Comparative Risk Mitigation in Net Asset Value (NAV) Financing:

A Comparative Analysis of U.S. Capital-Based and EU Structural Regulatory Regimes in a Transforming Private Markets System

by

Carson Decker

An honors thesis submitted in partial fulfillment

of the requirements for the degree of

Bachelor of Science

Business and Economics Honors Program

May 2026

Professor Marti G. Subrahmanyam
Professor Christina Wang
Professor Wendy Jin
Faculty Advisors

Professor Xuyuanda Qi
Thesis Advisor

Acknowledgments

My four years at NYUSH have, inevitably, come to their natural conclusion. My time here has not always been linear; I've faced my fair share of setbacks and trials along the way, but each has been an opportunity to grow, learn, and do better. This growth would not have been possible had it not been for the support of family, friends, and professors along the way. To you all, thank you.

It goes without saying that I must first thank my family. Their support throughout not only this program but my entire college career – the ups and the downs – has been invaluable; I would not be half the researcher, or man, without their unwavering love and support (even if that meant my calls disturbing their sleep).

I would like to express, as well, my gratitude to Prof. *Xuyuanda Qi*, my thesis advisor, who pushed me to think beyond my own constraints and see this paper as something more than its initial bounds. His support and guidance proved invaluable during the research process and throughout my penultimate year. There are, of course, numerous other professors along the way who shaped my academic journey whom I'd like to thank: Prof. *Rodrigo Zeidan*, Prof. *Offer Shapir*, and Prof. *Tao Jiao* for their unwavering support, understanding, and guidance through my Business & Finance studies. I would also like to thank Prof. *Alex Crosse*, who, inadvertently, became my mentor through four years of college and has consistently made time to hear my struggles from this paper to personal life. The time spent in their lectures, office hours, and beyond will always be a treasured part of my time in undergrad.

Finally, my gratitude to Prof. *Marti G. Subrahmanyam*, Prof. *Christina Wang*, and Prof. *Wendy Jin* for their efforts in coordinating the program. Additional thanks to *Xinyi Yang* for handling the logistics of the seminars, and to the professors who shared their individual projects. It's been a real honor to be a part of the honors program, and I look forward to following the journeys of my peers, wherever we may go.

As my fellow Missourian, Mark Twain, once said, "The secret of getting ahead is getting started." Thank you all for helping me get started.

Abstract

NAV financing, fund-level borrowing secured by the aggregate value of a fund's portfolio investments, has emerged as the fastest-growing segment of fund finance, projected to grow from approximately $100 billion in 2024 to $700 billion by 2030. This paper argues that NAV facilities, as currently practiced in the United States, create a distinct moral hazard channel that amplifies systemic risk by layering fund-level debt on top of portfolio company leverage. Five quantitative models calibrated to publicly-disclosed parameters provide the empirical grounding. A leverage-cascade simulation shows that 25-percent-LTV NAV facilities produce 1.83× LP loss amplification at typical-parameter market declines. A cost-of-carry IRR drag formula shows that LP returns fall by 358 basis points per annum at industry-typical pricing — defining the break-even hurdle that accretive NAV facility deployment must clear. A lognormal covenant-breach model shows three-year breach probabilities exceeding 10 percent at industry-standard buffers and volatilities. An LP pass-through analysis demonstrates that the leverage guardrails adopted by major U.S. public pension funds (CalSTRS, CalPERS) do not measure fund-level NAV leverage at all, producing a material mis-measurement of plan-level exposure. A cross-collateralization domino model shows that distress in a subset of holdings forces fire-sales of healthy holdings producing 40–47 percent total LP losses. A Qualitative Comparative Analysis identifies five institutional conditions for effective regulatory mitigation. The EU's structural approach under AIFMD II satisfies the first three (binding leverage limits, mandatory reporting, macroprudential intervention authority); the U.S. capital-based regime does not. The paper concludes that legislative action establishing fund-level leverage limits, enhanced Form PF reporting, and FSOC activity-level intervention authority is necessary to close the regulatory gap.

Keywords: NAV financing, private credit, shadow banking, fund-level leverage, moral hazard, AIFMD II, systemic risk, regulatory arbitrage.

Preface

My interest in private credit began as a curiosity about the parts of the financial system that operate outside public view. Where most undergraduate finance training centers on listed equities and the regulated banking sector, the rapid growth of non-bank intermediation over the past decade has shifted an enormous share of corporate credit creation into venues that disclose less, are supervised differently, and behave under stress in ways that established theory has only begun to model. The questions that drew me in were not technical at first, rather structural. Who actually lends to whom in this system? What gets reported and what does not? When losses arrive, who absorbs them, and on what timeline?

Net Asset Value (NAV) financing emerged from that broader interest because it sits at a particularly informative intersection of those questions. NAV facilities are the most recent, fastest-growing, and least-regulated form of leverage layering in the private fund universe. They are issued largely by lenders most readers will never have heard of, secured against portfolios that are valued by the funds themselves, and used in ways, particularly to manufacture distributions, that the limited partners bearing the risk often cannot observe in real time. Each of these features makes NAV financing a kind of stress test for the regulatory frameworks that were built for an earlier generation of capital markets. The findings in this paper are an attempt to take that stress test seriously.

This paper is intended for two audiences. The first is the academic and policy community working on systemic risk in non-bank financial intermediation, for whom the quantitative models in Sections III and IV and Appendix A are designed to provide reproducible empirical scale to arguments that are too often made in qualitative terms. The second is the broader honors community at NYUSH and beyond, whose interest in finance may not yet have extended into the private and shadow markets where the most consequential structural shifts are now occurring; this paper is written with the hope that it makes those markets a little more legible, and the case for closer attention a little more concrete.

The scope of this paper is intentionally limited to the U.S. and EU regulatory frameworks. The choice of comparator reflects both the dominance of these two jurisdictions in NAV facility origination and the sharpness of the structural-versus-capital regulatory contrast they offer. Other

jurisdictions — particularly the UK, Canada, and the major Asian fund-finance hubs — would deserve their own treatment in extensions of this work.

Table of Contents

I. Introduction

The private credit market has undergone a structural metamorphosis over the past fifteen years, growing from approximately $250 billion in assets under management in 2010 to an estimated $1.8 trillion by early 2024 (Lalafaryan 2023; BCG 2024). This expansion, accelerated by post-2008 regulatory reforms that constrained bank lending, has fundamentally altered the architecture of corporate finance. Within this transformation, net asset value (NAV) financing has emerged as one of the fastest-growing segments of fund finance, constituting a $100 billion market with a compound annual growth rate of approximately 30 percent between 2019 and 2023 (Padilla 2025; Citco Capital Partners 2024). NAV facilities—fund-level borrowings secured against the aggregate value of a fund's portfolio investments—enable general partners (GPs) to access capital for acquisitions, portfolio company support, and, controversially, limited partner (LP) distributions without liquidating underlying assets.

This paper advances the thesis that NAV financing, as currently practiced in the United States (U.S.), creates a distinct moral hazard channel that amplifies systemic risk across the private markets ecosystem. The core mechanism operates through what this analysis terms the leverage-on-leverage dynamic: NAV facilities layer fund-level debt on top of portfolio company leverage, creating compounding risk exposures that are neither visible to downstream investors nor adequately constrained by existing U.S. regulation. The availability of these facilities reshapes GP risk-taking behavior ex ante—consistent with Yared's (2011) framework demonstrating that agents expecting liquidity access invest differently than those facing binding constraints—while simultaneously enabling the artificial enhancement of internal rates of return (IRR) that obscures deteriorating fund performance (Forbes 2026).

The regulatory response to these risks has diverged sharply across jurisdictions. The United States relies primarily on a capital-based approach through the National Association of Insurance Commissioners (NAIC) Risk-Based Capital (RBC) framework, supplemented by investor-level protections and soft governance mechanisms such as the Institutional Limited Partners Association (ILPA) guidance released in July 2024. This regime constrains certain regulated investors—principally insurance companies—through capital charges on private credit exposures but imposes no structural limits on NAV facility usage at the fund or lender level. The European Union (EU), by contrast, has adopted a structural regulatory approach through the Alternative Investment Fund

Managers Directive II (AIFMD II), which establishes binding leverage ceilings of 175 percent for open-end funds and 300 percent for closed-end funds, coupled with mandatory reporting requirements and regulatory intervention powers under European Securities and Markets Authority's Article 25 framework (ESMA 2024).

This paper argues that the EU structural approach provides a more effective framework for mitigating the systemic risks inherent in NAV financing, while acknowledging the trade-offs this regime imposes in terms of market flexibility and innovation. The analysis proceeds through six interconnected questions that structure the comparative inquiry: (1) Why have U.S. and EU regulatory regimes diverged so markedly in their treatment of private credit leverage? (2) How does NAV facility availability function as liquidity support that reshapes risk-taking incentives? (3) What downside option structures do NAV facilities create for fund managers? (4) Through what channels does NAV lending transmit moral hazard into the broader financial system? (5) How do bank lending constraints interact with private credit expansion and NAV facility growth? (6) What regulatory design achieves optimal risk sharing between banks, private credit funds, and their investors?

The paper proceeds as follows. Section II examines the architecture of NAV financing and its place within the broader private credit transformation, drawing on Lalafaryan's (2023) modern debt governance framework and the bank-NBFI interconnection literature. Section III develops the moral hazard channel through which NAV facilities amplify systemic risk, integrating theoretical frameworks from Yared (2011) and Acharya and Viswanathan (2011) with empirical evidence on IRR manipulation, zombie firm proliferation, and five quantitative risk models calibrated to publicly-sourced NAV facility data. Section IV presents a detailed comparative analysis of U.S. and EU regulatory regimes. Section V evaluates evidence from financial stress episodes, including the COVID-19 crisis and Federal Reserve data on bank-private fund linkages. Section VI develops a Qualitative Comparative Analysis (QCA) framework identifying five institutional conditions for effective NAV risk mitigation and synthesizes policy recommendations. Section VII concludes. Appendix A contains the full methodology, calibration parameters, and reproducibility notes for the five quantitative models referenced throughout Sections III and IV.

II. The Architecture of NAV Financing and Private Credit

A. Mechanics of NAV Lending

NAV facilities are fund-level borrowing arrangements secured by the net asset value of a fund's portfolio investments rather than by the unfunded capital commitments of limited partners (which characterize subscription credit facilities) or by the assets of individual portfolio companies (Oaktree Capital Management 2024; Global Legal Insights 2024). These facilities typically take the form of three-to-five-year term loans with loan-to-value ratios ranging from 10 to 25 percent of portfolio NAV, secured by a pledge of the fund's equity interests in its portfolio companies (Padilla 2025). The structural distinction is critical: whereas subscription lines are secured against LP commitments and are typically drawn early in a fund's life, NAV facilities are secured against the marked value of existing investments and are most commonly utilized later in the fund lifecycle, when capital calls have been substantially exhausted.

The uses of NAV financing have expanded considerably beyond their original purpose of providing bridge liquidity. General partners now deploy NAV facilities for at least four distinct purposes: follow-on investments in existing portfolio companies, new acquisitions, defensive capital infusions during periods of portfolio company distress, and—most controversially—funded distributions to limited partners (ILPA 2024). The latter use has drawn particular scrutiny because it enables GPs to return capital to investors without selling portfolio assets, thereby generating apparent DPI (distributions to paid-in capital) that may mask deteriorating portfolio fundamentals. As the ILPA guidance acknowledges, NAV-based facilities used to fund distributions raise concerns about whether GPs are prioritizing short-term return metrics over genuine value creation.

The structural mechanics of NAV lending embed several risk-amplifying features. First, because the collateral is itself a marked-to-model valuation rather than a market-traded asset, the security package is inherently procyclical: valuations tend to rise during credit expansions (increasing borrowing capacity) and decline during contractions (triggering potential margin calls or covenant breaches). Second, NAV facilities create explicit leverage layering—fund-level debt sits on top of portfolio company debt, producing an effective leverage ratio that substantially exceeds either layer's standalone metrics. Alpha Group's analysis suggests that portfolio valuations would need to decline more than 30 percent to trigger LTV covenant breaches (Padilla 2025), but this analysis arguably understates tail risk in scenarios where portfolio company leverage simultaneously amplifies downside exposure. Third, the opacity of the underlying collateral—illiquid portfolio

companies valued through Level 3 fair value measurements—introduces valuation uncertainty that compounds during periods of market stress (Ascher, Riely, and Lichtman 2021).

B. The Private Credit Revolution and Credit Darkening

NAV financing must be understood within the broader transformation of corporate debt markets that Elias and de Fontenay (2025) characterize as credit darkening—the migration of corporate lending from transparent, publicly traded instruments to opaque, privately negotiated credit arrangements. The private credit market has grown from approximately $238 billion in 2008 to an estimated $2.4 trillion by mid-2023 (ACC/AIMA/Dechert 2019; BCG 2024), absorbing market share that was historically dominated by commercial banks and public bond markets. This expansion was not incidental but structurally driven by three interconnected regulatory forces: the Basel III framework's increased capital requirements for leveraged lending, the Volcker Rule's restrictions on proprietary trading and fund sponsorship, and risk retention requirements under the Dodd-Frank Act that reduced the economic viability of traditional originate-to-distribute lending models (Chernenko, Ialenti, and Scharfstein 2025).

Elias and de Fontenay (2025) identify three transformative consequences of this credit darkening that are directly relevant to NAV financing risks. First, private credit reduces the information available to the market and to regulators about the terms, pricing, and risk characteristics of corporate lending—a transparency deficit that extends to fund-level borrowing through NAV facilities. Second, the shift to private credit alters corporate governance dynamics, as private credit lenders exercise monitoring functions through different mechanisms than dispersed public bondholders. Third, credit darkening changes the mechanics of financial distress: whereas public debt restructuring proceeds through well-established Chapter 11 processes with court supervision and creditor voting, private credit workouts operate through bilateral negotiation between concentrated lender groups and borrowers, potentially enabling outcomes that prioritize lender recovery over enterprise value maximization.

The implications for NAV financing are profound. The opacity that characterizes private credit at the portfolio company level is compounded at the fund level, where NAV facility terms, utilization rates, and the interaction between fund-level and company-level leverage are disclosed only to the extent that fund managers choose to share this information. The Financial Stability Oversight Council's (FSOC) 2024 Annual Report explicitly flagged this opacity as a systemic risk concern,

noting that the opaque nature of private credit makes it difficult for regulators to assess risk management practices and the buildup of interconnections in the financial system (FSOC 2024). Similarly, the International Organization of Securities Commission's (IOSCO) (2023) thematic analysis of emerging risks in private finance identified leverage, opacity, and market interconnectedness as the primary channels through which private credit could transmit instability to the broader financial system.

C. Modern Debt Governance: Originate-to-Suit-and-Fit

Lalafaryan's (2023) framework of modern debt governance provides a crucial analytical lens for understanding how NAV financing operates within the private credit ecosystem. Lalafaryan draws a fundamental distinction between the bank lending model of originate-to-distribute—in which loans are underwritten with the expectation of syndication or securitization—and the private credit model of originate-to-suit-and-fit, in which credit instruments are tailored to the specific needs of borrowers and held by the originating fund through maturity. This distinction has direct implications for risk monitoring, governance, and the potential for moral hazard.

Under the originate-to-suit-and-fit model, private credit funds employ several governance mechanisms that differentiate their approach from traditional bank lending: floating pricing structures that adjust to changing risk conditions, bespoke covenant packages tailored to individual borrower circumstances, board representation or observer rights that provide direct governance access, and equity upside participation through warrants or conversion features (Lalafaryan 2023). These mechanisms, in theory, align lender and borrower incentives more closely than the standardized terms characteristic of syndicated lending. However, Lalafaryan's framework also reveals a critical tension: private credit funds perform financial intermediation functions—maturity, credit, and liquidity transformation—that are economically equivalent to banking activities, yet without access to central bank liquidity facilities or deposit insurance that provides banks with a public backstop during periods of stress.

This intermediation gap becomes particularly salient in the context of NAV financing. When a private credit fund originates loans to portfolio companies and simultaneously borrows against the aggregate NAV of those investments through a NAV facility, it is engaging in a form of leveraged financial intermediation that mirrors bank balance sheet expansion. The fund's equity investors (LPs) bear a risk profile that is functionally similar to subordinated bank debt holders, yet without

the regulatory protections—capital adequacy requirements, stress testing, supervisory examination—that constrain bank leverage and protect bank creditors. This regulatory asymmetry is not merely an oversight; it represents the fundamental policy question that the U.S. and EU have answered in divergent ways.

D. The Bank-NBFI Nexus: Transformation, Not Substitution

A critical insight from recent scholarship is that the relationship between banks and non-bank financial intermediaries (NBFIs), including private credit funds, is better characterized as transformation rather than substitution. Acharya, Cetorelli, and Tuckman (2024) demonstrate that banks and NBFIs do not operate as parallel, independent systems but rather as deeply interconnected components of a single credit intermediation chain. Their analysis reveals that bank loans to NBFIs grew from approximately $125 billion to over $300 billion in the period following the Global Financial Crisis, while credit commitments—including undrawn credit lines that function as contingent liquidity support—expanded from approximately $500 billion to over $1.5 trillion.

Levin and Malfroy-Camine's (2025) Federal Reserve Bank of Boston analysis provides granular empirical evidence of this interconnection at the fund level. Using regulatory data from FR Y-14Q filings, they estimate that large U.S. banks held approximately $300 billion in total loan commitments to private equity and private credit fund-level entities as of the third quarter of 2023, representing approximately 14 percent of total bank loan commitments to NBFIs—up from less than $10 billion (approximately 1 percent) in 2013. Moreover, their analysis reveals significant concentration risk: five large PE/PC fund management companies are responsible for roughly 1,000 individual loans accounting for approximately one-third (about $100 billion) of total PE/PC loan commitments. The utilization rate of these credit facilities has trended upward from approximately 40 percent in 2012 to nearly 60 percent by 2023, suggesting that private funds are increasingly relying on bank-sourced liquidity to support their operations.

The implications of this transformation view for NAV financing are far-reaching. NAV facilities do not merely redistribute risk from banks to non-bank lenders; they create new channels through which stress in the private credit sector can transmit back to the banking system. As Xu (2026) demonstrates in her analysis of contingent liquidity from banks to nonbank lenders, credit lines constitute approximately 90 percent of bank funding to nonbank lenders, with 41 percent of these

facilities carrying 364-day maturities—a structure that reflects Basel regulatory incentives (20 percent versus 50 percent credit conversion factor) rather than the underlying economic characteristics of the credit relationship. This maturity structure creates a systemic vulnerability: in stress scenarios, banks face the dual pressure of credit line drawdowns from private funds precisely when their own balance sheet capacity is most constrained.

III. The Moral Hazard Channel in NAV Financing

A. Theoretical Framework: Liquidity Expectations and Risk-Taking

The moral hazard channel in NAV financing operates through a mechanism that is analytically distinct from the standard principal-agent problems in private equity. While the existing literature has extensively examined agency conflicts between GPs and LPs (relating to fee structures, carried interest incentives, and information asymmetries), the specific moral hazard created by NAV facility availability operates at a structural level: the expectation of liquidity access reshapes investment and risk management decisions ex ante, even before any facility is drawn.

Yared's (2011) model of optimal fiscal policy under limited private credit provides the theoretical foundation for this analysis. Yared demonstrates that when economic agents face binding borrowing constraints, they invest optimally in short-term, liquid assets as a precautionary measure, maintaining portfolios that can withstand adverse shocks without requiring external financing. The key insight is that relaxing these borrowing constraints—or, equivalently, providing access to contingent liquidity—can reduce welfare by inducing agents to take on more illiquid, higher-risk positions under the assumption that financing will be available if conditions deteriorate. The optimal policy, Yared shows, is to maintain borrowing constraints rather than fully relax them, because constrained agents make more prudent investment decisions.

Applied to NAV financing, Yared's framework generates a clear prediction: fund managers who anticipate access to NAV facilities will construct portfolios that are more concentrated, more illiquid, and more leveraged at the portfolio company level than they would in a world without such access. This is not a pathological response but a rational optimization—if liquidity can be sourced from a NAV facility rather than from asset sales, the manager faces lower expected costs of holding illiquid positions and can defer exits that might otherwise be value-maximizing. The

moral hazard operates not through post-contractual shirking but through the rational recalibration of risk tolerance in response to contingent liquidity availability.

Acharya and Viswanathan's (2011) analysis of leverage, moral hazard, and liquidity reinforces this theoretical channel from a financial stability perspective. They demonstrate that favorable economic conditions yield cheaper short-term debt, inducing entry of higher-leverage firms, and that adverse asset shocks in good times consequently lead to greater deleveraging and sudden drying up of market and funding liquidity. In the NAV financing context, this maps directly onto the procyclical dynamics of the current market: the rapid growth of NAV lending during a period of compressed credit spreads and elevated valuations creates the conditions for a disorderly unwind if market conditions deteriorate.

B. IRR Amplification and the Zombie Firm Problem

The empirical evidence increasingly supports the theoretical prediction that NAV facilities are being used to manage return metrics rather than to create genuine economic value. The private equity industry faces a structural performance crisis: three-year annualized returns on the Cambridge Associates Private Equity Index have declined to 7.4 percent, compared to 18.4 percent for the MSCI World Index over the same period (Forbes 2026). Average holding periods have extended from 5.1 years in 2020 to 6.3 years in 2025, distribution yields have fallen from over 25 percent a decade ago to approximately 11 percent over the last three years, and the median DPI for 2020 vintage funds stands below 0.2x. In this environment of compressed exit opportunities and declining distributions, NAV facilities offer GPs a mechanism to maintain the appearance of healthy fund performance.

The IRR amplification mechanism operates as follows. Because IRR is a time-weighted return metric, the timing of cash flows materially affects the calculated return. By using a NAV facility to fund early distributions to LPs—distributions that would otherwise occur only upon actual portfolio company exits—GPs can accelerate the return of capital and generate apparent IRR improvement even when the underlying portfolio value has not changed. This creates what this paper terms a return illusion: LPs observe higher IRR figures that reflect financing decisions rather than investment performance, and uses these inflated metrics to evaluate manager quality and make subsequent allocation decisions.

The zombie firm problem represents the most acute manifestation of this moral hazard. The current PE landscape features over 18,000 funds seeking $3.3 trillion in commitments, while projected fundraising will yield only approximately $1.1 trillion—a fundamental mismatch that creates intense pressure on GPs to demonstrate performance (Forbes 2026). Continuation funds, which raised $62 billion in 2024 and over $40 billion in the first half of 2025 alone, represent one response to the inability to exit portfolio companies at acceptable valuations. NAV facilities represent another: by borrowing against portfolio NAV to fund distributions, GPs can delay the reckoning that would come from marking down investments or selling at below-target prices. The result is a growing population of portfolio companies held beyond their optimal holding period, supported by leverage rather than by operational value creation.

B.1 The Arithmetic of the Return Illusion: A Cost-of-Carry Model

To quantify the cost side of the IRR amplification mechanism, consider a stylized fund carrying a 15 percent gross IRR and a NAV facility at 25 percent LTV. 17Capital publicly discloses pricing for its NAV financing in the range of 550-750 basis points over the base rate, with tenors of three-to-five years and an optional payment-in-kind (PIK) structure at the manager's discretion (17Capital 2024). Applied against a 4.25 percent SOFR base consistent with the April 2026 rate environment, cash-pay facility rates span approximately 9.75-11.75 percent. Because facility interest is paid out of fund-level cash flows before LP distributions, the drag on LP net IRR follows the standard leveraged-equity formula: net IRR ≈ gross IRR − (LTV × facility rate) ÷ (1 − LTV). The denominator converts the dollar cost to a rate on the LP equity slice that remains junior to the facility.

Table 1 reports the resulting LP net IRR across the disclosed pricing band, holding gross IRR at 15 percent and LTV at 25 percent:

Table 1: Pricing Sensitivity — Net LP IRR at 15% Gross IRR, 25% NAV LTV

Pricing Regime	All-In Rate	Cash-Pay Net IRR (%)	PIK Net IRR (%)	Drag vs. Gross (pp)
Low (550 bps)	9.75%	11.75	12.23	3.3
Mid (650 bps)	10.75%	11.42	11.95	3.6
High (750 bps)	11.75%	11.08	11.67	3.9

Source: Author's model, calibrated to 17Capital (2024) pricing disclosures and a 4.25% SOFR base. Color coding on drag: green (<3 pp), amber (3-4 pp), red (>4 pp). PIK net IRR applies a 15% downward adjustment to the drag term to reflect the time-value advantage of deferred cash interest outflow.

Two points emerge. First, the IRR cost of NAV financing at industry-typical parameters is substantial: a 25 percent LTV facility at mid-range pricing consumes approximately 358 basis points of net fund IRR per annum under cash-pay terms. Second, the PIK option preferred by many borrowers provides only modest absolute relief—roughly 50 basis points of additional retained IRR—but it does so by deferring, not eliminating, the cost. That deferral is precisely the mechanism that compounds the return illusion: PIK-accruing NAV interest does not show up in current fund cash flows and therefore does not reduce reported IRR during the fund life, even though the facility principal plus accrued PIK interest will ultimately be paid out of terminal distributions.

In aggregate, the model suggests that NAV facilities at mid-range pricing need to unlock gross-IRR improvements of at least 350-400 basis points per annum through accretive deployment—additional investments or defensive capital infusions—to be net-positive for LPs. For the most controversial use case, funding distributions to LPs, no such deployment-based gross-IRR improvement occurs. The cost is borne entirely by LPs in exchange for earlier timing of cash receipt rather than additional value creation. The 358-basis-point drag is therefore the quantitative anchor of the return-illusion argument: observed IRR improvements of less than this magnitude are, on a cost-adjusted basis, IRR deterioration.

C. Leverage-on-Leverage Dynamics: A Quantitative Stress Analysis

The leverage-on-leverage concern represents perhaps the most significant structural risk in NAV financing. When a PE fund utilizes a NAV facility, it is layering fund-level debt on top of portfolio company debt, creating effective leverage ratios that substantially exceed either layer's standalone measurement. To quantify this amplification effect, this section presents a stress simulation modeling how enterprise value declines cascade through two leverage layers—portfolio company debt and fund-level NAV borrowing—to determine residual LP losses under varying scenarios.

Consider a hypothetical $1 billion PE fund that invests in portfolio companies using a moderate 2.0x debt-to-equity ratio, producing a total enterprise value (EV) of $3 billion ($2 billion in portfolio company debt plus $1 billion in equity). The fund then utilizes a NAV facility at various loan-to-value (LTV) ratios ranging from 0 percent (no facility) to 30 percent. When enterprise value declines, losses first reduce portfolio equity, and the remaining equity must then satisfy the NAV facility's senior claim before any residual flows to LP investors. Table 2 presents the results

of this simulation, scaled for structural reference to Ares Capital Corporation (ARCC), whose FY2024 10-K discloses a $4.5 billion senior secured revolving credit facility at the parent BDC level combined with subsidiary funding facilities (CP Funding upsized from $1.8B to $2.2B in October 2024; FB Funding $1.265B; JB Funding $0.8B) that together provide approximately $5.1 billion of available borrowing capacity.

Table 2: Leverage Cascade Stress Simulation — LP Loss Rates (%)

Moderate case: Hypothetical $1,000M PE Fund; Portfolio Company D/E = 2.0× (EV = $3,000M)

EV Decline	No Facility	LTV 5%	LTV 10%	LTV 15%	LTV 20%	LTV 25%	LTV 30%
0%	0	5	10	15	20	25	30
5%	15	20	25	30	35	40	45
10%	30	35	40	45	50	55	60
15%	45	50	55	60	65	70	75
20%	60	65	70	75	80	85	90
25%	75	80	85	90	95	100	100
30%	90	95	100	100	100	100	100

Source: Author's stress simulation. Portfolio company D/E = 2.0×; NAV facility debt is senior to LP equity. Color coding: green (<30% LP loss), amber (30-50%), red (>50%).

The simulation reveals three critical findings. First, the leverage cascade dramatically amplifies LP losses even under moderate enterprise value declines. A 10 percent decline in enterprise value—well within the range of normal market fluctuations—produces a 30 percent LP loss without a NAV facility (due to portfolio company leverage alone) but a 55 percent LP loss with a 25 percent LTV NAV facility. This represents a 1.83x amplification factor from the NAV facility alone. Second, the amplification effect is most severe at lower decline levels: at a 5 percent enterprise value decline, the 25 percent LTV scenario produces LP losses of 40 percent compared to 15 percent without the facility—a 2.67x amplification. This is precisely the range of market movements that might be dismissed as routine volatility but that, compounded through two leverage layers, generates substantial investor losses. Third, at a 20 percent enterprise value decline (comparable to a moderate recession), LP losses reach 85 percent with 25 percent NAV LTV, approaching total equity wipeout.

Sponsor-backed LBOs in higher-rate environments more frequently capitalize at 3.0× D/E at the portfolio-company level rather than 2.0×. Under this elevated PC leverage, the cascade compresses the NAV facility's available equity cushion further. Table 3 presents the stressed-leverage case:

Table 3: Leverage Cascade Stress Simulation — LP Loss Rates (%)

Stressed case: Portfolio Company D/E = 3.0× (EV = $4,000M)

EV Decline	No Facility	LTV 5%	LTV 10%	LTV 15%	LTV 20%	LTV 25%	LTV 30%
0%	0	5	10	15	20	25	30
5%	20	25	30	35	40	45	50
10%	40	45	50	55	60	65	70
15%	60	65	70	75	80	85	90
20%	80	85	90	95	100	100	100
25%	100	100	100	100	100	100	100
30%	100	100	100	100	100	100	100

Source: Author's stress simulation. Portfolio company D/E = 3.0× reflects typical sponsor-backed LBO capitalizations in higher-rate environments. Color coding: green (<30%), amber (30-50%), red (>50%).

At the stressed leverage case, LP losses at a 10 percent EV decline and 25 percent NAV LTV reach 65 percent, leaving just 35 percent of LP equity intact. At a 20 percent EV decline under 3.0× PC leverage, any NAV facility at 20 percent LTV or above fully wipes out LP equity. The Alpha Group "30 percent decline required to breach covenants" argument (Padilla 2025) is correct for the NAV-facility layer in isolation but irrelevant once cascaded through typical portfolio-company leverage: by the time the NAV layer is stressed, LP equity has already been deeply impaired by the first leverage layer.

Industry proponents argue that NAV facilities constitute only a small portion of overall fund leverage, and that typical LTV ratios of 10-25 percent provide substantial cushion against portfolio value declines (Padilla 2025). However, this argument focuses on the NAV facility layer in isolation and does not account for the compounding effect demonstrated in Tables 2 and 3, where portfolio company leverage has already amplified enterprise value declines by a factor of three before the NAV facility layer adds further amplification. The relevant analytical question is not whether NAV facilities are safe in isolation under normal market conditions, but whether the combined leverage cascade produces loss dynamics that are disproportionate to the underlying asset value change—and the simulation demonstrates that it does.

C.1 The Third Amplification Layer: Cross-Collateralization Contagion

Beyond the two-layer cascade captured in Tables 2 and 3, NAV facility collateral structures introduce a third amplification channel. Mayer Brown's taxonomy of NAV facility collateral identifies that most secured NAV facilities use direct pledges of investments, equity pledges of

holding vehicles, pledges of distribution proceeds, or pledges of cash/securities accounts—often combined with negative-pledge covenants that spring into active pledges if LTV deteriorates (Mayer Brown 2024). The economic consequence of any of these structures is the same: NAV facility collateral cross-collateralizes the full portfolio, so distress concentrated in a subset of holdings can force the sale of unrelated healthy holdings to cure a covenant breach. Callan (2025) and Baker (2024) each flag this dynamic as a principal LP risk.

Table 4 simulates the resulting domino effect in stylized portfolios, tracing the post-distress LTV position and the forced-sale losses on healthy holdings through to total LP loss:

Table 4: Cross-Collateralization Domino — Representative Scenarios

Scenario	Post-Distress LTV	Breach	Healthy Fire-Sold (% NAV)	Total LP Loss (%)
5-holding fund, 1 wipeout, 25% LTV, 40% covenant, 25% discount	31.3%	No	0.0	20
5-holding fund, 2 wipeouts, 25% LTV, 40% covenant, 25% discount	41.7%	Yes	2.9	40.7
5-holding fund, 2 wipeouts, 25% LTV, 40% covenant, 35% discount	41.7%	Yes	4.0	41.4
5-holding fund, 3 × 75% distress, 25% LTV, 40% covenant	45.5%	Yes	8.6	47.1
10-holding fund, 4 wipeouts, 25% LTV, 40% covenant	41.7%	Yes	2.9	40.7
10-holding fund, 3 wipeouts, 30% LTV, 40% covenant	42.9%	Yes	5.7	31.4
10-holding fund, 2 wipeouts, 25% LTV, 30% covenant (tight)	31.2%	Yes	2.2	20.6

Source: Author's domino simulation. Fire-sale discount applied to healthy holdings forced to early sale. Total LP Loss = distress loss + fire-sale discount loss on forced sales to cure covenant. Color coding on LP loss: green (<25%), amber (25-40%), red (>40%).

Two structural observations follow. First, the domino loss is highly sensitive to portfolio concentration. Concentrated (5-holding) funds are more exposed than diversified (10- or 20-holding) funds because each individual holding represents a larger share of NAV; a single wipeout produces a 20 percent NAV decline in the concentrated case versus 10 percent in the ten-holding case and 5 percent in the twenty-holding case. Second, even modest fire-sale frictions—a 25 percent discount is routine for forced-sale PE exits—convert healthy holdings into NAV drag at the point of binding covenant. In the representative 5-holding, 2-wipeout scenario, the fire-sale

discount alone contributes 71 basis points of LP loss on top of the 40 percent distress loss, and the expanded scenario (three 75-percent-distress events) produces a 47.1 percent total LP loss.

Baker (2024) frames this as a core structural concern with NAV financing: the facility creates a portfolio-wide contagion channel through which distress in one investment can directly impair LP recovery on unrelated investments. The modeled loss rates in the 40-47 percent range on baseline-realistic scenarios place the contagion amplification squarely in the range of magnitudes that warrant regulatory attention. Crucially, this is a structural feature of NAV facility collateral mechanics, not an artifact of any particular lender's documentation preferences—meaning it cannot be addressed by disclosure alone.

The AIFMD II framework addresses these amplification dynamics by imposing structural leverage limits that constrain the total leverage available at the fund level. Under the commitment method used for AIFMD II calculations, a fund with 25 percent NAV LTV would report fund-level leverage of 125 percent—well within the 175 percent open-end and 300 percent closed-end limits. However, the binding constraint operates through AIFMD II's broader risk management framework: the mandatory reporting requirements enable supervisors to observe the interaction between fund-level leverage and portfolio company leverage, and the macroprudential intervention authority under ESMA's Article 25 empowers regulators to impose additional restrictions when the aggregate leverage dynamics pose systemic risk. The U.S. framework, by contrast, provides no mechanism for constraining or even monitoring this leverage cascade at the fund level.

D. Valuation Uncertainty as Risk Multiplier

The risk-amplifying potential of NAV financing is compounded by the inherent uncertainty in valuing the underlying collateral. As Ascher, Riely, and Lichtman (2021) detail, illiquid asset valuation involves substantial subjective judgment, particularly for Level 3 assets that lack observable market inputs. The fair value hierarchy—Level 1 (quoted prices in active markets), Level 2 (observable inputs), and Level 3 (unobservable inputs requiring model-based estimation)—places the majority of PC and PE portfolio investments squarely in the Level 3 category, where valuations can diverge significantly across market participants.

The SEC's adoption of Rules 2a-5 and 31a-4 under the Investment Company Act in December 2020 represented a regulatory effort to address valuation concerns by requiring enhanced fair value

determination policies and procedures (Ascher, Riely, and Lichtman 2021). However, these rules apply to registered investment companies and investment advisers, leaving the broader private fund universe subject to less rigorous valuation oversight. The valuation challenge is particularly acute for NAV facilities because the collateral value directly determines borrowing capacity: an upward bias in portfolio valuations translates directly into increased leverage capacity, creating a self-reinforcing cycle in which optimistic valuations support greater borrowing, which in turn supports distributions that validate the original valuation assumptions.

D.1 Covenant Breach Probability Under Realistic Volatility

Neuberger Berman's 2024 framework identifies the buffer to LTV triggers—the gap between initial and covenant LTV—as a principal risk mitigant in NAV facility design (Neuberger Berman 2024). Mayer Brown's July 2024 analysis similarly notes that springing-pledge covenants typically trigger when the LTV ratio crosses a defined threshold, at which point additional collateral must be pledged or the facility must be cured (Mayer Brown 2024). To assess whether this buffer provides meaningful protection at industry-typical parameters, Table 5 computes the probability of a covenant breach over representative horizons, assuming NAV returns follow a lognormal distribution with zero drift and annualized volatility of 10 percent, 15 percent (the central case, consistent with observed PE mark-to-market volatility through the 2008 and 2020 cycles), or 25 percent (stress case).

Table 5: Covenant Breach Probability at 3-Year Horizon — Initial LTV 25%

Covenant LTV	Buffer (pp)	NAV Vol 10%	NAV Vol 15%	NAV Vol 25%
35%	9	3.2	12.2	28.8
40%	15	0.4	4.7	19.2
45%	20	0.1	1.6	12.7
50%	25	0	0.6	8.3

Source: Author's lognormal covenant-breach model, with breach probability $P = \Phi(\ln(LTV_0/LTV_{cov}) \mid \mu_T, \sigma_T)$, $\mu_T = -\sigma^2 T/2$, $\sigma_T = \sigma\sqrt{T}$ (full derivation in Appendix A.4). Color coding: green (<5%), amber (5-15%), red (>15%). Full horizon grids (1-, 3-, 5-year) are reported in Appendix A.

Three findings emerge. First, at the tight end of the NB buffer spectrum (9 percentage points, i.e. initial LTV 25 percent against a 35 percent covenant), even a 15 percent NAV volatility scenario produces a 12.2 percent probability of breach over three years—rising to 28.8 percent under 25 percent volatility. These are not tail events; they are plausible base-case outcomes. Second, expanding the buffer to 20 percentage points (the high end of typical practice) reduces three-year

breach probability to under 2 percent at 15 percent volatility and to 12.7 percent at the stress-volatility case. Third, and most importantly, horizon matters: a facility whose 1-year breach probability is 0.1 percent can carry a 5-year probability above 10 percent at the same volatility—a dynamic relevant for NAV facilities that carry extension options at manager discretion, effectively lengthening the risk horizon without re-underwriting.

The Keshav and Winters (2025) analysis (developed further in Section V.B below) suggests that the mere existence of discrete trigger mechanisms—fees, gates, covenants—can induce preemptive lender behavior that amplifies rather than dampens the underlying shock. The covenant-probability results here provide the scale: at buffer levels common in practice, breach probabilities over typical facility tenors are high enough that lender-side preemptive curing or forced deleveraging is a material, rather than remote, risk. The valuation-uncertainty concern identified in this Section III.D therefore operates not only through its impact on borrowing capacity but through its interaction with the probabilistic covenant structure—with a self-reinforcing dynamic in which valuation overstatement increases borrowing capacity, which increases LTV, which in turn increases the probability that subsequent valuation normalization triggers a discrete covenant cure event.

IV. Regulatory Landscape: A Comparative Analysis

A. The U.S. Capital-Based Regime

The United States addresses private credit risk primarily through investor-level capital regulation rather than through structural constraints on fund leverage or lending activity. The centerpiece of this approach is the NAIC Risk-Based Capital (RBC) framework, which requires insurance companies—the largest institutional investors in private credit—to hold capital reserves calibrated to the risk characteristics of their investment portfolios. Under this framework, private credit exposures receive risk charges based on their credit quality classification, with higher charges applied to lower-rated or unrated instruments.

Chernenko, Ialenti, and Scharfstein's (2025) analysis of Business Development Companies (BDCs)—publicly registered private credit vehicles that represent the most transparent segment of the market—reveals important structural features of U.S. capital regulation. BDCs maintain a median risk-based capital ratio of approximately 36 percent, substantially exceeding the

approximately 13 percent maintained by commercial banks. This higher capitalization provides meaningful loss-absorbing capacity: under stress scenarios involving a 10 percent increase in non-accrual rates, BDCs would deleverage by approximately 9.5 percent—a significant but manageable adjustment compared to the systemic deleveraging that characterized the 2008 banking crisis.

A caveat sharpens this analysis. ARCC's 10-K disclosures provide the most granular publicly-available picture of fund-level facility mechanics—asset-type-specific advance rates, maturity ladders, subsidiary funding vehicles, and borrowing base compliance—precisely because BDCs are registered under the Investment Company Act. Analogous facilities at unregistered private equity and private credit funds, where the bulk of NAV facility lending occurs, are not publicly disclosed and are not subject to BDC-level capital requirements. The Chernenko et al. 36 percent BDC risk-based capital ratio therefore represents the upper envelope of observable loss-absorbing capacity in U.S. private credit, not a central tendency. The unregistered PE/PC fund universe that employs the bulk of NAV financing does not maintain this level of capitalization, does not report it on a standardized basis, and is not examined for compliance with any equivalent standard.

However, the U.S. capital-based approach exhibits several critical limitations when applied to NAV financing risks. First, the RBC framework constrains only regulated investors (principally insurance companies) and does not reach unregulated participants in private credit markets, including pension funds, endowments, sovereign wealth funds, family offices, and high-net-worth individuals. NAV facility usage is a fund-level decision made by GPs, not an investment-level decision made by investors, and therefore falls entirely outside the scope of investor-level capital regulation. Second, the framework addresses credit risk at the individual investment level but does not capture the leverage amplification created by fund-level borrowing through NAV facilities. An insurance company holding a private credit fund investment faces capital charges calibrated to the fund's stated risk characteristics, but these charges do not increase when the fund takes on additional leverage through a NAV facility—even though the effective risk exposure of the insurance company's position has increased.

Third, and most fundamentally, the U.S. regulatory architecture lacks a mechanism for constraining the supply of NAV financing. The SEC's 2023 Private Fund Adviser Rules represented the most significant recent attempt to enhance regulatory oversight of private funds,

including provisions requiring quarterly reporting, restrictions on preferential treatment of certain investors, and enhanced disclosure of fund fees and performance. However, the U.S. Court of Appeals for the Fifth Circuit unanimously vacated these rules in June 2024, finding that the SEC exceeded its statutory authority under the Investment Advisers Act of 1940 (National Association of Private Fund Managers v. SEC, 2024). This judicial defeat eliminated the primary federal regulatory pathway for addressing fund-level practices, including NAV facility usage, and left the U.S. regulatory landscape substantially unchanged.

The SEC has signaled continued interest in NAV lending: in May 2024, Senior Examiner Dan Faigus indicated that the agency would review fund finance growth and seek to understand its effects on fund fees and performance (Padilla 2025). However, absent new rulemaking authority or a reversal of the Fifth Circuit's decision, the SEC's capacity to regulate NAV facility practices is limited to enforcement actions under existing antifraud provisions—a reactive rather than preventive approach to systemic risk mitigation.

A.1 The LP-Side Measurement Gap: Pension-Fund Leverage Pass-Through

The capital-based regime's reliance on investor-level constraint is further complicated by a measurement gap at the LP level. CalSTRS's September 2025 private-equity policy revision imposes a 10 percent cap on Total Fund net leverage, with approximately $1 billion of leverage currently allocated to the PE co-investment program; the co-investment book now constitutes roughly 22-24 percent of CalSTRS's $53 billion PE NAV (Pensions & Investments 2025; Meketa 2025). CalPERS reports Total PERF leverage of 9.0 percent as of June 30, 2025 (of which 5.0 percent is active, incremental to baseline), alongside a 2024 decision to raise PE allocation from 13 percent to 17 percent (CalPERS 2025). Neither pension fund's published guardrails adjust for leverage embedded at the underlying-fund level—including NAV facilities—on the funds in which they invest.

If NAV facilities are employed at LTV X percent by fraction F of the PE funds in an LP's portfolio, the additional pass-through plan-level leverage absorbed by the LP equals LTV × F × (PE NAV / Total Plan AUM). Table 6 computes this pass-through for CalSTRS and CalPERS across representative NAV facility adoption scenarios:

Table 6: LP Pass-Through Leverage vs. Plan-Level Leverage Cap

LP	NAV LTV	% Funds with NAV	PE Share of Plan	Added Leverage (pp)	Plan Cap (%)	Headroom (pp)
CalSTRS	15%	50%	15%	1.1	10.0	8.8
CalSTRS	25%	50%	15%	1.9	10.0	8.1
CalSTRS	25%	100%	15%	3.8	10.0	6.2
CalSTRS	30%	100%	15%	4.6	10.0	5.4
CalPERS	15%	50%	17%	1.3	12.0	10.7
CalPERS	25%	50%	17%	2.1	12.0	9.9
CalPERS	25%	100%	17%	4.3	12.0	7.8
CalPERS	30%	100%	17%	5.1	12.0	6.9

Source: Author's LP pass-through model. CalSTRS PE AUM $53B, Total Plan ~$345B → 15% PE share; CalPERS 17% PE target share. Color coding on added leverage: green (<2 pp), amber (2-4 pp), red (>4 pp); on headroom: green (>9 pp remaining), amber (7-9 pp), red (<7 pp).

Three observations follow. First, for both pension funds the direct pass-through of NAV facility leverage into plan-level leverage is modest in absolute magnitude—even the aggressive scenario of 30 percent LTV on 100 percent of underlying funds adds 4.6-5.1 percentage points to plan leverage. Second, the current CalSTRS leverage cap of 10 percent is nonetheless consumed by between 11.5 percent and 46.0 percent of capacity depending on NAV facility adoption rate—a meaningful competitor to the plan's direct leverage program, which already sits near cap. Third, and most consequentially, neither the CalSTRS 10 percent cap nor the CalPERS 9.0 percent current utilization incorporates NAV facility leverage at all. The LP's explicit leverage limit is disjoint from the implicit leverage absorbed through its PE allocation.

This disjunction is a direct illustration of what the QCA framework in Section VI.A below will term the Condition 5 gap: investor-level capital charges (here, LP-level leverage guardrails) do not reflect fund-level leverage taken via NAV facilities. The CalSTRS September 2025 policy revision is explicitly framed as adding "leverage guardrails," yet the measurement framework it imposes covers only leverage incurred directly by the plan, not leverage pass-through from underlying funds. From a systemic-risk perspective, the LP has adopted a cap that materially understates actual plan-level leverage exposure—a structural accuracy problem that the EU AIFMD II aggregate-leverage reporting regime closes on the supply side. A secondary finding is specific to CalPERS: under the plausible 25 percent LTV, 100 percent adoption scenario, approximately 4.25 percentage points of plan leverage exists off-cap and effectively un-disclosed to plan beneficiaries

and state regulators—a disclosure gap that is not merely a transparency issue but has concrete quantitative stakes.

B. ILPA Guidance as Soft Regulation

In the absence of binding federal regulation, the ILPA's July 2024 Guidance for NAV-Based Facilities represents the most comprehensive effort to establish governance norms for NAV lending in the U.S. market. The guidance recommends that GPs seek LPAC (Limited Partner Advisory Committee) approval before utilizing NAV facilities, disclose the purpose, size, and key terms of any NAV borrowing, discuss alternative financing options with investors, and specify the collateral arrangements and cash sweep provisions associated with the facility (ILPA 2024).

Market commentary through 2024 and 2025 suggests cautious GP adoption of the ILPA recommendations, with some decline in distribution-purpose NAV financing attributed to the ILPA scrutiny (Hogan Lovells 2025; DLA Piper 2024). The guidance specifically requires, absent explicit LPA authorization, that the GP obtain LPAC consent prior to entering a NAV facility—and requires LPAC consent for any NAV facility used to fund distributions, regardless of LPA language. Standardized disclosures include rationale, size, borrowed amounts, initial LTV, interest rate, and term. This represents meaningful progress in market governance norms.

Nonetheless, this paper characterizes ILPA guidance as soft regulation—voluntary standards that recognize the risks inherent in NAV financing but lack the binding authority necessary to constrain behavior that conflicts with GP economic incentives. The ILPA guidance suffers from three structural limitations. First, it is voluntary: fund managers may decline to adopt its recommendations without legal consequence, and the guidance itself acknowledges the heterogeneity of LPA (Limited Partnership Agreement) provisions regarding NAV facility authorization. As practitioners note, some LPAs require LPAC notification, others require formal consent, some explicitly prohibit NAV financing, and many are silent on the subject entirely (Padilla 2025). Second, the guidance addresses disclosure rather than constraint: even where adopted in full, it does not limit the amount of NAV leverage a fund may incur but merely requires that investors be informed of the practice. Third, the guidance relies on LP bargaining power to enforce compliance, yet the well-documented information asymmetry between GPs and LPs—compounded by LPs' limited capacity to evaluate complex fund-level financing decisions in real time—undermines the effectiveness of this market-based governance mechanism.

C. The EU Structural Regime: AIFMD II

The European Union's approach to private fund leverage regulation differs fundamentally from the U.S. model in that it imposes structural constraints at the fund-manager and fund levels rather than relying solely on investor-level capital regulation. The AIFMD II, which entered into force on April 15, 2024, and must be transposed into Member State law by April 16, 2026, establishes a comprehensive regulatory framework that addresses leverage, liquidity management, valuation, reporting, and delegation requirements for alternative investment fund managers (Jones Day 2025; KPMG 2024).

The leverage provisions are central to the EU's risk mitigation framework. AIFMD II establishes binding leverage limits of 175 percent for open-end AIFs and 300 percent for closed-end AIFs, calculated as the ratio between the AIF's total exposure (including all forms of leverage, whether through borrowing, derivatives, or other means) and its net asset value. These limits function as structural ceilings that constrain fund-level borrowing regardless of the purpose or form of the leverage—including NAV facilities. Crucially, the leverage calculation methodology encompasses both committed and uncommitted leverage, preventing regulatory arbitrage through facility structuring.

Beyond leverage ceilings, AIFMD II establishes several complementary regulatory mechanisms. First, enhanced reporting requirements mandate that AIFMs report the total leverage employed by each fund to their home-state competent authority, including data on the current risk profile of the AIF (market, liquidity, counterparty, and operational risk) and details of delegation arrangements for portfolio management and risk management functions. The new reporting templates, which will be fully operational by April 16, 2027, require substantially more granular leverage data than the initial AIFMD framework (ESMA 2024).

Second, ESMA's Article 25 framework empowers national competent authorities to impose leverage limits on individual AIFs or categories of AIFs when they determine that the use of leverage poses a risk to financial stability. This provision creates a macroprudential toolkit that enables regulators to respond dynamically to leverage buildups rather than relying solely on static rules.

Third, AIFMD II introduces specific provisions for loan-originating AIFs that are directly relevant to PC funds engaged in NAV lending. These provisions include risk retention requirements (a minimum of 5 percent of the notional value of originated loans), concentration limits restricting exposure to any single borrower, and requirements for sound credit risk assessment processes. The loan origination framework effectively extends banking-style prudential regulation to private credit activities, addressing the intermediation gap identified by Lalafaryan (2023) in which private funds perform bank-like functions without bank-like regulatory oversight.

ESMA's 2024 risk assessment of leveraged AIFs provides empirical context for the EU regulatory approach. Based on end-of-2023 AIFMD data, ESMA identified hedge funds as displaying the highest levels of leverage among AIFs, with considerable exposures to sovereign bonds across strategies that may pose market impact risk. The assessment also flagged GBP Liability-Driven Investment (LDI) funds—whose leveraged exposures to UK government bonds precipitated the September 2022 gilt market crisis—as demonstrating the real-world consequences of inadequately monitored leverage in the alternative investment sector (ESMA 2024). The LDI episode provides a compelling case study for the value of structural leverage monitoring: the crisis was triggered not by credit losses but by rapid margin calls on leveraged positions, precisely the type of liquidity shock that NAV facilities could amplify in the private equity context.

Table 7 compares the structural features of the U.S. and EU regulatory regimes across the dimensions most relevant to NAV financing risk mitigation:

Table 7: Comparative Regulatory Framework for NAV Financing Risk Mitigation

Regulatory Dimension	United States	European Union (AIFMD II)
Fund-level leverage cap	None for unregistered PE/PC funds. BDCs subject to ICA §18 coverage (≥150%).	Binding: 175% (open-end), 300% (closed-end) under commitment method. Covers NAV facilities.
Leverage calculation scope	Not applicable at fund level. NAIC RBC operates at investor level only.	Commitment method includes all committed and uncommitted borrowing, derivatives.
Mandatory reporting	Partial — Form PF (size-threshold only); FR Y-14Q (bank-side); no consolidated view.	Comprehensive Annex IV; enhanced templates fully operational April 2027.
Macroprudential intervention	FSOC entity-level designation only; no activity-level leverage tools.	ESMA Article 25: national competent authorities may impose activity-level leverage caps.
Loan-origination standards	No specific framework for private-credit origination outside banking regs.	AIFMD II loan-origination regime: 5% risk retention, concentration limits, credit-risk processes.

Regulatory Dimension	United States	European Union (AIFMD II)
Investor-level capital charges	NAIC RBC for insurers (static by strategy); no adjustment for fund-level NAV leverage.	Solvency II for insurers; CRD/CRR for bank exposures. Dynamic through fund leverage reporting.
Primary policy instrument	ILPA soft-governance (voluntary, disclosure-based, market-enforced).	Binding directive, transposed into Member State law by April 16, 2026.

Source: Author's analysis based on AIFMD II (Directive 2024/927), ILPA (2024), Chernenko et al. (2025), ESMA (2024), and related regulatory sources.

D. The Regulatory Gap: Why Capital-Based Regulation Falls Short

The comparative analysis reveals a fundamental asymmetry in regulatory philosophy that has material consequences for systemic risk. The U.S. capital-based approach addresses private credit risk at the wrong level of the intermediation chain: it constrains the investors who allocate capital to private funds but not the funds themselves or the NAV lenders who provide fund-level leverage. This creates a regulatory blind spot in which the riskiest activities—leverage layering through NAV facilities, valuation-dependent borrowing, and IRR-driven distribution practices—operate largely unconstrained by regulatory requirements.

The EU structural approach, by contrast, addresses leverage at the point of origination: the fund manager who decides to incur leverage through a NAV facility must do so within binding leverage limits and under ongoing regulatory reporting and supervision. This does not eliminate the moral hazard channel entirely—fund managers may still take on maximum permitted leverage—but it truncates the tail risk by establishing hard ceilings on the degree of leverage amplification that any single fund can create. Moreover, the reporting requirements associated with AIFMD II provide regulators with real-time visibility into leverage trends that can inform macroprudential intervention before systemic risks materialize.

The regulatory gap is further highlighted by the contrasting treatment of bank-NBFI interconnections across jurisdictions. In the U.S., the FSOC has acknowledged the systemic risk implications of private credit growth but has limited tools to address fund-level leverage. The Federal Reserve's stress testing framework captures bank exposures to private funds but does not test the second-order effects of fund-level distress on the banking system. In the EU, the combination of AIFMD II leverage limits, CRD/CRR capital requirements for bank exposures, and Solvency II capital charges for insurance company allocations creates a more comprehensive framework in which leverage is constrained at multiple points in the intermediation chain. The

European Central Bank's May 2024 Financial Stability Review special feature on private credit (Cera et al. 2024) and the Bank of England Prudential Regulation Authority's April 2024 Thematic Review of PE-Related Financing Activities (PRA 2024) further demonstrate the EU and UK's more proactive supervisory approach to private fund leverage.

V. Evidence from Financial Stress Episodes

A. The COVID-19 Liquidity Shock and Bank-NBFI Transmission

The COVID-19 pandemic's market impact in March 2020 provides the most recent large-scale test of bank-NBFI interconnection dynamics. Acharya, Cetorelli, and Tuckman's (2024) analysis demonstrates that during the acute phase of the crisis, NBFIs drew heavily on pre-committed bank credit lines, transmitting liquidity stress from the non-bank sector to bank balance sheets at precisely the moment when banks themselves faced elevated uncertainty about their own asset quality and funding stability. The episode validated the "transformation view" of bank-NBFI relationships: banks' credit commitments to NBFIs functioned as contingent claims that converted non-bank liquidity stress into direct bank balance sheet pressure.

Levin and Malfroy-Camine's (2025) analysis provides a more nuanced picture of PE/PC fund behavior during COVID-19. They find that PE/PC fund-level borrowers increased loan utilization only modestly during the crisis period (Q4 2019 to Q1 2020), in contrast to some other NBFI categories that experienced larger utilization spikes. However, this relatively muted response should be interpreted cautiously. PE/PC fund-level borrowing utilization has trended upward from approximately 40 percent to nearly 60 percent over the 2012-2023 period, suggesting that funds have been gradually increasing their reliance on bank-sourced liquidity during normal times—potentially reducing the residual capacity available for crisis-period drawdowns. Moreover, the COVID-19 episode was characterized by rapid policy intervention (Federal Reserve emergency facilities) that may have truncated the stress dynamics before the full implications of PE/PC leverage could manifest. Crucially, had the cascade effects quantified in Tables 2-4 been triggered during the COVID-19 drawdown, the LP-level loss magnitudes would have materialized rapidly given the concentration of NAV facilities in late-life vintages with near-exhausted LP capital call capacity.

B. EU MMF Evidence: Regulatory Design and Crisis Behavior

Keshav and Winters's (2025) analysis of European Money Market Fund (MMF) behavior during the September 2022 UK Growth Plan announcement provides compelling evidence that regulatory design fundamentally shapes financial institution behavior during stress events. Their study examines the differential response of fixed-NAV MMFs (Constant NAV and Low-Volatility NAV funds) versus floating-NAV (Variable NAV) funds to the same exogenous shock. The findings are striking: fixed-NAV MMFs with liquidity fees and redemption gates experienced significant runs, while floating-NAV MMFs did not.

The mechanism is relevant to NAV financing regulation by analogy. Keshav and Winters demonstrate that the very existence of liquidity restriction mechanisms (fees and gates) can paradoxically trigger the behavior they are designed to prevent: investors, fearing the imposition of restrictions, rush to redeem before gates are activated, creating a self-fulfilling run dynamic. In the context of NAV facilities, a parallel dynamic could emerge if lenders become concerned about portfolio value deterioration: the existence of margin call provisions and LTV covenants could trigger preemptive credit line reductions that force fund-level deleveraging at the worst possible time—amplifying rather than dampening the underlying asset price correction. The covenant-breach probabilities reported in Section III.D Table 5 establish the empirical scale: at buffer levels common in practice (9-15 percentage points) and volatilities consistent with PE portfolio marks, 3-year breach probabilities of 5-20 percent mean that lender-side preemptive curing is a material expected-case event, not a tail scenario.

The policy implication is that regulatory design matters more than the mere existence of risk management tools. The EU MMF evidence suggests that structural approaches—such as requiring floating-NAV structures that absorb losses gradually rather than imposing discrete trigger points—produce more stable outcomes than threshold-based mechanisms that create cliff effects. Applied to NAV financing, this supports the AIFMD II approach of imposing continuous leverage limits rather than relying on covenant-based triggers that create procyclical discontinuities.

C. Federal Reserve Data and Bank-PE/PC Linkages

The growing body of Federal Reserve research on bank-PE/PC linkages provides additional evidence supporting the need for structural leverage regulation. The May 2023 Federal Reserve Financial Stability Report noted that financial stability risks from private credit funds appear limited but flagged the opacity of private credit fund portfolios as making it difficult to gauge

default risk. The FSOC's 2024 Annual Report escalated this assessment, specifically identifying scenarios in which private credit stress could create cascading liquidity pressures through multiple interacting channels: portfolio companies drawing on undrawn revolving credit facilities from direct lenders, direct lenders drawing on their own bank credit lines to meet these demands, banks demanding margin from private credit funds and BDCs in response to declining valuations, and the resulting liquidity pressures exacerbating further asset price declines (FSOC 2024).

The UK PRA's April 2024 Thematic Review of Private Equity-Related Financing Activities independently identified multiple channels of bank exposure to PE and PC funds: loan, bond, and derivative exposures to portfolio companies; loans to the funds themselves (including both subscription facilities and NAV facilities); and indirect exposures through banks' roles as counterparties in hedging and other derivative transactions. The PRA's "Dear Chief Risk Officer" letter to banks cautioned that institutions need a comprehensive view of potential correlations and concentrations among PE/PC counterparties, rather than analyzing individual loans in isolation (PRA 2024). This supervisory communication underscores a limitation of the U.S. approach: bank-level prudential supervision alone cannot address the aggregate leverage dynamics that emerge when multiple funds borrow against interconnected and potentially correlated portfolio assets.

VI. Toward Optimal Risk Mitigation: A QCA Framework and Policy Recommendations

A. Five Institutional Conditions for Effective NAV Risk Mitigation

Drawing on the comparative regulatory analysis, the empirical evidence from stress episodes, and the theoretical framework of moral hazard in leveraged fund finance, this section develops a Qualitative Comparative Analysis (QCA) identifying five institutional conditions that jointly determine the effectiveness of a regulatory regime in mitigating NAV financing risks. The QCA approach is appropriate for this analysis because the effectiveness of regulatory regimes depends on configurations of complementary conditions rather than on any single factor in isolation.

Condition 1: Binding Leverage Limits at the Fund Level. The most critical institutional condition is the existence of legally enforceable ceilings on fund-level leverage that encompass all forms of borrowing, including NAV facilities. As demonstrated by the AIFMD II framework, effective leverage limits must be calculated on a look-through basis, incorporating both committed and

uncommitted facilities, and must apply regardless of the stated purpose of the borrowing. The U.S. framework lacks this condition entirely for unregistered private funds: neither the Investment Advisers Act, the Investment Company Act (from which private funds are exempt), nor any other federal statute imposes fund-level leverage constraints on private equity or private credit vehicles. The absence of this condition creates the fundamental regulatory gap that enables the moral hazard channel identified in Section III.

Condition 2: Mandatory Leverage Reporting to Prudential Supervisors. Effective regulation requires that supervisors receive regular, standardized data on fund-level leverage utilization, collateral composition, and the interaction between fund-level and portfolio company-level borrowing. The AIFMD II reporting framework, particularly the enhanced Annex IV templates scheduled for implementation by April 2027, satisfies this condition by mandating disclosure of total leverage, risk profile data, and delegation arrangements. The U.S. framework provides partial visibility through Form PF reporting (for funds above certain size thresholds) and through bank regulatory data (FR Y-14Q filings), but this data is fragmented across regulatory agencies and does not provide a consolidated view of fund-level leverage dynamics. The FSB's December 2025 Global Monitoring Report, which documented the growth of NBFI assets to $256.8 trillion (51 percent of total global financial assets), emphasized the critical importance of closing data gaps for private credit (FSB 2025).

Condition 3: Macroprudential Intervention Authority. The capacity to impose additional leverage constraints in response to emerging systemic risks provides a dynamic complement to static leverage limits. ESMA's Article 25 Framework, which empowers national competent authorities to restrict leverage when they identify financial stability risks, satisfies this condition in the EU. The U.S. framework assigns macroprudential surveillance to the FSOC but provides limited intervention tools: the FSOC can designate non-bank financial companies as systemically important (subjecting them to enhanced prudential standards), but this entity-level designation process is cumbersome and has proven politically difficult to implement. A macroprudential authority capable of imposing activity-level leverage restrictions—rather than entity-level designations—would better address the systemic risk dynamics of NAV financing.

Condition 4: Alignment of Bank Capital Requirements with Fund-Level Leverage. Because banks serve as the primary providers of liquidity to private funds through credit facilities (including NAV

lending), effective risk mitigation requires that bank capital requirements reflect the true risk of these exposures—including the risk amplification created by fund-level leverage. Chernenko, Ialenti, and Scharfstein (2025) demonstrate that banks face favorable capital treatment for lending to private credit funds (20 percent risk weight under the SSFA methodology) compared to direct lending to middle-market borrowers (100 percent risk weight), creating a regulatory arbitrage that incentivizes banks to channel credit through the private fund intermediation layer. The Basel IV revisions will partially address this issue by imposing higher capital requirements on certain securitization exposures, but the treatment of fund-level lending facilities remains an area of regulatory development.

Condition 5: Investor-Level Capital Charges That Reflect Fund-Level Leverage. The capital charges imposed on institutional investors' private fund allocations should account for the effective leverage of the underlying fund, including any NAV facility utilization. Under the current NAIC RBC framework, insurance companies' capital charges for private fund investments are calibrated to the fund's strategy classification and credit quality characteristics but do not increase dynamically when the fund takes on additional leverage through NAV facilities. The pension-fund pass-through analysis in Section IV.A (Table 6) demonstrates that this problem is not limited to insurance regulation: the LP-level leverage guardrails adopted by CalSTRS and CalPERS likewise fail to capture fund-level NAV leverage, meaning that even well-governed LPs carry materially larger plan-level leverage exposure than their explicit caps recognize. A risk-sensitive capital framework would adjust charges based on reported fund leverage ratios, creating market-based incentives for investors to favor lower-leverage fund structures and providing a demand-side complement to the supply-side constraints of Conditions 1-3.

B. Comparative Assessment

Applying the QCA framework, the EU regulatory regime substantially satisfies Conditions 1-3 through the AIFMD II framework and ESMA's macroprudential authority, and partially satisfies Conditions 4-5 through the interaction of CRD/CRR bank capital requirements and Solvency II insurance capital charges. The U.S. regulatory regime partially satisfies Condition 5 (through the NAIC RBC framework for insurance company investors) and Condition 4 (through bank capital requirements that, however, create perverse incentives favoring indirect lending through funds), but does not satisfy Conditions 1-3. Table 8 summarizes this assessment.

Table 8: QCA Assessment of Institutional Conditions for NAV Risk Mitigation

Institutional Condition	United States	European Union
1. Binding fund-level leverage limits	✗ Not Satisfied	✓ Satisfied
2. Mandatory leverage reporting to prudential supervisors	✗ Not Satisfied	✓ Satisfied
3. Macroprudential activity-level intervention authority	✗ Not Satisfied	✓ Satisfied
4. Bank capital aligned with fund-level leverage	◒ Partially Satisfied	◒ Partially Satisfied
5. Investor-level capital charges reflecting fund leverage	◒ Partially Satisfied	◒ Partially Satisfied

Source: Author's QCA assessment. ✓ = Satisfied; ◒ = Partially Satisfied; ✗ = Not Satisfied.

The absence of the first three conditions in the U.S. regime is not merely a quantitative gap but a qualitative one: without fund-level leverage limits, mandatory reporting, and macroprudential intervention authority, the U.S. framework cannot address the moral hazard channel at its source. The ILPA guidance, while a constructive step, functions within the market governance domain and cannot substitute for the regulatory infrastructure that Conditions 1-3 require. As the Fifth Circuit's vacatur of the SEC's Private Fund Adviser Rules demonstrates, the current statutory framework may not provide adequate authority for the SEC to establish these conditions through rulemaking, suggesting that legislative action may be necessary to close the regulatory gap.

C. Policy Recommendations

Based on the QCA framework and comparative analysis, this paper recommends the following policy measures for the United States, while acknowledging the trade-offs each imposes on market flexibility and innovation.

First, Congress should enact legislation establishing fund-level leverage limits for private funds above a specified size threshold, with the SEC empowered to set and adjust the specific limits through notice-and-comment rulemaking. The AIFMD II limits of 175 percent (open-end) and 300 percent (closed-end) provide a reasonable starting point, but the specific calibration should reflect U.S. market characteristics and be subject to periodic review. This recommendation represents the most significant—and most controversial—departure from the current U.S. approach, and this paper acknowledges that binding leverage limits impose costs in terms of reduced GP flexibility, potential competitive disadvantage relative to less-regulated jurisdictions, and the risk that static limits may be poorly calibrated for specific fund strategies. However, the analysis in Sections III-V demonstrates that the costs of unrestricted fund-level leverage—moral hazard, IRR

manipulation, leverage amplification, and systemic risk transmission—exceed the costs of appropriately calibrated structural limits. Model 1 alone establishes that 1.83× LP loss amplification is a routine feature of typical-parameter NAV facility use, while Model 5 shows that the cross-collateralization channel adds a third amplification layer that operates even inside existing covenant structures.

Second, the SEC should enhance Form PF reporting requirements to capture NAV facility utilization, fund-level leverage ratios (including both committed and drawn amounts), the interaction between fund-level and portfolio company-level leverage, and the valuation methodologies used for collateral supporting NAV facilities. These reporting enhancements fall within the SEC's existing statutory authority under the Dodd-Frank Act and do not require new legislation. The data collected should be shared with the FSOC, the Federal Reserve, and relevant state regulators to enable consolidated monitoring of private credit leverage dynamics.

Third, the FSOC should develop activity-level macroprudential tools that enable it to impose temporary leverage restrictions on specific fund categories or financing activities (such as NAV lending) in response to identified financial stability risks. This would require legislative action to expand the FSOC's toolkit beyond the current entity-level designation process, which is poorly suited to addressing systemic risks that emerge from the aggregate behavior of many funds rather than from the activities of a single institution.

Fourth, the NAIC should revise the RBC framework to incorporate dynamic capital charges that adjust based on reported fund-level leverage ratios. Insurance companies investing in funds that utilize NAV facilities at high leverage ratios should face proportionally higher capital charges, creating market-based incentives for institutional investors to demand lower-leverage fund structures. State pension-fund regulators and investment committee standards should be amended in parallel to require that LP-level leverage caps incorporate pass-through leverage from underlying funds, closing the measurement gap illustrated by the CalSTRS and CalPERS analysis in Section IV.A. This demand-side pressure would complement the supply-side constraints recommended above.

Fifth, bank regulatory agencies should review the capital treatment of lending to private funds—particularly credit facilities that function as contingent liquidity support for NAV-financed fund

structures—to ensure that capital requirements accurately reflect the risk amplification created by fund-level leverage. The favorable risk weighting of PE/PC fund lending relative to direct corporate lending (identified by Chernenko, Ialenti, and Scharfstein 2025) creates incentives that channel credit through the least-regulated intermediation pathway, undermining the intent of post-crisis banking reforms.

VII. Conclusion

The rapid growth of NAV financing within the private credit ecosystem represents a structural transformation in how leverage is created, distributed, and monitored in the financial system. This paper has argued that NAV facilities create a distinct moral hazard channel—operating through the ex-ante reshaping of GP risk-taking behavior, the amplification of return metrics through financial engineering, and the layering of fund-level leverage on top of portfolio company debt—that is inadequately addressed by the U.S. capital-based regulatory framework. The comparative analysis demonstrates that the EU's structural approach under AIFMD II provides a more effective model for systemic risk mitigation, combining binding leverage limits, mandatory reporting, and macroprudential intervention authority in a coherent regulatory architecture that addresses leverage at the fund level rather than solely at the investor level.

The analysis acknowledges the trade-offs inherent in structural regulation. Binding leverage limits constrain GP flexibility and may reduce the innovation that has characterized private credit markets. The AIFMD II framework imposes compliance costs that could disadvantage EU-domiciled funds relative to competitors in less-regulated jurisdictions. And the specific calibration of leverage limits inevitably involves judgment calls that may prove too restrictive for some strategies and too permissive for others. These costs are real and should be weighed against the benefits of risk mitigation.

The quantitative risk-analysis supplement integrated throughout Sections III-IV provides specific empirical grounding for the conclusion that the U.S. regulatory gap in fund-level leverage oversight represents a material and growing vulnerability in the financial system. Model 1 demonstrates that LP loss amplification of 1.6-2.7× is a routine feature of typical-parameter NAV facility use. Model 2 quantifies the break-even hurdle for accretive NAV facility deployment at 350-400 basis points per annum—a hurdle that distribution-financing uses cannot clear by

construction. Model 3 shows that covenant-buffer-based mitigants are probabilistically thin at parameters common in practice, with 3-year breach probabilities above 10 percent at industry-standard buffers. Model 4 documents that LP-side guardrails at major U.S. public pension funds (CalSTRS, CalPERS) do not measure fund-level pass-through leverage at all, producing a material mis-measurement of plan-level leverage exposure. Model 5 demonstrates that cross-collateralization contagion produces 40-47 percent LP loss rates in realistic concentrated-distress scenarios. These numbers do not replace the theoretical channel developed in Sections II-III; they quantify it.

The market-trajectory evidence sharpens the case further. ILPA estimates the current NAV facility market at approximately $100 billion, with a potential growth path to $600 billion by 2030; 17Capital projects approximately $70 billion of NAV deployment in 2025 alone against a total addressable market of $700 billion by 2030. Even the lower bound of these projections—a roughly six-fold expansion over five years—implies that the regulatory gap is closing in scale at a rate that substantially exceeds the typical U.S. rulemaking cycle. The Fifth Circuit's June 2024 vacatur of the SEC's Private Fund Adviser Rules, combined with the apparent need for legislative action to install Conditions 1-3, means that structural regulatory convergence with the EU is unlikely to occur before the market reaches a scale where the costs of inaction are considerably larger than they are today.

The ILPA's soft governance approach, while valuable as a market-based complement, cannot substitute for binding structural regulation. The SEC's limited statutory authority, as demonstrated by the Fifth Circuit's vacatur, constrains the agency's ability to address this gap through rulemaking alone. Legislative action is needed to establish the institutional conditions—fund-level leverage limits, mandatory reporting, and macroprudential intervention tools—that the QCA framework identifies as necessary for effective NAV risk mitigation.

The FSB's July 2025 final report on leverage in non-bank financial intermediation and IOSCO's ongoing work on private finance risks signal that the international regulatory community is converging toward the view that structural approaches to NBFI leverage oversight are both necessary and feasible. The United States has an opportunity to align its regulatory framework with these emerging international standards while adapting the specific institutional design to reflect the unique characteristics of U.S. capital markets. The cost of inaction—allowing the moral

hazard channel in NAV financing to continue expanding unconstrained—is a growing systemic vulnerability that will be tested, with potentially severe consequences, when the next period of market stress arrives.

Appendix A. Quantitative Models — Methodology and Calibration

This appendix documents the methodology, parameter calibration, and source mapping for the five quantitative models referenced throughout Sections III and IV. Each model is calibrated to publicly-disclosed parameters; no proprietary data is used. Full scenario grids (CSV output) and the computational script (models.py) are available in the supplementary workspace folder and reproduce the results reported in the body tables.

A.1 Source Mapping

Model	Primary Source(s)	Real-World Parameter(s) Used
1. Leverage Cascade Stress	ARCC 10-K (FY2024); Padilla 2025; Oaktree 2024	Portfolio D/E 2.0×-3.0×; NAV LTV 0-30%; ARCC ~$4.5B senior RCF + ~$4.3B subsidiary facilities as BDC-scale reference
2. Cost-of-Carry IRR Drag	17Capital 2024; SOFR ~4.25% (Apr 2026)	Pricing margin 550/650/750 bps; tenor 3-5 yrs; optional PIK; LTV 0-30%; gross IRR 10-20%
3. Covenant Breach Probability	Neuberger Berman 2024; Mayer Brown 2024	Initial LTV 10-30%; covenant LTV 35-50%; NAV vol 10/15/25%; horizons 1/3/5 yrs; lognormal zero-drift
4. LP Pass-Through Leverage	CalSTRS 2025 policy; CalPERS 2025 review; P&I; Meketa	CalSTRS 10% Total-Fund net leverage cap; $53B PE AUM; PE 22-24% co-invest share; CalPERS 9.0% PERF leverage; 17% PE target
5. Cross-Collateralization Domino	Mayer Brown 2024; Baker 2024; Callan 2025	5-20 holdings; distress concentration 1-3 holdings; fire-sale discount 15-35%; cure-covenant mechanics

A.2 Model 1 — Leverage Cascade

Definitions. Let E denote LP equity (calibrated at $1,000M for the reference fund), and let D denote portfolio-company debt with D = E × (D/E ratio). Total enterprise value of the portfolio at origination is:

$$EV = \mathrm{E} + \mathrm{D}.$$

Under an enterprise-value decline of δ, the new total enterprise value is:

$$EV_{new} = EV(1 - \delta).$$

Residual portfolio equity after portfolio-company debt is satisfied:

$$Equity_{residual} = \max(EV_{new} - \mathrm{D}, 0).$$

Letting D_{NAV} denote the NAV facility's debt at the fund level (D_{NAV} = LTV · E), the LP loss rate under the cascade is:

$$\text{LP loss rate} = \frac{\text{E} - \max(Equity_{residual} - D_{NAV}, 0)}{\text{E}}.$$

Calibration. The moderate case uses D/E = 2.0× (EV = $3,000M); the stressed case uses D/E = 3.0× (EV = $4,000M). Both sweep δ ∈ {0%, 5%, 10%, 15%, 20%, 25%, 30%} and LTV ∈ {0%, 5%, 10%, 15%, 20%, 25%, 30%}, producing the 7×7 grids reported as Tables 2 and 3 in Section III.C.

A.3 Model 2 — Cost-of-Carry IRR Drag

Let LTV denote the fund-level loan-to-value, and let r_f denote the all-in facility rate (cash-pay):

$$r_f = \text{SOFR} + \text{margin}.$$

Net IRR to the LP equity slice, which sits junior to the NAV facility, follows the standard leveraged-equity formula:

$$\text{net IRR} \approx \text{gross IRR} - \frac{\text{LTV} \cdot r_f}{1 - \text{LTV}}.$$

For PIK structures, the cash-flow drag is deferred. The model applies a 0.85 multiplier to the cash-pay drag to reflect the time-value advantage of deferred outflow:

$$drag_{PIK} = 0.85 \cdot drag_{cash}.$$

Calibration. SOFR = 4.25% (April 2026); margins ∈ {550, 650, 750} bps over SOFR; LTV swept 0–30%; gross IRR ∈ {10%, 12.5%, 15%, 20%}. The break-even gross-IRR improvement of 350–400 bps per annum at 25% LTV / mid pricing represents the hurdle accretive NAV deployment must clear for LP-neutral use, anchoring the return-illusion argument in Section III.B.

A.4 Model 3 — Covenant Breach Probability

Under a lognormal NAV-return process with annualized volatility σ and zero drift, fund-level LTV at horizon t is:

$$LTV_t = \frac{D_0}{NAV_t}.$$

The probability of covenant breach at horizon T is computed under the lognormal density Φ(·) with mean μ_T and standard deviation σ_T, where:

$$\mu_T = -\frac{\sigma^2 T}{2},$$

$$\sigma_T = \sigma\sqrt{T}.$$

Breach probability at horizon T:

$$\mathrm{P}[\text{breach}] = \Phi\left(\ln\left(\frac{LTV_0}{LTV_{cov}}\right) \mid \mu_T, \sigma_T\right).$$

Calibration. Initial LTV ∈ {10%, 15%, 20%, 25%, 30%}; covenant LTV ∈ {35%, 40%, 45%, 50%}; volatility σ ∈ {10%, 15%, 25%}; horizon T ∈ {1, 3, 5} years. Volatility assumptions span the range of observed mark-to-market volatility in seasoned PE portfolios through the 2008 and 2020 cycles. Full horizon grid is available in the companion CSV; Section III.D Table 5 reports the 3-year cross-section at initial LTV 25%.

A.5 Model 4 — LP Pass-Through Leverage

Additional plan-level leverage attributable to NAV pass-through is:

$$\Delta L_{plan} = \mathrm{LTV} \cdot \mathrm{F} \cdot \frac{NAV_{PE}}{AUM_{plan}},$$

where F is the fraction of underlying funds employing NAV facilities and the ratio NAV_{PE} / AUM_{plan} is the plan's PE allocation share. The model is linear and does not capture interaction effects with the plan's existing direct-leverage program; the reported headroom values should therefore be interpreted as upper bounds on available capacity.

Calibration. CalSTRS PE share of 15% reflects ≈$53B PE AUM over ≈$345B total plan; CalPERS PE share of 17% reflects the 2024 policy target allocation. Fraction F is swept across 50% and 100% to bracket adoption uncertainty. Section IV.A Table 6 reports the resulting plan-level pass-through leverage and headroom values.

A.6 Model 5 — Cross-Collateralization Domino

Consider an equal-weighted portfolio of n holdings with initial NAV = 1.0 (unit-normalized). Distress applied to k holdings at severity s ∈ [0,1] produces:

$$NAV_{new} = 1 - \frac{k}{n} \cdot \mathrm{s}.$$

The post-distress LTV ratio is:

$$LTV_{new} = \frac{LTV}{NAV_{new}}.$$

If LTV_{new} exceeds the covenant threshold cov, the fund must sell healthy holdings at a fire-sale discount d to cure. Letting D be the original facility debt, the required healthy-asset sale fraction h satisfies:

$$h \geq \frac{\mathrm{D} - \mathrm{cov} \cdot NAV_{new}}{1 - \mathrm{d} - \mathrm{cov}}.$$

Total LP loss combines the direct distress loss and the fire-sale-discount loss on forced healthy-asset sales:

$$Loss_{total} = Loss_{distress} + Loss_{\mathrm{fire-sale}}.$$

Calibration. n ∈ {5, 10, 20}; k ∈ {1, 2, 3, 4}; severity s ∈ {50%, 75%, 100%}; covenant cov ∈ {30%, 35%, 40%, 45%}; fire-sale discount d ∈ {15%, 25%, 35%}. Section III.C.1 Table 4 reports representative scenarios.

A.7 Limitations

Five limitations apply across the model set. First, Models 1, 2, and 5 treat gross IRR and portfolio returns as static: real NAV trajectories are volatile, which is captured explicitly only in Model 3. Second, Model 2's PIK haircut (0.85 multiplier) is a simplified adjustment; a rigorous treatment requires discounting at the fund's cost of equity, which is investor-specific. Third, Model 4 is linear in the PE-share parameter and does not capture correlation between the plan's direct leverage and its underlying-fund pass-through leverage. Fourth, Model 5 assumes equal-weighted holdings; real PE portfolios are concentration-weighted, and the true domino loss in a mature vintage with one dominant holding would exceed the modeled levels. Fifth, none of the models incorporate lender-side behavioral response: the Keshav-Winters (2025) mechanism suggests that preemptive lender action could amplify losses beyond the modeled levels at the point of covenant stress.

A.8 Disclosure

Modeling, simulations, and graphical outputs presented in this paper were developed with the assistance of artificial intelligence tools. All underlying mathematical formulations, assumptions, and resulting outputs have been independently reviewed and validated by the author, with additional verification by third parties where appropriate. The use of such tools was limited to

computational support and did not substitute for theoretical development, interpretation of results, or substantive analytical judgment.

To ensure transparency and reproducibility, full scenario grids in CSV format, along with the corresponding computational script ("models.py"), are provided in the supplementary workspace folder. These materials replicate the results reported in the tables within the main body of the paper and are made available to enable independent verification, sensitivity analysis, and further extension by other researchers.

References

ACC/AIMA/Dechert. 2019. "The Future of Private Credit." Industry Report.

Acharya, Viral, Nicola Cetorelli, and Bruce Tuckman. 2024. "Where Do Banks End and NBFIs Begin?" NBER Working Paper No. w32316.

Acharya, Viral, and S. Viswanathan. 2011. "Leverage, Moral Hazard, and Liquidity." Journal of Finance 66 (1): 99-138.

Ares Capital Corporation. 2024. "Credit Facility Amendment and Restatement." Business Wire, April 12, 2024; subsequent Form 8-K filing.

Ares Capital Corporation. 2024. "Ares Capital CP Funding Facility Upsize and Extension." Business Wire, October 2024.

Ares Capital Corporation. 2025. "Form 10-K Annual Report for Fiscal Year Ended December 31, 2024." SEC EDGAR, CIK 1287750.

Ascher, Stephen L., Charles D. Riely, and Andrew J. Lichtman. 2021. "Illiquid Asset Valuation Presents Unique Risks Amid Pandemic." Law360, February 4.

Baker, Colleen. 2024. "Net Asset Value Financing and Private Equity." University of Pennsylvania Law Review Online 171 (1).

BCG (Boston Consulting Group). 2024. "Private Credit: Feeling the Pressure, Seizing the Opportunity for Banks." February.

Callan. 2025. "NAV Loans Risk: What Limited Partners Should Consider in 2025." Blog post, Callan Associates.

CalPERS. 2025. "Private Equity Annual Program Review, June 2025." Item 06c-01, California Public Employees' Retirement System Investment Committee.

CalSTRS. 2024. "Private Equity Investment Policy Revision — First Reading." INV 2024-09 Item 05.00, California State Teachers' Retirement System.

CalSTRS. 2025. "Investment Committee Portfolio Risk Report, May 2025."

Cera, Katharina, Pierce Daly, Lieven Hermans, Philippe Molitor, Oscar Schwartz Blicke, Andrzej Sowiński, and Elisa Telesca. 2024. "Private Markets, Public Risk? Financial Stability Implications of Alternative Funding Sources." European Central Bank Financial Stability Review, May.

Chernenko, Sergey, Ialenti, and David S. Scharfstein. 2025. "Bank Capital and the Growth of Private Credit." SSRN Working Paper No. 5097437, January 14.

Citco Capital Partners. 2024. "NAV Lending Market Analysis." June.

DLA Piper. 2024. "ILPA Releases New NAV Facilities Guidance." Insights, August 2024.

Elias, Jared A., and Elisabeth de Fontenay. 2025. "Credit Goes Dark." Yale Law Journal (forthcoming).

ESMA (European Securities and Markets Authority). 2024. "Annual Risk Assessment of Leveraged AIFs in the EU — 2024." ESMA50-524821-3642.

Forbes. 2026. "Why Private Equity Is Suddenly Awash with Zombie Firms."

FSB (Financial Stability Board). 2025. "Global Monitoring Report on Nonbank Financial Intermediation 2025." December 16.

FSB (Financial Stability Board). 2025. "Leverage in Nonbank Financial Intermediation: Final Report." July 9.

FSOC (Financial Stability Oversight Council). 2024. "Annual Report 2024." Washington, DC: U.S. Department of the Treasury.

Global Legal Insights. 2024. "NAV and Hybrid Fund Finance Facilities." Fund Finance Laws and Regulations.

Hogan Lovells. 2025. "2025 NAV Facilities Outlook: Evolving Applications and Best Practice Considerations."

ILPA (Institutional Limited Partners Association). 2024. "ILPA Guidance for NAV-Based Facilities." July.

IOSCO (International Organization of Securities Commissions). 2023. "Thematic Analysis: Emerging Risks in Private Finance." Final Report FR10/23, September 14.

Jones Day. 2025. "AIFMD II Implementation: The Final Countdown." December.

Keshav, and Winters. 2025. "European Money Market Fund Investors Demand Liquidity." European Financial Management.

KPMG. 2024. "Preparing for AIFMD II." Regulatory Insights.

Lalafaryan, Narine. 2023. "Private Credit: A Renaissance in Corporate Finance." Cambridge Faculty of Law, SSRN Working Paper No. 4635056.

Levin, John D., and Antoine Malfroy-Camine. 2025. "Bank Lending to Private Equity and Private Credit Funds: Insights from Regulatory Data." Federal Reserve Bank of Boston, SRA Notes Issue 2025-02, February 5.

Mayer Brown. 2024. "NAV Credit Facilities: The Spectrum of Collateral Structures." Publication, July 2024.

Mayer Brown. 2024. "NAV Credit Facility Primer: A Fund Finance Guide." Publication, September 2024.

Mayer Brown. 2024. "NAV Facilities: The Institutional Limited Partners Association's New Guidance." Publication, September 2024.

National Association of Private Fund Managers v. SEC, No. 23-60471 (5th Cir. 2024).

Neuberger Berman. 2024. "A Perspective on Private Equity NAV Loans." February 2024.

Oaktree Capital Management. 2024. "NAV Finance 101: The Next Generation of Private Credit."

Padilla, Sergio. 2025. "NAV Loans Are the Next Frontier of Private Credit's Growth." Fund Finance, PEI Media, September 1.

Pensions & Investments. 2025. "CalSTRS Updates Private Equity Policy to Take Off Training Wheels from Co-Investment, Add Leverage Guardrails."

PRA (Prudential Regulation Authority, Bank of England). 2024. "Thematic Review of Private Equity Related Financing Activities." April 23.

17Capital. 2024. "NAV-Based Financing: What You Need to Know." Insights publication.

17Capital. 2024. "A Tool for Growth." Insights publication.

Xu, Jiaheng. 2026. "The Value of Contingent Liquidity from Banks to Nonbank Lenders." Wharton School, University of Pennsylvania, Job Market Paper.

Yared, Pierre. 2011. "Public Debt in Economies with Heterogeneous Agents." Unpublished manuscript, Columbia University.