans. Given the 20% risk weight of PCF loans the ratio of capital to assets is 4.0%. The ROE of PCF loans is 29.30%. Because PCF loans have significantly smaller losses, the second scenario assumes that when lending to private credit funds, banks target a plausible 12% CET1 ratio. The ROE of PCF loans in this case is 46.02%. Under the first two scenarios, the ratio of capital to gross assets is less than the 5% Supplemental Leverage Ratio (SLR). If the SLR constraint binds, as it may be for banks with large trading operations and securities portfolios, the ROE could be calculated based on 5% equity capital. The last column of Table 3 reports an ROE of 24.29% on PCF loans when the binding capital requirement is the the

³⁰ <https://www.fdic.gov/resources/bankers/capital-markets/regulatory-capital/ssfa-job-aid.xls>

³¹ Where the overcollateralization is only 12.19%, the risk weight under SSFA will begin to increase rapidly as underlying MM loans begin to default or become seriously delinquent. However, if the amount of overcollateralization is greater than 12.19% (which we understand is typically the case), the SSFA risk weight can remain at 20% even as the underlying pool begins to deteriorate. For example, if the overcollateralization is 30%, then the SSFA risk weight will remain at 20% until approximately 17% of the underlying loan pool defaults or becomes seriously delinquent, at which point the SSFA risk weight will begin to climb rapidly as additional MM loans default or become seriously delinquent.

³² In the Fed's 2025 stress tests, the projected minimum for the CET1 ratio for domestic banks that engage in C&I lending is 10.1%. We interpret this to say that banks try to maintain at least 10.1% CET1 ratio under stress. Using calculations similar to the BDC stress tests in Section 4.2, we estimate net losses on bank lending to middle market firms of 10.8%, resulting in a 20.9% target CET1 ratio during normal times for middle market loans. We round down to 20% as our baseline. Our estimates of portfolio losses and PPNR for banks differ from Section 4.2 in three respects. First, we assume that the bank's portfolio consists entirely of first-lien senior secured loans, which earn a 600 bps spread relative to SOFR and experience a 15.3% loss rate under stress. Second, to be conservative in our estimation of the minimum capital ratio, we calculate the difference between total losses incurred over two years and PPNR earned over one year. Effectively, this assumes that portfolio losses are front-loaded during the first year. Third, to calculate the interest expense component of PPNR, we assume that banks finance their lending to middle market firms with floating-rate debt that accounts for 80% of their total funding.

5% leverage ratio.

The estimated differences in ROE on MM loans and PCF loans do not account for potential differences in their required rates of return. Although lending to private credit funds is less risky than lending to middle market firms, the required rate of return on equity may be higher for PCF loans because they are more leveraged. While it would be useful to adjust for differences in risk, given the high debt-to-equity ratio, the calculation of the required rate of return is sensitive to specific assumptions about the unlevered asset beta of the loans and the risk borne by the bank's debtholders. However, under a broad range of reasonable assumptions, the ROE of lending to private credit funds exceeds a bank's required rate of return.

The estimated differences in ROE also depend on our assumptions about operating expenses.³³ Lower values of the operating expense of MM loans would increase the ROE of MM loans, but even with zero operating expenses, the ROE would be 18.47%, still significantly less than the ROE of PCF loans.³⁴ Higher values of the operating expenses of PCF loans will reduce the ROE of PCF loans. The breakeven value is around 1.25%. For a large bank that lends to multiple funds managed by the same private credit manager and provides other services to those managers, the operating cost of PCF loans is likely to be significantly lower than this breakeven value. Importantly, the typical PCF loan is larger than that of a middle market loan. Thus, given that there are fixed costs of origination, underwriting and servicing, the unit operating costs should be lower for PCF lending. Finally, as we discuss in the next section, banks' operating expenses for MM loans are likely to be higher than the 1.38% estimate derived using data for private credit fund managers. This would further increase the relative attractiveness of PCF loans.

If it is indeed the case that banks earn excess returns by lending to private credit funds, one has to ask how this can persist in equilibrium. One possibility is that there is imperfect competition in the supply of credit to private credit funds — and nonbank financial intermediaries more broadly — such that banks charge oligopolistic rates on these loans. [Schwert \(2018\)](#) presents evidence that banks earn excess returns on leveraged loans, which he suggests could be related to market power. [Jiang \(2023\)](#) estimates a loan pricing model and finds evidence of market power in the pricing of bank credit lines to nonbank mortgage originators. New entrants without strong existing relationships with private credit managers may face relatively high operating expenses of PCF loans, thus limiting competition. Furthermore, developing the capability to structure loans that qualify for the SSFA treatment is costly, and incurring these costs may not be worthwhile for

³³ Building on our approach, [Pandolfo \(2025\)](#) uses loan-level data from the Y-14 reports to estimate the profitability of typical bank C&I loans and PCF loans and reaches broadly similar conclusions.

³⁴ [Corbae and D'Erasmus \(2021\)](#) report estimates of marginal noninterest expenses derived from trans-log functions. They estimate net marginal expense of 41 basis points for the top 10 banks and 113 basis points across all banks. Because a large share of loan portfolios for large banks consists of loans to nonbank financial intermediaries and other types of less informationally sensitive loans, these estimates are likely to understate the marginal cost of lending to highly-levered middle-market firms.

smaller banks.³⁵ Without the SSFA treatment, the ROE of PCF loans is much less attractive, and the ROE in this case is less than the ROE of MM loans. There may also be relatively few banks with the balance sheet capacity to offer credit lines to private credit funds.

Another possibility is that banks are not actually earning excess returns because contractual spreads do not reflect the true risks and costs of lending to private credit funds. In particular, while the risk of default on bank credit facilities might be negligible, as noted by [Cooperman et al. \(forthcoming\)](#), spreads may compensate for the costs of committing to provide liquidity during periods of stress, a time when bank capital and liquidity are at a premium. Because the base rate, SOFR, does not adjust as market risk increases and bank funding costs rise, banks need to incorporate these expected costs into the spreads and fees on their credit facilities.³⁶ While we think of the risk of drawdowns is priced mostly through commitment fees on the undrawn portion, it is possible that part of the spread is also compensation for this risk.

5.2 Middle Market Lending vs. Management of Private Credit Funds

As noted above, a number of the very largest banks are involved in private credit not just through lending to private credit funds, but as sponsors of private credit funds. In these roles, they establish the entities that originate and fund middle market loans. They charge fees for managing the fund, typically in the form of a management fee (a percentage of assets under management) and a performance fee. Realized fees average about 3.1% of assets under management for publicly-traded BDCs and 1.7% for non-traded BDCs.

Why do banks engage in private credit as asset managers rather than as balance sheet lenders? To address this question, we present a simple model comparing the value of balance sheet lending with the value of asset management. First, consider balance sheet lending, where we normalize the size of the loan portfolio to one. Assuming no growth in assets, the value of the middle market lending business is:

$$-E_b + (1 - \tau)PV\left[R_L - (1 - E_b)R_{Db} - Losses - OpEx_b\right], \quad (2)$$

where $PV[\cdot]$ is the present value operator. E_b is the equity investment of the bank in the middle market loan portfolio. R_L is the interest income on middle market loans. R_{Db} is the debt funding cost of the bank. $OpEx_b$ is the operating expenses of balance sheet lending by the bank. We assume

³⁵ In call report data, lending to nondepository financial intermediaries (NDFIs) is very strongly correlated with assets receiving SSFA treatment but only for large banks, with more than \$100 billion in assets. The correlation is much weaker for smaller banks, who appear to lend to NDFIs but generally do not adopt SSFA treatment of these loans.

³⁶ As [Cooperman et al. \(forthcoming\)](#) note, this contrasts with LIBOR, which used to be the base rate for loans and adjusted with changes in bank funding costs. Thus, spreads on credit facilities have likely increased to reflect this change in the base rate.

that interest income, R_L , and expected losses are the same regardless of whether the portfolio is held on balance sheet or in a private credit fund. Importantly, however, we allow operating expenses to be different at banks and private credit funds, along with differences in debt funding costs.

A key feature of banking is that banks can raise funding at rates below those of comparable-risk firms and nonbank financial intermediaries. Thus, we write $R_{Db} = R_c - \Delta$, where R_c is the competitive market cost of debt for nonbanks and Δ is the premium or subsidy that banks benefit from when they issue debt.

With this decomposition, we can write (2) as follows:

$$-E_b + (1 - \tau) \left(PV[Loans] - (1 - E_b)(PV[R_c] - PV[\Delta]) - PV[OpEx_b] \right), \quad (3)$$

where $PV[Loans]$ is the present value of loan income less expected losses.

Given that R_c is the competitive market rate, the present value of this component of debt funding is simply 1. Thus, we can write (3) as:

$$-1 + \tau(1 - E_b) + (1 - \tau) \left(PV[Loans] + (1 - E_b)PV[\Delta] - PV[OpEx_b] \right) \quad (4)$$

The value of the middle market lending business to the bank is just the pre-financing NPV of the business $-1 + (1 - \tau)(PV[Loans] - PV[OpEx_b])$ plus two financing benefits: the tax shield from debt financing $\tau(1 - E_b)$ and the below market-rate financing, $(1 - \tau)(1 - E_b)PV[\Delta]$.

As an alternative to funding loans on their balance sheet, banks could set up a separate private credit fund to hold and finance middle market loans and receive asset management fees for managing the fund. The private credit fund is financed with equity E_p and debt $(1 - E_p)$. The pre-fee value of the private credit fund is:

$$-E_p + PV \left[R_L - (1 - E_p)R_c - Losses \right]. \quad (5)$$

Note that we are currently assuming the loans and expected credit losses are the same in the private credit fund and the bank. However, there are four differences between asset management and balance sheet lending. First, the fund borrows at the market rate, R_c , not at the lower rate $R_c - \Delta$. Second, the fund will typically have more equity, $E_p > E_b$. Third, $OpEx_p$, which is borne by the bank through its asset management group, could be less than $OpEx_b$. Finally, the fund pays no taxes since it is a flow-through entity. We also assume that equity investors in the fund are tax exempt, as many investors in private credit are pension funds, endowments, and other tax-exempt institutions.

The asset manager of the private credit fund is assumed to be able to charge a fee equal to the pre-fee value created by the fund. As in [Berk and Green \(2004\)](#), we are assuming that managers

that can create excess returns are the scarce resource, and thus competition for managers drives fees up to eliminate excess returns after fees (alpha). This is a reasonable assumption given that [Erel, Flanagan, and Weisbach \(2024\)](#) find that alpha in private credit is approximately zero. In untabulated results, we also document that alpha in BDC returns is close to zero, although the estimate is noisy.

Under the assumption of zero alpha, the annual fee, f , per unit of assets under management is just the NPV of the loan portfolio:

$$PV[f] = -1 + PV[Loans] \quad (6)$$

Given that there are no taxes at the fund level and all financing is at market rates, the Modigliani-Miller theorem applies and capital structure does not affect value and thus fees.

While we are assuming that the fund and their investors are tax exempt, the bank pays taxes on its fee income less operating expenses. Thus, the present value of managing the assets of the private credit fund is

$$(1 - \tau) \left(PV[Loans] - 1 - OpEx_p \right). \quad (7)$$

We compare the value of bank balance sheet lending to the value of asset management by comparing (4) and (7). The bank will prefer managing a private credit fund to balance sheet lending provided:

$$\tau E_b + (1 - \tau) \left(PV[OpEx_b] - PV[OpEx_p] \right) > (1 - \tau)(1 - E_b)PV[\Delta] \quad (8)$$

The benefit of balance sheet lending is that the bank gets cheaper after-tax debt financing of $(1 - \tau)(1 - E_b)PV[\Delta]$. The cost is that banks likely have higher operating expenses due to regulatory and supervisory oversight. There is also an extra tax cost compared with asset management. For bank lending, only the debt component of financing is tax deductible, whereas in the case of asset management, the entire investment is effectively deductible because fees are reduced by the initial investment in the loan portfolio, not just the portion funded by debt.

Absent a bank funding advantage and with no operating cost differential, banks would choose asset management over balance sheet lending because of the tax advantage of private credit funds. Given average bank tax rates of 25% and assumed capital ratios for middle market lending of 20%, this amounts to a private credit tax advantage of 5% of the loan portfolio.

The exact size of the funding advantage for banks, Δ , is difficult to estimate. As noted in the previous subsection, the relevant funding cost is their marginal wholesale funding cost, which is approximately SOFR + 110 bps. This might understate the marginal cost of funding middle market loans given that these loans are riskier than the average assets held by a bank. The other assets of the bank, including loans, securities, and fee streams, which may be less risky and are imperfectly

correlated with the returns on middle market loans, help explain why banks can borrow in wholesale markets at SOFR + 110 bps. However, in theory, an increase in middle market borrowing could lead to an increase in funding costs such that the marginal cost of funding the loans could be greater than SOFR + 110 bps.

For now, we consider a range of possibilities for Δ from 50 bps to 155 bps. The high end of this range is just the difference between the effective spread on BDC credit facilities of 265 bps and the spread on bank wholesale funding, 110 bps. The bank's funding advantage could come from implicit government guarantees because banks are too big to fail. The funding advantage could also exist because banks are positioned to issue money-like instruments for which they are paid a premium.³⁷ For illustrative purposes, we discount Δ at the bank's long-term funding cost, which is approximately 100 bps above the 10-year Treasury yield of 4.57% at the end of 2024Q4. With a tax rate of 25% and leverage of 80%, the present value of the after-tax funding advantage (the right hand side of (8)) is 5.4% on the low end ($\Delta = 50$ bps), 16.7% on the high end ($\Delta = 155$ bps), and 10.8% for an intermediate level bank funding advantage ($\Delta = 100$ bps).

If the tax benefit from the private credit structure (τE_b) is 5%, we can calculate the threshold operating expense advantage of private credit above which private credit would be more favorable to the bank than balance sheet lending. Thus, based on inequality (8) and discounting operating expenses at the bank's long-term funding cost of 5.57%, we see that at $\Delta = 50$ bps, the threshold operating expense advantage of private credit is 3 bps, meaning that as long as the operating expenses of private credit are 3 bps lower than the bank operating expense, it is more favorable to engage in middle market lending through private credit funds rather than on bank balance sheets. At $\Delta = 100$ bps the threshold is 43 bps, and at $\Delta = 155$ bps the cutoff is 87 bps. If, as we suggested above, the operating expenses of private credit funds and BDCs are about 138 bps, then bank operating expenses would need to be between 2% and 63% greater to make it worthwhile for banks to forgo their funding cost advantage to operate through a private credit fund or BDC.

Although we cannot observe the operating expenses a bank would incur on middle market loans if they were originated, underwritten, serviced, and funded on the bank's balance sheet, it is reasonable to think that they are indeed higher than they would be if the bank operated the middle market lending business through a private credit fund. Those extra costs relate to an extra degree of care that must be taken when the loan portfolio, and bank operations are subject to regulatory and supervisory oversight. In June 2024, there were 347 supervisory findings outstanding ("Matters Requiring Attention" and "Matters Requiring Immediate Attention") at the 26 U.S.-headquartered banks with over \$100 billion of assets. About two-thirds of the supervisory findings were related to governance and controls. Only one third of these banks had satisfactory ratings across all

³⁷ Note that the funding advantage is not the difference between money market rates and deposit rates. Large banks like JPMorgan and Bank of America have low deposit rates approaching zero but they pay large amounts to attract depositors. These depositors are presumably willing to accept low rates on their deposits because of an extensive branch network, advertising and ancillary services.

three ratings categories (capital planning and positions, liquidity risk management and positions, governance and controls).³⁸

One form of supervision that may be particularly relevant here is the interagency guidance on leveraged lending, originally issued in 2001 and revised in 2013.³⁹ While this guidance does not prohibit leveraged lending, it “describes expectations for the sound risk management of leveraged lending activities.” Complying with this guidance likely imposes costs on banks that are not borne by private credit funds. More broadly, risky loans may attract particular attention from supervisors and increase the likelihood that banks will be judged as not complying with sound risk management practices. This is consistent with the finding of [Chernenko, Erel, and Prilmeier \(2022\)](#) that publicly traded middle market firms with negative EBITDA are about 35 percentage points less likely to borrow from banks than nonbanks.⁴⁰ Indeed, when BDCs report statistics on the debt-to-EBITDA ratio of their portfolio companies, the average tends to be above six – a cutoff commonly used by supervisors to identify risky leveraged loans. Furthermore, a significant share of BDC portfolios consists of annualized recurring revenue (ARR) loans. ARR loans are not underwritten on the basis of cash flow measures such as EBITDA, but rather based on subscription-based revenues, which are often thought to be highly sticky. Typically, the borrowers have negative or low EBITDA; in the latter case, this results in very high debt-to-EBITDA ratios. Lenders make these loans based on forecasts that with further growth and the funding support of their private equity sponsors, the firms will eventually generate enough EBITDA to cover loan payments. Goldman Sachs BDC, for example, reports that as of December 31, 2024, about 20% of its portfolio involved investments “where EBITDA may not be the appropriate measure of credit risk.” As a result, Goldman Sachs BDC excludes these investments from the reported weighted average net debt-to-EBITDA ratio of 6.2x.

A combination of leveraged loan guidance and other forms of supervision may, therefore, lead banks not to make the sort of middle market loans that private credit funds would find optimal to make. In our model, this would result in a lower net present value of the loan portfolio held on a bank’s balance sheet relative to the loan portfolio of a private credit fund. Thus, there could be further costs that banks would incur if they ran their middle market lending business on the bank’s balance sheet.⁴¹ Regardless of whether we can document the magnitude of the cost differential,

³⁸ See the Federal Reserve’s *Supervision and Regulation Report* of May 2024: <https://www.federalreserve.gov/publications/files/202405-supervision-and-regulation-report.pdf>

³⁹ The 2013 Interagency Guidance on Leveraged Lending can be accessed at: <https://www.federalreserve.gov/supervisionreg/srletters/sr1303a1.pdf> In December 2025, the OCC and FDIC withdrew from the 2013 interagency guidance on leveraged lending, although the Federal Reserve did not. See <https://www.fdic.gov/news/press-releases/2025/interagency-statement-occ-and-fdic-withdrawal-interagency-leveraged>

⁴⁰ This may also help to explain why private credit funds appear to be more flexible in the way they renegotiate with borrowers who violate financial covenants, as shown by [Jang \(2024\)](#).

⁴¹ It is also possible that asset managers can charge higher fees than our model assumes if investors overestimate the expected risk-adjusted returns from private credit. Although it is difficult to rule out this alternative explanation, existing evidence on the returns of private credit funds does not provide much support. Using a cash-flow based

our simple model helps us infer what that cost differential must be given other parameters of the model and observed behavior. This model thus suggests that what may help to explain the growth of private credit is not traditional regulatory capital arbitrage, but rather “supervisory arbitrage.”

Finally, we note that our findings and our model suggest that banks do not necessarily have an advantage in loan origination, underwriting, and servicing of the sort envisioned by [Diamond \(1984\)](#), at least in the context of middle market lending. This is a market in which a strong community presence made possible by an extensive branch network is less important than relationships with middle market private equity sponsors, which asset management firms have been well-positioned to cultivate. Instead, the advantage that banks have is in funding, as modeled by [Diamond \(2020\)](#). This leads them to focus most of their activity on making relatively safe loans to middle market lenders rather than making risky loans directly to middle market firms. In fact, it may be their institutional disadvantage in lending that leads banks to operate their middle market lending business off their balance sheet and in private credit funds.

6 Conclusion

We argue that the growth of private credit cannot be explained as an attempt to avoid onerous bank capital requirements. We show that private credit funds are far better capitalized than banks. Nevertheless, despite their high levels of capital, leverage limits imposed by the SEC and by bank loan covenants could lead private credit funds to reduce lending during stress scenarios, as examined by [Chernenko and Scharfstein \(2025\)](#).

While the standard regulatory arbitrage story does not explain the growth of private credit, bank regulation and supervision likely play important roles. We outline plausible conditions under which it is more profitable to lend to private credit funds than to lend directly to middle market firms. In part, this is because bank loans to private credit funds (or, more precisely, SPVs established by them) are typically considered senior tranches of securitizations, allowing banks to use lower risk weights for these loans and thus relatively little capital. We also identify conditions under which banks would prefer to make middle market loans via affiliated private credit funds rather on balance sheet. For plausible parameters, banks would be willing to forgo less expensive balance sheet funding to avoid the extra costs of managing a portfolio under the oversight of bank regulators

methodology that builds on [Gupta and Van Nieuwerburgh \(2021\)](#) and [Flanagan \(2024\)](#), [Erel, Flanagan, and Weisbach \(2024\)](#) estimate insignificant alphas for a sample of private credit funds launched between 1992 and 2015. These results do not rule out the possibility that funds launched during the more recent period, which experienced very rapid growth in private credit, have negative risk-adjusted returns. [Suhonen \(2024\)](#) looks at the stock returns of publicly traded BDCs, analyzing data through June 2022. His estimates of alpha are small and imprecisely estimated. In untabulated results, we conduct a similar exercise while extending the sample period through December 2024 and controlling for the portfolio shares allocated to direct lending, Broadly Syndicated Loans (BSLs), and equity. Like [Erel, Flanagan, and Weisbach \(2024\)](#) and [Suhonen \(2024\)](#), our estimates of alpha are small, positive and imprecisely estimated. Thus, we cannot rule out the possibility that investors overpay for private credit funds, but there is also no compelling evidence that they do.

and supervisors. We infer from the fact that banks are more likely to do their middle market lending through private credit funds that such regulatory and supervisory costs are potentially substantial.

Our analysis suggests that bank capital requirements per se are not an impediment to lending given that bank holding companies *choose* to lend through entities that have much more capital than would be required of banks. Importantly, however, these entities have much lighter touch regulation and supervision, thus lowering operating costs of compliance. We therefore conjecture that it is high capital requirements in combination with high supervision costs that make it more difficult for banks to meet their ROE targets and discourage bank lending. It may thus be worth considering whether a policy of very high capital requirements combined with lighter touch regulation and supervision could meet financial stability and bank profitability objectives.

Finally, we note that our analysis helps explain the growth in bank lending to NBFIs such as private credit funds, fintechs and hedge funds, a fact documented by [Acharya, Cetorelli, and Tuckman \(2024\)](#). Favorable capital treatment of loans to NBFIs and more costly regulatory and supervisory oversight of banks, could be driving the shift of risky assets from banks to NBFIs.

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Internet Appendix

for

Bank Capital and the Growth of Private Credit

This internet appendix reports

1. Additional details on the estimation of the operating expenses of lending to middle market firms.
2. Estimates of portfolio similarity across affiliated funds.
3. Estimates of industry default beta in Table [IA1](#).
4. Information on BDC Joint Ventures in Table [IA2](#).
5. Additional summary statistics in Figures [IA1–IA9](#).

Operating Expenses of Middle Market Lending

We estimate the operating expenses of middle market market lending using the financial statements of two publicly-traded asset managers that specialize in private credit: Ares Management Corporation and Blue Owl Capital. Ares reports six segments: credit, real estate, private equity, secondaries, operations management group, and other. As of 2024Q3, credit, which itself consists largely of direct lending, accounted for 72% of aggregate AUM of \$464 billion and 69% of total revenue. Blue Owl describes itself as operating three investment platforms — credit, real estate, and GP strategic capital, which provides capital to other private capital managers — but its financial statements have a single reportable segment. For consistency and simplicity we use firm-level expense data for both firms. We use GAAP expenses, which include equity and performance-based compensation of investment professionals, minus depreciation and amortization, which mainly reflects amortization of intangible assets due to acquisitions.

The denominator should be total assets: the sum of invested equity and drawn debt. Because neither Ares nor Blue Owl reports this measure directly, we have to estimate it from the other commonly reported metrics: AUM, Fee Paying AUM (FPAUM), and available capital. AUM is the sum of net asset value (NAV), drawn and undrawn debt, and uncalled equity capital. AUM overstates the value of the invested capital by the sum of undrawn debt and uncalled equity commitments. What constitutes FPAUM varies across different investment vehicles, but generally for BDCs FPAUM is total assets while for the typical private investment fund, FPAUM is the net

asset value of the drawn equity capital. Because FPAUM does not always include drawn debt and because it does not include fee-exempt AUM such as own capital, FPAUM tends to underestimate the value of the invested debt and equity capital. Because in recent years Ares reports the available capital or dry powder, we can estimate its total assets as the difference between AUM, which includes undrawn debt and uncalled equity, and available capital. Blue Owl unfortunately does not report the value of the available capital; it reports instead the value of AUM that is not yet paying fees, which is a proxy for uncalled equity commitments. To estimate Blue Owl's total assets, we first calculate the difference between total AUM and AUM that is not yet paying fees. This captures the value of drawn equity as well as drawn and undrawn debt. We then assume that Blue Owl and Ares have the same relationship between total assets and the difference between AUM and AUM that is not yet paying fees. We therefore use the average ratio for Ares of 90% to scale down our estimate of Blue Owl's total assets.

Using the average of the beginning and end-of-year assets as the denominator, the average expense ratios for Ares and Blue Owl are 1.28% and 1.04%. We estimate each manager's expense ratio using as much data as possible to account for the potential time variation in expense ratios. We use 2016–2023 for Ares and 2022–2023 for Blue Owl, which went public in 2021. Finally, the average expense across the two asset managers is 1.16%.

Expense ratios of asset managers do not include various professional fees and other administrative expenses incurred by their funds. We estimate these separately using data on the BDCs managed by Ares and Blue Owl. The numerator is the BDC operating expenses other than i) management and incentive fees, ii) debt-related financing expenses, and iii) shareholder servicing fees and offering costs. The denominator is the average of the beginning and end-of-year assets. The average across the different funds is 0.22%.

Portfolio Similarity of Affiliated Funds

To provide more systematic evidence corroborating significant similarity in holdings between BDCs and other private credit funds, we measure cosine similarity of the portfolio holdings of affiliated BDCs managed by the same investment manager. We find pairs of BDCs where one BDC is publicly traded and another one is non-traded.

Although not very common, some BDCs change their investment managers or have subadvisers. When a new manager takes over, it can take the new manager a long time to change the fund's portfolio. Since loans trade rarely, the manager has to wait for the old loans to be repaid. In the meantime, holdings of such funds are unlikely to be similar to the holdings of other funds managed by the same manager. We therefore require BDCs to be managed by the same investment manager throughout.

We also exclude BDCs that are younger than two years or have less than \$100 million in assets as these BDCs are unlikely to have fully ramped up their portfolios.

After applying these screens, we have 205 BDC pair-quarter observations across 11 unique investment advisers, 11 unique public BDCs, and 25 private BDCs. The median cosine similarity is 0.63, indicating significant though not perfect overlap.

Difference in holdings between affiliated BDCs are likely to be due to difference in fund age. Funds launched at different points in time would have invested in different loans, and these differences are likely to persist over time. When we require the difference in fund age to be less than five years, median cosine similarity increases to 0.85.

Instead of looking at the existing portfolio weights, we can look at the similarity in changes. When a given fund extends a new loan, do affiliated funds participate in the same loan? We determine the first time each fund invests in a given company and calculate the share of the new investment relative to fund assets. We then calculate cosine similarity of the values of such new positions. The median cosine similarity among funds that are at least two years old and have at least \$100 million in assets is 0.80.

Table IA1
Industry Default Beta

This table reports the results of regressions of industry default rate on the aggregate default rate. For each industry, we report the point estimate, its, standard error, root MSE, and the number of annual observations. Annual default rates for 35 industries over 1970–2024 are from Exhibit 44 in [Moody’s Annual Default Study](#). Aggregate default rate is from Exhibit 37. Coverage for some industries does not start until after 1970.

Industry	Beta	Standard error	Root MSE	N
Aerospace & Defense	0.89	0.15	0.01	55
Automotive	1.86	0.33	0.02	55
Banking	0.34	0.09	0.01	50
Beverage, Food, & Tobacco	0.74	0.11	0.01	55
Capital Equipment	1.18	0.19	0.01	55
Chemicals, Plastics, & Rubber	0.96	0.15	0.01	55
Construction & Building	2.49	0.32	0.02	55
Consumer goods: Durable	2.76	0.41	0.03	53
Consumer goods: Nondurable	2.31	0.36	0.03	55
Containers, Packaging, & Glass	1.34	0.51	0.03	38
Energy: Electricity	0.71	0.51	0.03	42
Energy: Oil & Gas	1.03	0.38	0.03	55
Environmental Industries	1.10	0.69	0.04	37
Finance	0.74	0.15	0.01	50
Forest Products & Paper	1.88	0.30	0.02	55
Healthcare & Pharmaceuticals	0.71	0.21	0.02	55
High Tech Industries	0.89	0.18	0.01	55
Hotel, Gaming, & Leisure	3.19	0.51	0.03	46
Insurance	0.01	0.10	0.01	45
Media: Advertising, Printing & Publishing	3.59	0.94	0.06	43
Media: Broadcasting & Subscription	2.73	0.58	0.04	42
Media: Diversified & Production	0.57	0.58	0.04	44
Metals & Mining	2.16	0.41	0.03	55
REIT	0.59	0.25	0.02	38
Retail	1.42	0.30	0.02	55
Services: Business	1.16	0.25	0.02	53
Services: Consumer	1.92	0.47	0.03	31
Sovereign & Public Finance	0.52	0.53	0.03	36
Telecommunications	1.62	0.29	0.02	55
Transportation: Cargo	1.41	0.34	0.03	55
Transportation: Consumer	1.96	0.72	0.05	55
Utilities: Electric	0.09	0.04	0.00	55
Utilities: Oil & Gas	0.11	0.06	0.00	55
Utilities: Water	0.22	0.13	0.01	37
Wholesale	1.69	0.43	0.03	46

Table IA2
BDC Joint Ventures

This table reports information on BDC joint ventures. For each JV, the table reports i) the name of the joint venture partner, ii) BDC's stake in the JV (*JV share*), iii) the value of BDC investment in the JV relative to BDC's total assets (*portfolio share*), iv) the value of JV assets (in millions), and v) JV's debt-to-assets ratio. JV information is as of 2023Q2. JV debt-to-assets ratio excludes subordinated debt provided by BDC or its JV partner. Some JVs do not report all relevant information.

CIK	Name	JV	JV partner(s)	JV share	Portfolio share	JV	
						Assets	D/A
1552198	WhiteHorse Finance Inc	WHF STRS Ohio Senior Loan Fund LLC	State Teachers Retirement System of Ohio	65.7%	10.6%	344	54%
1603480	TCW Direct Lending LLC	TCW Direct Lending Strategic Ventures LLC	Security Benefit Corp + Oak Hill Advisors LP	80.0%	7.1%	85	0%
1372807	Portman Ridge Finance Corp	Great Lakes Funding II LLC		12.5%	8.3%		
1372807	Portman Ridge Finance Corp	KCAP Freedom 3 LLC	Freedom 3 Opportunities LLC	62.8%	3.0%		
1383414	PennantPark Investment Corp	PennantPark Senior Loan Fund LLC	Pantheon Ventures (UK) LLP	60.5%	13.9%	839	64%
1504619	PennantPark Floating Rate Capital Ltd	PennantPark Senior Secured Loan Fund I LLC	Kemper Corp	87.5%	21.8%	848	62%
1414932	Oaktree Specialty Lending Corp	Senior Loan Fund JV I LLC	Trinity Universal Insurance Co	87.5%	4.2%	370	54%
1414932	Oaktree Specialty Lending Corp	OCSI Glick JV LLC	GF Equity Funding	87.5%	1.5%	127	52%
1496099	New Mountain Finance Corp	NMFC Senior Loan Program III LLC	SkyKnight Income II LLC	80.0%	4.2%	697	73%
1496099	New Mountain Finance Corp	NMFC Senior Loan Program IV LLC	SkyKnight Income Alpha LLC	78.6%	3.4%	501	71%
1512931	Monroe Capital Corp	MRCC Senior Loan Fund I LLC	Life Insurance Company of the Southwest	50.0%	6.3%	177	61%
1422183	FS KKR Capital Corp	Credit Opportunities Partners JV LLC	South Carolina Retirement Systems Group Trust	87.5%	8.9%	3,648	52%
1490927	Franklin BSP Lendig Corp	FBLC Senior Loan Fund LLC	Cliffwater Corporate Lending Fund	79.8%	10.1%	974	62%
1544206	Carlyle Secured Lending Inc	Middle Market Credit Fund II LLC	Cliffwater Corporate Lending Fund	84.1%	3.4%	248	63%
1544206	Carlyle Secured Lending Inc	Middle Market Credit Fund LLC	Credit Partners USA LLC	50.0%	9.5%	839	59%
17313	Capital Southwest Corp	I-45 SLF LLC	Main Street Capital Corp	80.0%	4.1%	153	56%
1812554	Blue Owl Credit Income Corp	Blue Owl Credit Income Senior Loan Fund LLC	State Teachers Retirement System of Ohio	87.5%	1.7%	809	62%
1655888	Blue Owl Capital Corp	Blue Owl Capital Corporation Senior Loan Fund LLC	The Regents of the University of California	50.0%	2.7%	1,158	61%
1859919	Barings Private Credit Corp	CPCF BPCC LLC	Cresset Partners Private Credit Fund LLC	9.1%	0.2%	115	58%
1379785	Barings BDC Inc	Sierra Senior Loan Strategy JV I LLC	MassMutual Ascend Life Insurance Company	89.0%	1.5%	107	72%
1655050	Bain Capital Specialty Finance Inc	Senior Loan Program LLC	Amberstone Co Ltd	50.0%	4.4%	874	60%
1655050	Bain Capital Specialty Finance Inc	International Senior Loan Program LLC	Pantheon	70.5%	9.4%	751	47%
1287750	Ares Capital Corp	Senior Direct Lending Program LLC	Varagon Capital Partners	87.5%	5.6%	5,128	73%

Additional Summary Statistics

Figure IA1
Distribution of BDC Size

This figure shows how the distribution of BDC size has evolved over 2000Q1–2023Q4. As of 2023Q4, the sample of 5 largest BDCs consists of Blackstone Private Credit Fund, Ares Capital Corp., Blue Owl Credit Income Corp., FS KKR Capital Corp., and Blue Owl Capital Corp.

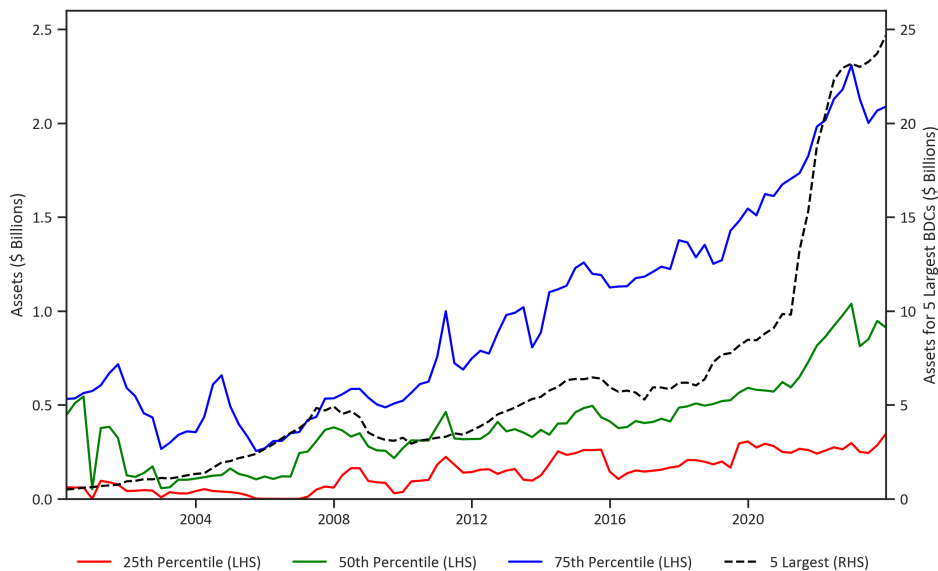


Figure IA2
BDC Loan Spread

This figure reports the weighted average spread on all floating-rate loans, 1st lien loans, and 2nd lien loans from 2013Q3 to 2023Q3. The spread includes both cash and PIK components.



Figure IA3
BDC Investments by Industry

This figure reports the share of aggregate BDC investments by industry, as of 2023Q3. We use a large language model (LLM) to map almost five thousand raw industry descriptions in the holdings data into 35 Moody's industries. Equal-weighted shares refer to the simple average of portfolio shares across BDCs.

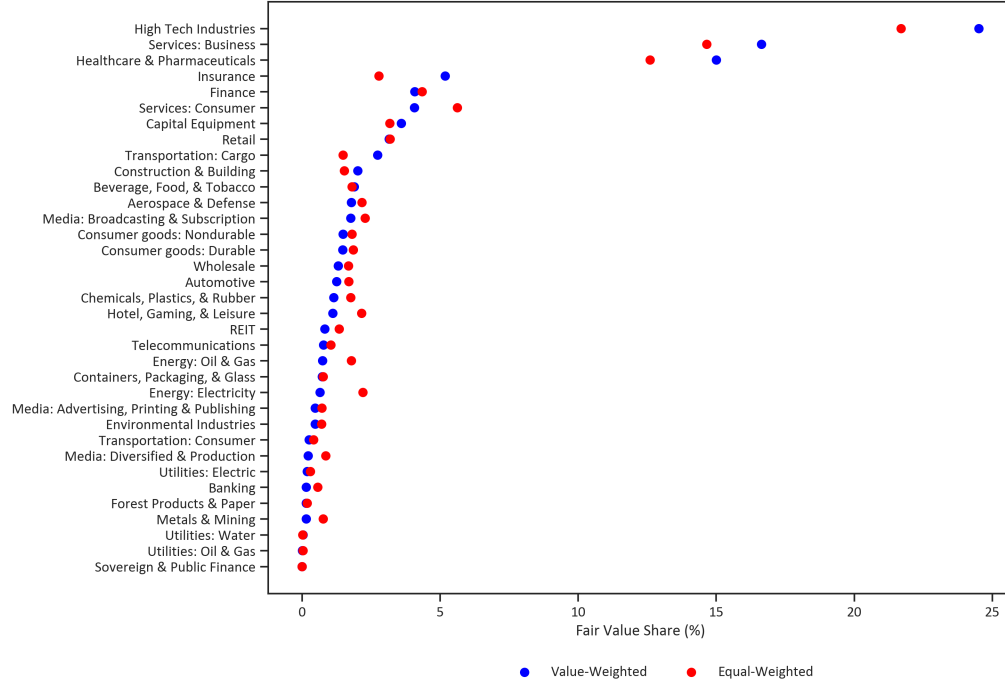


Figure IA4
Portfolio-Level Industry Default Beta

For each BDC-date observation we calculate the value-weighted average of industry default beta across all loans in the BDC's portfolio. Industry default beta is the slope from the annual regression of industry default rate on the aggregate default rate. Annual default rates for 35 industries over 1970–2024 are from Exhibit 44 in [Moody's Annual Default Study](#). The sample consists of BDCs with at least \$100 million in assets and loan portfolio share of at least 50%.

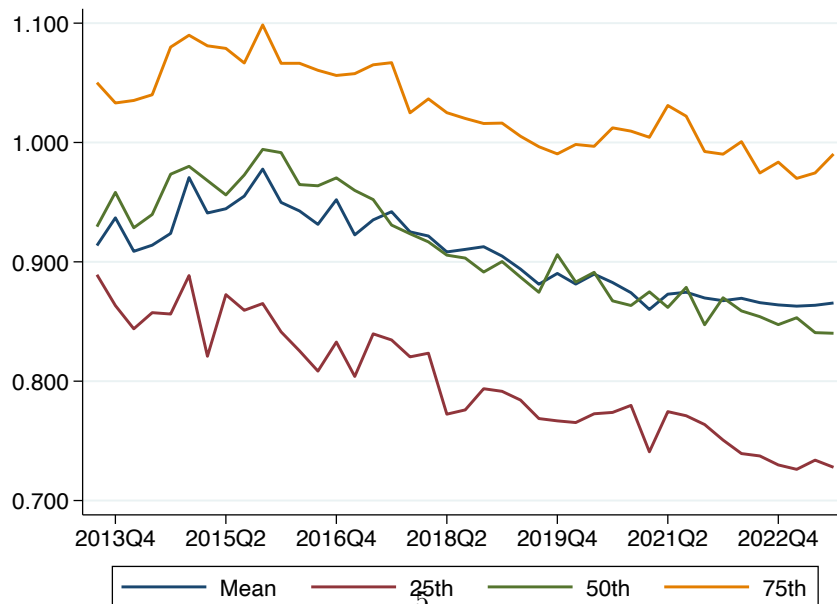


Figure IA5
BDC Asset Composition

This figure shows the composition of BDC assets from 2013Q3 to 2023Q3. Assets are decomposed into cash, CLOs, equity in joint ventures (JVs), other equity, broadly syndicated loans (BSL), and all other loans.

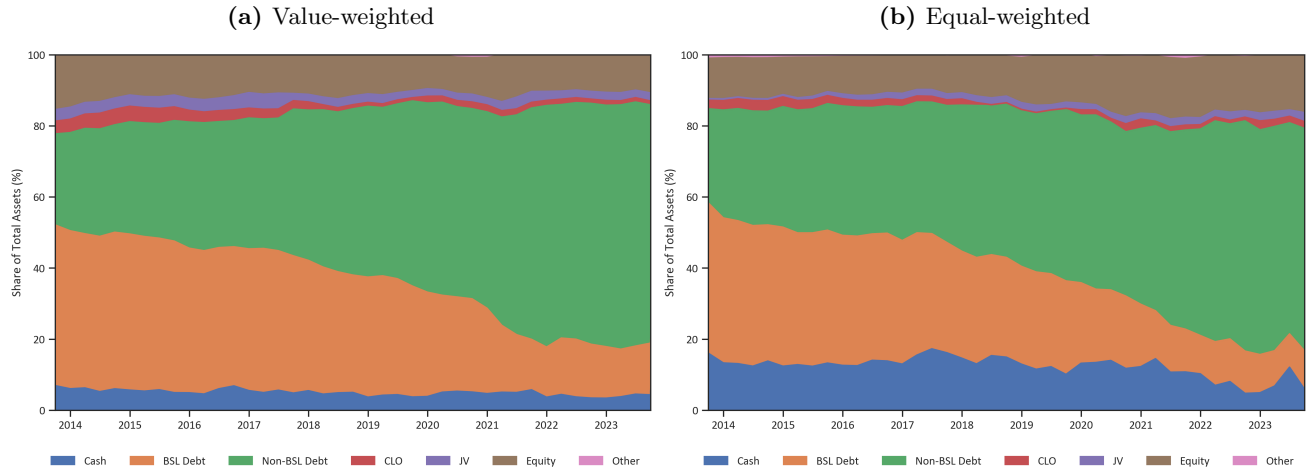


Figure IA6
BDC Loan Portfolio Composition

This figure reports the composition of BDC direct loan portfolios from 2013Q3 to 2023Q3. Holdings of broadly syndicated loans (BSLs) are excluded. Loans are decomposed into senior secured, 1st lien, 2nd lien, unsecured, unitranche, and other loans.

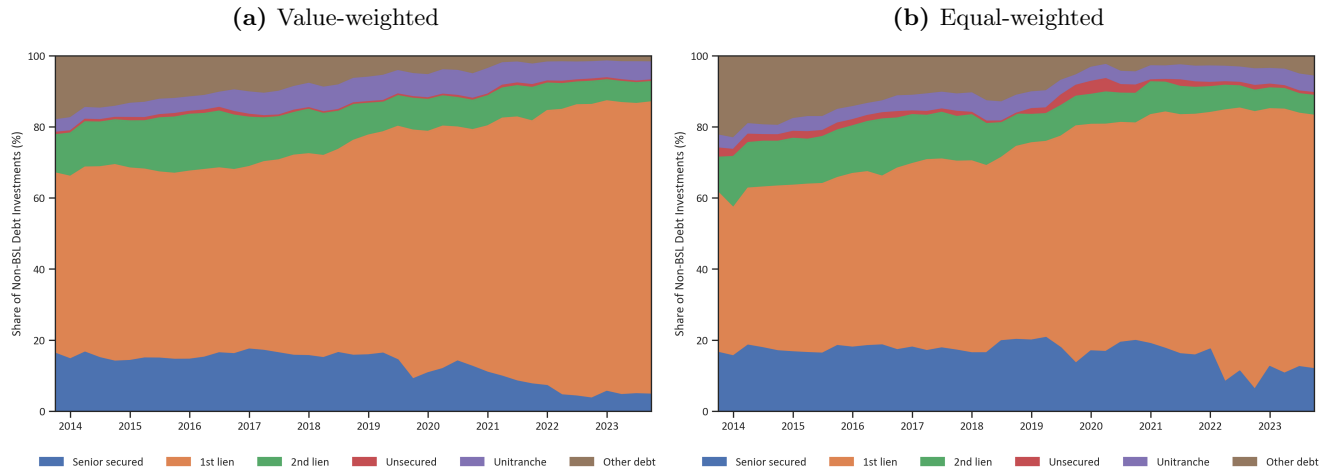


Figure IA7
BDC Investment Size

This figure shows percentiles of investment size, measured at amortized cost, between 2013Q3 and 2023Q3. We aggregate across all debt and equity investments in the same portfolio company.

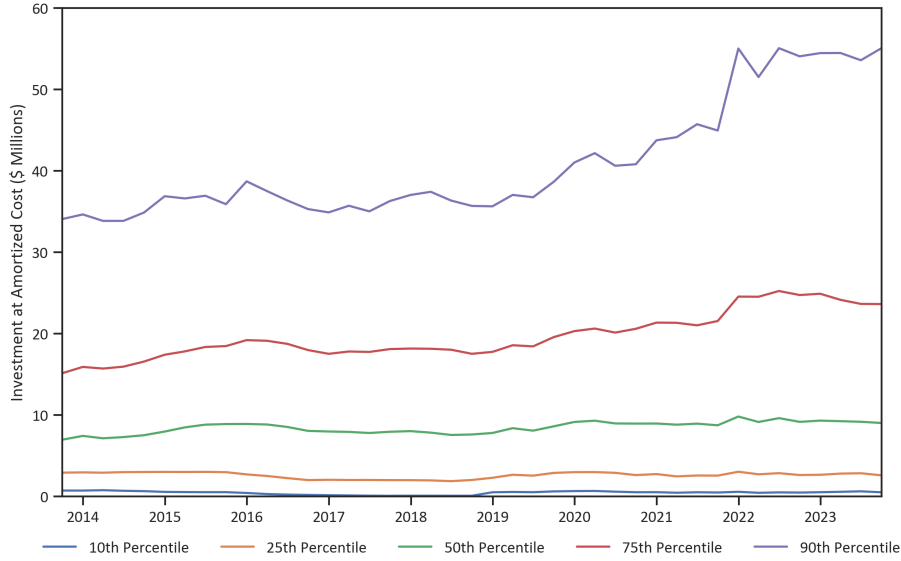


Figure IA8
BDC Debt by Instrument Type

This figure plots the share of aggregate BDC debt by instrument type from 2010Q1 to 2023Q4. Debt is decomposed into revolving credit, notes and bonds, term loans, securitized debt, and other. Notes and bonds are expressed net of securitized debt. Other aggregates commercial paper, leases, trust preferred securities, and other borrowings. It also includes total debt not elsewhere classified.

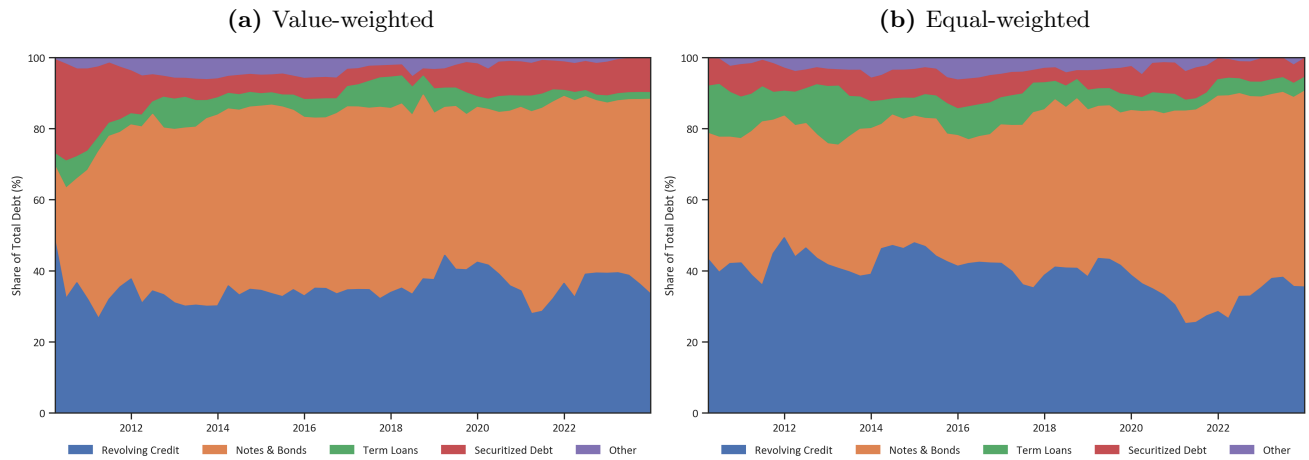


Figure IA9
BDC Financing Spread

This figure reports the weighted average spread on all revolving credit used by BDCs from 2010Q1 to 2023Q4.

