

Private Equity Continuation Vehicles: A Model of Strategic Asset Transfers*

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February 27, 2026

Abstract

We develop a theoretical framework that formalizes the conflicts of interest arising in continuation vehicles (CVs), in which general partners (GPs) transfer portfolio companies from an existing fund to a new vehicle they continue to manage. While CVs can enhance efficiency by extending the holding period of high-potential firms, they also create opportunities for rent extraction as GPs can exploit their informational advantage and intermediary position between legacy and new limited partners (LPs). CV formation involves two informational frictions: adverse selection, whereby new LPs overpay for low-quality assets, and inverse selection, whereby they underpay for high-quality assets. We show that the likelihood and performance of CVs depend on GP coinvestment and carried interest incentives, as well as on whether the legacy fund is in or out of the money. The model links LP liquidity needs, GP incentives, and contract design to CV performance and the distribution of value across investors. Using proprietary data on continuation vehicle transactions, we also provide systematic evidence on contractual features in these deals that has not previously been documented.

Keywords: Private equity, Continuation vehicles, General partners, Limited partners, Agency conflicts, Asset transfer, Information asymmetry, Optimal contracts.

*We thank Sebastian Gryglewicz, Clara Martinez-Toledano, Erwan Morellec, Gordon Phillips, Joel Shapiro, Per Strömberg, Neng Wang, Mark Westerfield, Mike Weisbach, as well as seminar and conference participants (Carnegie Mellon, Cambridge RAPS/RCFS Europe, EDHEC, SKEMA) for their helpful comments. We are also very grateful to several market participants who generously shared data and insights on the continuation vehicle market.

In recent years, continuation vehicles (CVs) have become an increasingly prominent feature of the private equity industry. In these transactions, general partners (GPs) transfer a subset of portfolio companies to a newly created fund established specifically to hold these assets—often described as GPs “selling to themselves,” rather than exiting to strategic buyers, other GPs, or public markets. By mid-2025, a majority of the 50 largest private equity firms had used a CV at least once, with annual transaction volume reaching \$100 billion—about half of all secondary market activity. CVs now account for roughly 20% of private equity exits across buyouts, venture capital, private credit, and real assets.¹

The rationale offered by GPs is that CVs provide a solution in situations where a fund holds an asset that could benefit from an extended holding period, but a subset of limited partners (LPs) want a cash payout. CVs then enable GPs and investors in the new vehicle to capture returns associated with the longer holding period while providing liquidity to limited partners in the legacy fund.

While this provides a sound economic rationale for CVs, these transactions also raise potential conflicts of interest. CVs are structured and negotiated by GPs who effectively act as both sellers (on behalf of the legacy fund) and buyers (on behalf of the continuation vehicle). As a result, CVs have become the subject of substantial controversy and have already prompted several lawsuits. In November 2025, the Abu Dhabi Investment Council sued Energy & Minerals Group (EMG) over the proposed sale of Ascent Resources to an EMG-managed CV, alleging that the transaction undervalued the company and shifted value from existing investors to the new vehicle. Similar complaints have been filed against other sponsors in U.S. courts.²

Against this background, several central questions arise. When do CVs improve efficiency by extending ownership of high-potential firms, and when do they instead facilitate rent extraction? What are the key conflicts of interest in CV transactions? How do contractual terms and participation decisions shape which assets are continued and at what prices? This paper addresses these questions by developing a theory of CVs within a three-date contracting framework. While concerns about adverse selection—namely, the transfer of low-quality assets—are natural, a key implication of our analysis, consistent with the aforementioned lawsuits, is that inverse selection, whereby high-quality assets are transferred at undervalued

¹Jefferies (2025), *Global Secondary Market Review*, July, available at https://go.jefferies.com/1/399542/2025-07-22/5tb4pk/399542/17531934550cf0YM0Q/Jefferies___Global_Secondary_Market_Review___July_2025.pdf.

²See *Abu Dhabi Investment Council vs. Energy & Minerals Group* and *Dailane Investments Limited vs. H.I.G. Capital LLC*.

prices, is often the more fundamental concern in continuation vehicles.

We begin with a simple baseline environment. A risk-neutral GP manages a legacy fund that holds two portfolio companies. At an interim date, each asset is privately observed by the GP to be in one of three states: (i) *successful*, which can be sold to external buyers at a high price; (ii) *high-potential*, which has no liquidation value at the interim date but may reach the same high price by the final date if additional capital is invested and the GP exerts effort; and (iii) *unsuccessful*, which has zero value at all dates. At the interim date, the GP can either sell assets to external buyers or transfer one asset into a CV. In such a transaction, some legacy LPs roll their stakes into the new vehicle while others cash out, and a new LP purchases the shares of exiting investors and finances the continuation investment.

The central friction is the GP's dual role as an informed seller and buyer. The GP is privately informed about asset types and can present any continued asset as high-potential, regardless of its true quality. In addition, the GP derives private benefits from shirking rather than exerting effort to create value. On the buy side, there is always a competitive pool of uninformed LPs. With some probability, however, the GP encounters an LP with superior information about asset quality. While competition among uninformed LPs disciplines observable prices, the GP retains discretion over share allocation and can favor the informed investor. This allows the informed LP to acquire CV shares at a discount and to share the resulting surplus with the GP through side arrangements. In practice, such arrangements may take the form of commitments by the informed LP to invest in the GP's future funds, to accept less favorable fee terms, or to provide other implicit compensation.

The legacy fund contract can take two economically relevant forms. Either the GP earns carry only if both assets are successfully exited, which corresponds to a high return hurdle. Alternatively, the GP earns carry once at least one asset is successfully exited, corresponding to a low return hurdle. Legacy LPs choose the hurdle rate in the legacy fund contract. A high-hurdle contract is naturally cheaper from the LPs' perspective. The downside is that when one company is already successful and the other is high-potential or unsuccessful, the GP earns no carry from the legacy fund regardless of whether it sells the successful company. In this case, the GP has a strong incentive to transfer the successful company to the CV at too low a price. Its payoff from the legacy fund remains zero either way, but it gains within the CV through future carry. Exiting legacy LPs thus effectively give away a successful company too cheaply to an informed buyer—a problem we refer to as *inverse selection*.

LPs can instead lower the hurdle so that carry is paid once at least one company is suc-

cessfully exited. This contract is more expensive for them, but it mitigates inverse selection. In this case, when one company is successful and the other is high-potential, the GP prefers to sell the successful company within the legacy fund to earn carry and to use the CV for the high-potential or unsuccessful company. In particular, when one company is successful and the other is unsuccessful, the GP may transfer the unsuccessful company to the CV to boost legacy fund cash flows and generate carry. The resulting inefficiency is borne by the new LP. This constitutes a standard *adverse selection* problem.³

In the model, legacy LPs face a trade-off between a high hurdle, which limits carried-interest payments but increases exposure to inverse selection, and a lower hurdle, which mitigates inverse selection at the cost of higher carry and adverse selection for new buyers. Crucially, when rollover rates are low—reflecting stronger LP liquidity needs—both inverse selection and adverse selection become more severe, as the GP can exploit its intermediary position between exiting LPs and new investors. In this case, providing incentives for the GP to always exit high-quality assets within the legacy fund becomes prohibitively costly. Legacy LPs therefore optimally adopt a high-hurdle contract that allows the GP to continue high-quality assets when the legacy fund is out of the money. On the positive side, this crowds out the continuation of low-quality assets, thereby mitigating adverse selection. Likewise, a high-hurdle contract is also optimal when the GP’s carried-interest stake in the continuation vehicle is larger, as this raises the cost of incentivizing the exit of successful assets.

Overall, the model shows how the structure of the legacy fund contract shapes both the quality and growth potential of assets transferred to CVs. When the legacy contract offers more generous carried interest, transfers tend to involve assets of lower initial quality but greater scope for subsequent growth, and they occur at relatively low prices. When carried interest is less generous, transfers instead concentrate on higher-quality assets with more limited growth potential and occur at relatively higher prices.

The model also provides a simple interpretation of several contractual features observed in the data. First, it predicts that carried interest is steeper in the legacy fund than in the CV. A higher legacy carry rate disciplines the GP’s continuation decision by deterring underpriced transfers of high-quality assets and mitigating inverse selection. Second, a distinctive feature of CVs is that carried interest crystallized at the transaction is typically reinvested rather than distributed. In the model, this feature arises endogenously as incentive mechanism:

³There are also states in which inefficiencies arise irrespective of the hurdle rate, as well as parameter regions with multiple equilibria. For expositional simplicity, we abstract from these cases in the introduction and focus on the central intuition.

requiring carry to be rolled into the vehicle makes opportunistic continuation of low-quality assets less attractive by forcing the GP to reinvest based on the (inflated) transfer price.

The model also delivers a rich set of empirical implications related to conflicts of interest and contractual structures in CVs. For example, we show that GP coinvestment is a double-edged sword. It mitigates adverse selection by inducing the GP to internalize a larger share of the losses from continuing low-quality assets, but exacerbates inverse selection by strengthening incentives to transfer successful assets into the CV at discounted prices.

Crucially, greater legacy LP rollover unambiguously improves outcomes for LPs by reducing value transfers at CV formation and attenuating both selection problems. In contrast, the GP benefits from lower rollover rates, as this strengthens its intermediary position between legacy and new LPs and allows it to extract greater rents. This creates a tension: the GP prefers lower rollover rates, even though they are detrimental to legacy LPs.

Our analysis also informs legacy LPs' rollover decisions. When inverse selection is severe and transfers occur at undervalued prices, legacy LPs are better off rolling over rather than cashing out, since exiting requires selling their stakes too cheaply to new investors. Rollover is especially attractive under high-hurdle contracts, which are precisely the regimes associated with undervalued transfers. Overall, rolling protects legacy LPs against inverse selection, but exposes them to adverse selection.

Beyond these baseline implications, the paper offers several additional contributions and practically relevant extensions. First, we endogenize initial asset quality by introducing screening effort—capturing deal sourcing and selection—at legacy fund formation. We show that low-hurdle legacy funds induce higher screening effort, and thus better asset quality, relative to high-hurdle funds. Compared to a benchmark without CVs, the option to raise a CV can weaken incentives to screen and select high-quality assets, implying a potential negative spillover of the emergence of CVs on the quality of legacy fund portfolios. Second, we allow the GP to continue multiple assets within a single CV. We find that this added flexibility lowers the average quality of continued assets and, in particular, reduces the likelihood that successful assets are rolled into the CV. Consistent with this mechanism, the analysis suggests that single-asset CVs contain higher-quality assets than multi-asset vehicles.

Related Literature. Our paper contributes to the nascent literature on secondary transactions. [Nadauld, Sensoy, Vorkink, and Weisbach \(2019\)](#) offer the first comprehensive study of the secondary market, which at the time was mostly LP-led, i.e., investors buying and selling stakes in PE funds. [Kastiel and Nili \(2023\)](#) offer a legal perspective on CVs.

Two contemporaneous papers provide empirical analyses of continuation funds. [Abuzov, Gornall, Shive, Strebulaev, and Weisbach \(2025\)](#) and [Luepertz, Roosenboom, and Verbeek \(2025\)](#) both document the rapid growth of the market, analyze similar transaction samples, and reach broadly overlapping conclusions: CVs are concentrated in larger and better-performing funds, typically involve high-performing assets, see low rollover rates from legacy LPs, and attract a new investor base dominated by secondary specialists. Our paper is distinct in two respects. First, using detailed transaction documents, we provide systematic evidence on contractual features of CVs that have not previously been documented. Second, we develop a theoretical framework that formalizes the conflicts of interest these vehicles generate and characterizes the effects of fund contracts and GP compensation.

We also contribute to the theoretical literature on private equity and venture capital (e.g., [Hochberg, Ljungqvist, and Vissing-Jørgensen \(2014\)](#); [Malenko and Malenko \(2015\)](#); [Ewens, Gorbenko, and Korteweg \(2022\)](#); [Gryglewicz and Mayer \(2023\)](#)), with [Albuquerque and Zawadowski \(2025\)](#) developing a theory of private debt. [Donaldson, Piacentino, and Thakor \(2021\)](#) provide a micro-foundation for non-bank intermediaries such as private equity funds. [Axelson, Strömberg, and Weisbach \(2009\)](#) and [Maurin, Robinson, and Strömberg \(2023\)](#) develop contracting theories of LBOs, focusing on the GP’s incentives to select firms over the fund’s lifetime. While we consider selection in an extension, our novel contribution is to model the endogenous choice between exit and continuation of portfolio companies, capturing the core economic mechanism underlying continuation vehicles.

Our work is most closely related to [Vanasco \(2017\)](#), who studies how initial screening and moral hazard affect market liquidity under adverse selection. Our setting differs in several key ways. First, alongside adverse selection, it introduces an inverse selection problem: the GP acts as both informed seller and buyer, benefiting from transferring high-quality assets at undervalued prices. Second, to capture the conflicts of interest specific to CVs, we model multiple assets and three asset types to capture CV-specific concerns—not only that bad assets may be continued, but also that good assets’ exits may be inefficiently delayed.

1 Structure of Continuation Vehicles

The descriptive contribution of our paper is to document the structural features of continuation vehicles. Existing industry reports primarily emphasize volume trends and the composition of GP-led secondaries, but provide little detail on contractual or structural de-

sign. In this section, we present the key empirical facts about continuation vehicles and elaborate on their defining characteristics.

Our data come from two large secondary investors whose identities we keep confidential. One is a specialized secondary investor, and the other is a direct investments program of a large limited partner. First, we review investment memos for 15 deals closed between Q1 2023 and Q2 2025 across the US and European markets, representing approximately \$20 billion in equity. This sample covers established mid- and large-cap private equity funds. Second, we analyze internal summaries on GP compensation and expected performance of CVs for a broader set of deals spanning the period from Q1 2019 through Q1 2025. Finally, we interview the investment teams about CV transactions they review but choose not to join. The teams report having visibility into nearly the entire universe of CV activity in the U.S. and Europe.

Fact 1 – Purpose and timing. *Continuation vehicles (i) extend the asset holding period by about four years beyond the original fund term, and (ii) raise additional capital.*

The market standard for CVs is a five-year life with two one-year extensions upon approval of the LP Advisory Committee (LPAC). In our sample, the assets are transferred into the CV after they have been held for 5.1 years (median of 4.8 years) in the legacy fund, which is in line with the average holding period for PE portfolio companies. In the legacy fund structure, this typically occurs around year seven following the fund’s closing.⁴ Thus, CVs allow the GP to reset and extend the potential holding period for selected assets by approximately four years—seven years for the continuation fund, net of roughly three years remaining in the legacy fund. Figure 1 illustrates the typical timing of a continuation fund.

Note that, before the emergence of CVs, GPs have sometimes retained marquee assets across multiple fund vintages. Examples include FleetCor for Summit Partners and Visma for Hg Capital. One could argue that CVs have formalized this practice, offering a more structured approach to managing such assets over extended horizons.

The universal stated rationale for extending the holding period is unrealized growth potential. A typical CV also raises additional capital to support inorganic growth. In our sample, unfunded commitments account for about 15% of the equity exposure on average (median 11%). Investment memos mention expected gross IRRs. They average around 20%.⁵

⁴A traditional private equity fund has maturity of ten years: eight years, plus two one-year extensions upon LPAC approval.

⁵Consistent with [Lazard \(2025\)](#) who report that single-asset CVs had a gross IRR of 21% in 2024.

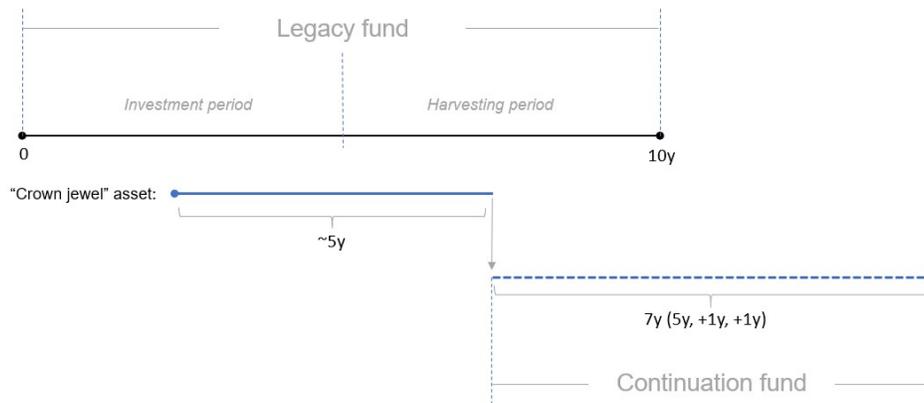


Figure 1: Continuation vehicle timing

Fact 2 – GP contract. *Continuation vehicles typically require the GP to coinvest the after-tax carry earned as a result of the transaction, along with additional out-of-pocket capital. Carry often follows a step-up structure, where the GP earns 10% carry above a 10% IRR, rising to 20% above a 20% IRR. Management fees are calculated on invested capital.*

The economic incentives of a GP are complex. Since a continuation vehicle is treated as an exit for the legacy fund, the GP realizes carry when assets are passed to the CV.⁶ At the same time, GPs economics are reset in a CV.

Selling LPs are those that participate in the primary private equity market. According to Private Equity International, public pension funds accounted for half of that capital in 2024.

Recognizing the complexity, potential conflicts of interest, and uneven expertise among participants in CV transactions, the U.S. Securities and Exchange Commission (SEC) adopted new rules in 2023 under the Investment Advisers Act aimed at GP-led secondaries. These

⁶As a rule, carry is in the money in CV transactions. In a European carry waterfall structure, carry is realized only after the preferred return on the entire called capital has been cleared. However, as noted earlier, CVs often occur around year seven of the fund—well into the fund’s “harvesting stage”.

rules mandate fairness opinions, enhanced disclosure of material conflicts, and increased transparency around valuation methodologies and carry crystallization mechanisms (SEC, 2023). The potential conflicts in the GP-led secondary transaction are also widely acknowledged in the industry (see, for instance, [Persaud \(2024\)](#)).

There are multiple implicit and explicit mechanisms that intend to mitigate the potential conflict of interest (i) between GP and legacy LPs, and (ii) between GP and the LPs in the continuation vehicle. We are particularly interested in contractual terms in the continuation vehicle which address GP and continuation vehicle LPs' alignment. In part, the point of the model presented in this paper is to evaluate effectiveness of these terms in ensuring alignment in the continuation vehicle and evaluate its implication for the legacy LPs, as well as to formalize these conflicts of interest.

Table 1 summarizes the key terms in a continuation vehicle and contrasts them with a primary fund. A few points are important to highlight:

- GPs coinvest in the CV by reinvesting 100% of the crystallized carry from the transferred assets and are typically required to contribute additional capital. There is considerable variation in GP contributions beyond the carry roll. Similarly, the management teams of the portfolio companies are often expected to roll over most of their equity stake into the CV.

Variation in a GP's total exposure to the CV is related to the size of the legacy fund: in smaller funds, GP exposure in the CV is typically around 10–11%, whereas in larger funds this percentage is substantially lower—even when the dollar contribution is actually greater in the latter case.

- There is variation in annual management fees but they tend to cluster around 50 basis points on the invested capital. Anchor investors typically receive an additional discount.
- A typical carry structure has three tiers, with 20% carry only achieved upon realization of 20% gross IRR. It is also common to include MOIC hurdles in addition to IRR hurdles. For example, the highest carry bracket is typically conditional on a 20% IRR and 2x MOIC.⁷

⁷Although we have not encountered this in the transactions we have reviewed directly, it appears that some deals include so-called “super carry”, which is an additional carry tier where the GP receives 25% carry once returns exceed a 25% gross IRR and a 3.0x MOIC.

Fact 3 – CV process, buy-side. *The GP-led secondary market is highly competitive. In contrast to the primary fund market, LP investment demand for continuation vehicles is concentrated among a small number of large, specialized players.*

In a typical GP-led secondary, the GP engages a specialized advisory firm to run the process. Evercore, Lazard and Jefferies are among the most frequently used advisors in this market. The goal of the advisors is to ensure a fair and efficient process. Legacy LPs may sell their exposure at a negotiated price—typically based on third-party valuations or a competitive bidding process—or elect to “roll” their interests into the continuation vehicle. While the proportion of rolled capital varies across transactions, it is widely observed that most legacy investors choose not to roll over their stakes into the continuation vehicle. Our sources indicated that only about 10% of legacy LPs by volume tend to roll their stake into a continuation vehicle. This number is also consistent with [Kastiel and Nili \(2023\)](#). Instead, demand for CVs is dominated by specialized secondary investors.

According to PEI Secondary Investor Ranking, in the five years between 2019 and 2023 the top-20 secondary firms raised close to \$400 billion dollars, that is four times larger than the amount raised by the next 30 players. For comparison, according to Preqin, the total secondary deal volume over the same period was \$480 billion.

The largest continuation vehicle investors include specialized secondary funds affiliated with large alternative asset managers (e.g., Blackstone, Carlyle), fund-of-funds platforms (e.g., HarbourVest, StepStone, Pantheon, Partners Group), dedicated secondary specialists (e.g., Ardian, Lexington Partners, Collier Capital), and investment firms like Goldman Sachs. In addition, several large LPs buy stakes in continuation vehicles through their direct private market programs.

Although the new buy-side CV investors often differ from those in the primary market, it is reasonable to assume that the legacy LPs—particularly those serving on the LPAC—are highly sophisticated, even if not specialized in secondary investments. In particular, many of these LPs have coinvestment programs, which suggests they have the capability to conduct independent due diligence on the portfolio companies.

Fact 4 – CV process, information sharing. *As a market standard, all LPs in the legacy fund, as well as those in the continuation vehicle, receive the same information from the GP.*

There is an inherent information asymmetry between the GP and its LPs, this will be

Term	Continuation Vehicle	Primary (Legacy) Fund
Fund term	5 years, plus two 1-year extensions with LPAC approval	8 years, plus two 1-year extensions with LPAC approval
Funded	85%	0%
Management fee	0.25–0.75% on invested capital	1.5–2% of committed capital during investment stage, shift to invested capital base and step down in fees thereafter
Carried interest	10% over 10% gross IRR 15% over 15% gross IRR and 1.5–1.7x MOIC 20% over 20% gross IRR and 2x MOIC (100% GP catch up at all tiers)	20% above 8% gross IRR (100% GP catch up)
GP commitment	100% after tax carry roll, plus additional capital commitment	–

Table 1: Typical terms in a continuation vehicle vs. a primary fund

central to the model. To the extent that information asymmetry exists between exiting LPs and those in the continuation vehicle, it stems from institutional differences rather than from the flow of information. A continuation vehicle transaction typically begins with securing an anchor investor—a buy-side investor (or group of investors) that promise to commit capital up to a specified amount. CV transactions are often bespoke and require significant due diligence and ongoing communication. As a result, outreach to legacy LPs usually does not begin until the transaction is sufficiently advanced and closure appears likely.

Once the GP has secured an anchor-investors for its continuation vehicle, all LPs in the legacy fund, as well as those in the continuation vehicle, receive the same information from the GP. Although GP-led secondaries are private transactions and may not be subject to the full scope of public securities regulations, GPs often follow market best practices to minimize legal risk and reduce investor friction. Additionally, under the Investment Advisers Act of 1940, GPs—acting as fiduciaries—are required to avoid conflicts of interest and ensure fair and transparent disclosure to LPs.

In U.S. public markets, information exchange is regulated by U.S. securities laws, including the Securities Exchange Act of 1934, Rule 13e-4, and Regulation 14E. These rules impose requirements around disclosure, equal treatment of holders, and minimum offer periods.

In practice, the GP typically establishes a secure “data room”, an online repository

where key documents related to the transaction are made available. These often include legal agreements related to the continuation vehicle, portfolio company performance data and financial firmions, third-party valuation reports, and the GP’s track record. All legacy LPs, advisors, and potential buyers are granted access to the same “data room.”

Official information sharing is often complemented by informal guidance or direct communication ahead of the transaction launch. In general, an anticipated exit is communicated to LPs ahead of the event and tends to draw heightened attention, as this is when returns are realized. Exits involving a sale to a continuation vehicle typically attract even greater scrutiny due to the embedded conflicts of interest. As one GP noted, in the case of such an exit, they would speak with their largest LPs “three to five times before the LPAC meeting.” This is in line with Institutional Limited Partners Association (2019) continuation vehicles guidelines, which recommends that GPs should engage LPs “as early as possible in the process to provide the rationale for the restructuring and any alternatives considered.”

Generally, it is reasonable to say that all LPs have access to the same “hard” information. However, as discussed earlier, the composition of legacy LPs differs substantially from the specialized investors who tend to dominate the CV side. Traditional LPs are often resource constrained (see Ivashina and Lerner, 2019, for detailed examples). At the same time, legacy LPs benefit from a long history of both formal and informal communication with the GP regarding its portfolio investments. In sum, while it is difficult to broadly characterize whether legacy LPs or CV investors are better informed, it is plausible that in specific cases one group may hold an informational advantage (see, e.g., [Ivashina and Lerner \(2019\)](#)).

2 A Theory of Continuation Vehicles

To make the exposition more tractable, we split this section into two parts. In Section 2.1, we introduce the formal elements of the model, and in Section 2.2, we discuss the motivation for the key model assumptions.

2.1 Model Setup

We develop a theory of private equity and continuation funds over three dates, $t = 0, 1, 2$. The general partner (GP) and all limited partners (LPs) are risk-neutral. There is no discounting between periods. The GP, i.e., fund manager, is assumed to have no capital of its own and

is protected by limited liability. The GP operates a legacy fund that invests in two portfolio companies indexed by $z \in \{A, B\}$, over the first period, from $t = 0$ to 1. At $t = 1$, the GP either sells these assets (to external buyers) or transfers one of them into a continuation vehicle (CV) that operates from $t = 1$ to the final date $t = 2$. The GP cannot continue both assets.⁸

Company Types. At the end of the first period (at $t = 1$), assets are in one of three states denoted $s_z \in \{H, M, L\}$ — whose realization is i.i.d. across assets:

1. **Successful** ($s_z = H$), with exogenous probability $p \in (0, 1)$. A successful asset (also referred to as *crown jewel*) can be sold to external buyers for price $X > 0$ at both times $t = 1$ and time $t = 2$.
2. **Unsuccessful** ($s_z = L$), with probability $(1 - p) \delta$ where $\delta \in [0, 1]$. An L -type asset (also referred to as *zombie*) is *permanently* unsuccessful, and has a value of zero to external buyers at both time $t = 1$ and time $t = 2$.
3. **High-potential** ($s_z = M$), with probability $(1 - p) (1 - \delta)$. At time $t = 1$, a high-potential asset can only be sold to external buyers at a price of zero (a normalization). However, this type of assets may succeed if continued to $t = 2$ *and* the GP exerts hidden effort $e_1 = 1$ at time $t = 1$. In that case, the asset succeeds with probability p , and can be sold for a price X at $t = 2$; otherwise, price is zero. Low effort, $e_1 = 0$, yields a zero probability of success.⁹

To sum up, to external buyers, an H -type asset has a value of X at both time 1 and time 2. L - and M -type assets have time-1 value of 0, but an M -type asset may have time-2 value of X , reflecting its “growth” potential.

If a company is continued to $t = 2$, it requires an additional investment outlay $I > 0$ at $t = 1$, financed by the LPs participating in the CV.¹⁰ At $t = 1$, the GP chooses effort $e_1 \in \{0, 1\}$. Not exerting effort ($e_1 = 0$) generates private benefits $\lambda > 0$. For L - and H -type assets, effort does not affect the time-2 payoff (it is always 0 or X , respectively). The GP therefore never exerts effort when continuing such assets and enjoys private benefits λ .

⁸This assumption aligns with the observation that most CVs contain a single asset. Section 4.3 relaxes this assumption, allowing the GP to continue both assets; and Section 5.4 studies the case when the legacy fund comprises only one asset.

⁹For simplicity, the probability of success is then the same and equals p across both periods, although one could easily assume differing probabilities. In Section 5.1, we endogenize the first-period success probability, which is then determined by time-0 effort by the GP.

¹⁰The baseline abstracts from time-0 investment and effort; these are introduced in Sections 5.2 and 5.1.

We assume $pX - \lambda - I > 0$, so that continuing an M -type asset yields a positive net surplus: expected payoff exceeds both the required investment I and the GP’s moral-hazard cost (the foregone private benefits λ). We also assume $I > \lambda$, implying that continuing an L - or H -type asset is (socially) inefficient.¹¹

Information at CV Formation. At $t = 1$, the GP privately observes the states of both assets, $S := (s_A, s_B)$. The GP then chooses whether to (i) sell both companies to external buyers or (ii) transfer one company to a CV and sell the other. If a CV is formed, new LPs acquire the shares of the exiting LPs. In equilibrium, the shares are purchased by a representative new LP (the winning bidder), which we refer to as “the new LP.”

We allow for heterogeneity in the information of potential new LPs, reflecting that secondary-market participants are often specialized investors. When approaching new investors, the GP encounters an informed investor—referred to as a *specialist*—with probability $\phi \in [0, 1)$. Whether a specialist is present is observed by the GP but not by other investors.¹² Specialists observe the asset’s time-1 value (0 or X). As a result, they can identify H -type assets but cannot distinguish between L - and M -types. Intuitively, they can recognize companies that have already succeeded, but cannot tell whether a company is a permanent write-off or has high potential.¹³ In addition to informed secondary investors, there is always a competitive pool of potential uninformed investors. Like legacy LPs, they cannot observe or verify the state or value of the asset at $t = 1$.

CV Contract. The CV contract specifies a payment to the GP of $w_2 \geq 0$ if the CV generates cash flow X , and zero otherwise. w_2 can be interpreted as carried interest.

To avoid complications arising from heterogeneous LP information in the CV, we simplify the determination of the CV contract by considering a fixed payment w_2 set at the minimal level required to implement effort $e_1 = 1$, even when asset types are unknown. That is, the incentive constraint for effort (for M -types), $pw_2 \geq \lambda$, is binding, so that $w_2 = \frac{\lambda}{p}$.

¹¹Continuation entails cost I , generates private benefits λ , but does not increase the asset’s value.

¹²We would obtain the same findings assuming that a specialist is always present and observes a signal $X' \in \{0, X\}$ regarding firm value. This signal is also available to the GP but not to other investors. For L - and M -types, X' is always zero. For H -types, the signal reveals the asset’s value ($X' = X$) with probability ϕ and yields a false negative ($X' = 0$) otherwise. Thus, the specialist holds an informational advantage when the asset is an H -type and $X' = X$ (with probability ϕ); in all other instances, the specialist is effectively uninformed. In this framework, the GP’s awareness of the specialist’s information reflects a common signal—potentially involving information the GP privately shares or reveals during communication. As discussed in Appendix I-C.2, the GP may also elicit the specialist’s information during CV formation.

¹³Section 5.3 considers that specialists observe the full state $\{L, M, H\}$. The qualitative results are unchanged, but the baseline information structure preserves tractability.

Accordingly, the contract is always the same and is determined to minimize GP rents “as if” the continued asset is M -type. A micro-foundation is provided in Internet Appendix I-C.1. Intuitively, this contract form is motivated by the fact that asset types are neither observable nor contractible. Any attempt to condition the contract on reported types would be prone to misreporting, with the GP reporting M to justify the incentive pay.¹⁴

CV Shares and Liquidity Needs. Rolling legacy LPs and the new LP hold all of the shares of the CV.¹⁵ CV shares—whose total number is normalized to a unit mass—give their holders rights to cash flows net of GP compensation at $t = 2$: they pay $X - w_2$ if the asset is successful by $t = 2$ (and zero otherwise).

A fraction θ of CV shares is retained by legacy LPs, who roll over their interests from the primary fund and, therefore, do not need to purchase the shares. The remaining fraction $1 - \theta$ is sold by exiting LPs to the new LPs at an observable (transfer) price v . Exiting LPs therefore receive a total payment of $(1 - \theta)v$. In the baseline model, we take θ to be exogenous, reflecting that rollover decisions are largely driven by liquidity needs or institutional constraints, as some legacy LPs are unable to participate in CVs. Section 4.2.2 endogenizes θ .

CV shareholders finance the continuation investment I in proportion to their ownership, contributing I dollars per share held. Accordingly, rolling LPs contribute θI , while the new LP contributes $(1 - \theta)I$. Thus, the new LP pays a total of $(1 - \theta)(v + I)$ for its shares in the CV, i.e., they pay an all-in price of $V \equiv v + I$ per share.

CV Pricing. In practice, CV formation and price discovery combine features of (i) auction-like bookbuilding and (ii) an OTC market, where the GP selectively invites buyers, communicates with them privately, and exercises discretion over share allocations. We capture this in reduced form as follows. The GP conducts a price auction for CV shares in which uninformed investors bid competitively, with the highest (transfer price) bid denoted v_U . We assume the GP has limited discretion in share allocation and may favor the specialist by allocating the shares if the specialist matches the highest uninformed bid v_U ex post.

When a specialist is present and values the CV shares at $v_I > v_U$ (i.e., is willing to pay a higher transfer price), the GP offers a hidden side deal that allows the specialist to acquire the $1 - \theta$ shares at price $\hat{v} \in [v_U, v_I]$. In such a deal, the GP extracts a fraction $\alpha \in (0, 1]$ of the specialist’s buyer rent $(1 - \theta)(v_I - \hat{v})$ through a hidden side payment. Here, α captures

¹⁴We formally show that, in equilibrium, all assets are transferred at the same (pooling) price, consistent with the CV contract being identical across states. The CV contract is therefore the “cheapest” contract for LPs that always induces effort, even when the exact asset type is unknown.

¹⁵In Section 4.4, we allow the GP to coinvest capital in CV shares.

in reduced form the GP’s bargaining power and feasibility of side deals.¹⁶

The GP can condition allocation on acceptance of the side deal, and the specialist accepts whenever $\hat{v} \leq v_I$. When $v_I > v_U$, the specialist anticipates it can obtain the allocation ex post via the side deal. Hence, outbidding uninformed investors is suboptimal: it raises the winning bid v_U and thus shrinks the feasible buyer rent. Therefore, the specialist bids v_U , or waits and matches ex post. The highest bid v_U is thus set by uninformed investors and reflects their valuation conditional on winning allocation, which occurs only when the specialist is absent or does not take the allocation.¹⁷ If a specialist invests, the transfer price becomes $v = \hat{v}$; otherwise, uninformed investors are marginal and $v = v_U$. We will show that, in equilibrium, $\hat{v} = v_U$ whenever $v_I > v_U$, since the GP then chooses the lowest feasible offer to maximize extracted rent. Thus, all CVs are priced the same and the presence of a side deal cannot be inferred from prices.

For the following analysis, we define the all-in price $V \equiv v + I$ paid by new LPs for CV shares, also referred to as *valuation*. In equilibrium, V coincides with the uninformed investors’ valuation of the CV and its asset. We focus on parameter values such that $v > 0$ (equivalently, $V > I$) in equilibrium, ensuring that the market for CV shares does not break down due to adverse selection: the pooling valuation of the CV asset V exceeds the continuation cost I . A sufficient condition is $(1 - \delta)(pX - \lambda) > I$.

Legacy Fund Contract. At time $t = 0$, legacy LPs sign a contract \mathcal{C} with the GP, specifying compensation as a function of cash flows realized at $t = 1$ and the observed continuation decision, namely whether the GP continues an asset and at which valuation.

We restrict attention to legacy fund contracts that stipulate non-negative payments to the GP and compensate the GP only if at least one asset in the fund is successfully exited, with all payments made at the end of the legacy fund at $t = 1$.¹⁸ Contracts are chosen to maximize LP payoffs, corresponding to minimizing the GP’s agency rents under the standard financing-capacity logic of [Holmström and Tirole \(1997\)](#). Section 5.2 shows that this objective is optimal irrespective of whether contracts are designed by LPs or by the GP.

¹⁶In practice, side arrangements may involve non-verifiable transfers such as kickbacks or stapled commitments. We assume $\alpha > 0$, hence avoiding the knife-edge case $\alpha = 0$.

¹⁷Section I-C.3 considers an extension in which the specialist may occasionally bid at its willingness to pay, and shows that our results remain similar.

¹⁸We assume the GP is paid only if fund cash flow exceeds X , as, e.g., [Axelson et al. \(2009\)](#), which corresponds to a performance hurdle, i.e., carried interest is paid only after sufficiently high fund performance. In particular, this implies that the GP receives no payment before any successful exit, which can only occur at the end of the legacy fund at $t = 1$. [Axelson et al. \(2009\)](#) micro-found this assumption by considering fly-by-night operator GPs, who would raise PE funds en-masse, if contracts offered pay without success.

Crucially, all contracts are private, in the sense that they are observable and verifiable only to the parties involved. As a result, the GP may enter side agreements with subsets of LPs that others cannot observe. New LPs therefore cannot verify the contractual terms governing the legacy fund, and during CV formation the GP may also strike unobserved side deals with new LPs.

Timing and Equilibrium. Finally, the sequence of events is as follows:

- 1) At $t = 0$, legacy LPs sign the contract \mathcal{C} with the GP.
- 2) At $t = 1$, events realize and actions are taken in the following order:
 - a) The GP privately observes asset types $s_z \in \{L, M, H\}$. The GP decides whether to sell both assets to external buyers or to continue one in a CV.
 - b) Once the continuation decision is made, the GP approaches buyers, encountering a specialist with probability ϕ . The GP learns about the presence of a specialist only after the continuation decision and thus cannot condition on it. The CV share price v is determined and observed, and the new LP buys $1 - \theta$ shares from exiting LPs, who receive total payout of $(1 - \theta)v$.
 - c) CV shareholders cover financing need I ; the GP chooses effort $e_1 \in \{0, 1\}$.
 - d) Any asset that is not continued is sold to external buyers. Legacy fund cash flows realize, which, per unit of exiting LP interest, may take the following values: (i) $2X$ (two successful exits); (ii) $X + v$ (one successful exit, one transfer at price v); (iii) X (one successful exit, no CV); (iv) v (no successful exit, one transfer); and (v) 0. The GP is compensated per \mathcal{C} . Any rewards from side contracting with the new LP materialize.
- 3) At $t = 2$, cash flows from any CVs are realized and the GP receives w_2 if it is successful.

As formalized in Appendix A, an equilibrium consists of an optimal legacy fund contract \mathcal{C} and the beliefs of new investors, who price CV shares. In equilibrium, the GP and legacy LPs optimally determine the contract to maximize expected legacy LP payoff, taking as given beliefs of new investors. New investors form rational expectations and update beliefs using Bayes' rule, whenever applicable.

2.2 Discussion of Assumptions

This section provides additional discussion and motivation for key model assumptions. It does not introduce any new formal elements.

Overall Structure. In our model, the legacy fund holds two companies—the minimal number needed to constitute a portfolio. As we discuss in greater detail in Section 5.4, a model with only one legacy asset cannot generate our key results. The reason is that our mechanism relies on (1) the GP’s compensation being tied to overall fund performance, (2) whether compensation is effectively in or out of the money at CV formation (a distinction that is not meaningful in a single-asset setting), and (3) how the performance of one asset affects the GP’s continuation decision for the other. A single-asset model cannot capture these forces.

We assume that there are three possible states: L , M , or H . Three states is the minimum needed to capture that continuation can be inefficient either because a company is unsuccessful or because it is already successful and requires no further input. Both of these inefficient outcomes are relevant in the context of continuation funds. In our framework, crown-jewel CVs (continuation of H -types) and zombie CVs (continuation of L -types) are inefficient by assumption and destroy value for certain investor groups, whereas high-potential CVs (M -type continuations) create value. We note, however, that in practice the term “crown-jewel” (and “crown-jewel CV”) is sometimes used more broadly to include what we define as high-potential assets.

CV Assumptions. We assume that a fraction of legacy LPs exits, creating a natural role for new LPs to replace them in the CV. This assumption captures both financial and institutional frictions. On the financial side, some LPs may simply need liquidity. On the institutional side, many LPs are unable to roll over because their mandates prohibit single-asset decisions or because they cannot respond within the short time frame typically offered by GPs. For expositional convenience, we group all these reasons under the label of “liquidity needs.” We assume exogenous liquidity needs in the baseline, reflecting that decisions to roll are — by and large — constrained by exogenous institutional constraints or liquidity needs. Section 4.2.2 endogenizes legacy LPs’ decision to roll.

Continuation requires both (1) additional capital to support further development of the company, such as financing add-on acquisitions or expanding existing operations (e.g., hiring more sales staff), and (2) GP effort. In practice, continuation almost always entails some new

investment. The investment cost is needed in our setting to make continuation inefficient for L - and H -types, as these continuations do not increase terminal cash flow.

Effort reflects the GP’s role in monitoring, and strategic guidance, and carries an opportunity cost (in terms of foregone private benefits λ).¹⁹ The key role of effort in our setting is to discipline the determination of the carried interest stake w_2 in the CV via incentive pay; see Appendix I-C.1 for a micro-foundation of CV contract. However, the analysis would go through too with exogenous stake w_2 . The CV contract is kept simple and can be interpreted as the combination of a carried interest stake and equity, consistent with structures observed in practice.

Finally, we restrict the GP to maximally continue one asset, in line with practice that continuation funds often contain a single-asset and are typically much smaller than the corresponding legacy funds (given that the legacy fund holds two assets, capturing this requires that the CV has one asset). The economic implication of this assumption is that raising a CV is a scarce or precious option: Since not all assets can be continued, the GP faces the trade-off that continuing one asset crowds out the opportunity to continue another one. Section 4.3 extends the model to allowing the CV to contain two assets. It shows that when the GP can continue both assets, it may raise lower-quality CVs.

Specialist Investors. We allow new LPs to include specialist investors who have superior information relative to legacy LPs. In addition to specialists, there is always a pool of uninformed investors. By “specialist,” we mean an investor who is informed about the specific deal under consideration. Conversely, an investor who is not informed about a given deal is treated as part of the mass of uninformed investors, regardless of their general sophistication.

Legacy LPs may also include specialized investors. However, we view the information advantage as typically lying with new specialists, who conduct deal-specific due diligence when evaluating the CV investment, whereas legacy LPs often take a more passive role and do not re-assess the asset at exit. The extent of this informational advantage is captured by the parameter ϕ .

In particular, we assume that, with probability ϕ , the GP encounters new investors. The GP is aware of these investors’ information, which can be motivated in several ways. First,

¹⁹That is, we assume value creation in PE depends on the GP’s costly (due to foregone private benefits), unobservable effort, creating a standard moral hazard problem (e.g., Casamatta, 2003; Schmidt, 2003; Gryglewicz and Mayer, 2023; Maurin et al., 2023). Continuing without effort generates private benefits, creating incentives to continuing H or L -types.

the GP may be able to elicit information or willingness to pay from new LPs, as micro-founded in Appendix I-C.2. Alternatively, new LPs' information may be revealed during the CV formation and pricing process, for example through interactions or bargaining between the GP and investors. Second, both the GP and informed LPs may have access to a common signal—such as soft information that is not available or verifiable to other investors. Third, the GP may present information that specialists (but not other investors) can use to identify the company's time-1 value. Crucially, because the GP's interactions with new investors are neither observable nor verifiable by others, other LPs are unaware of new LPs' private information and cannot verify any side deals between the GP and LPs.

For simplicity, specialists are informed about time-1 value only: they can identify H -types, but cannot distinguish between L and M -types. This assumption reflects that it is easier for outsiders to verify and be informed about the asset's current value X , rather than the future growth potential, which represents less tangible information. However, our findings would remain similar, if we assumed that new investors observed the state (see Section 5.3).

Optimal Contracting and Side Deals. We highlight the multi-layered conflicts of interest between LPs and GPs and characterize the optimal contracts. Our approach has both normative and positive implications. Normatively, it shows how financing and contracts should be structured to maximize LP value and limit GP rent extraction in CVs. Positively, it explains how and when different contractual arrangements can give rise to inefficient zombie and crown-jewel funds. In either case, our analysis clarifies how contractual provisions address these conflicts.

GPs and certain investors may engage in side agreements that are not observable to other LPs, both in the legacy fund and in the CV. In practice, contract details are indeed often private to the signatory parties: even when a fund is governed by a common limited partnership agreement (LPA), the GP and participating LPs can enter into side arrangements (“side letters”) that render parts of the contractual relationship effectively private. Another channel for such side deals involves future co-investment opportunities, which are likewise unobservable to other parties and can represent substantial implicit payouts for participating LPs (for instance, new LPs may participate in the CV at favorable terms, in exchange for committing participation in another fund of the GP).

Two implications follow. First, new LPs may not fully observe the legacy contract, weakening the ability of the GP and legacy LPs to credibly commit not to transfer zombies

to new investors. Second, exiting LPs cannot observe the final contractual terms between the GP and new LPs. The GP may therefore receive rewards from new LPs for transferring undervalued assets, such as commitments to subsequent funds managed by the same GP, which effectively compensate the GP through future additional fees.

CV Pricing. In practice, CV formation and price discovery combine (i) features of an auction-like bookbuilding process and (ii) features of an OTC market, in which the GP selectively invites buyers, communicates and negotiates with them privately, and exercises discretion over share allocations. Our reduced-form modeling of CV pricing reflects these institutional features. First, it incorporates an auction-like component in which uninformed investors bid competitively and informed specialists do not participate or under-bid strategically. Second, the GP may favor specialists by offering them the opportunity to purchase shares upon matching the highest bid ex post, while extracting part of the resulting buyer rents through a side deal.

Crucially, our pricing mechanism and the scope for side deals rely on specialists (or a representative specialist) behaving strategically and in a coordinated manner. This assumption reflects specialists' sophistication, the fact that their number is limited, or that the GP selectively invites them and coordinates them. In particular, for H -type transfers, specialists rationally anticipate the possibility of forming a side deal with the GP after the price auction, allowing them to buy in at a low price. As a result, specialists behave strategically in the price auction, either not participating or bidding low. The market-test auction therefore yields uninformed investors' willingness to pay as the valuation benchmark. Section I-C.3 relaxes the assumption of strategic specialist behavior and shows that the results remain similar, when specialists occasionally bid competitively in the price auction.

3 Solution and Equilibrium

At time $t = 1$, the GP privately observes the state $S \in \mathcal{S}$, where

$$\mathcal{S} := \{(L, L), (M, L), (H, L), (M, M), (H, M), (H, H)\}.$$

Given that legacy fund contracts compensate the GP only after at least one successful exit, there are two relevant contract structures: (1) contracts that pay the GP only if both assets are successfully exited at $t = 1$, that is, when legacy fund cash flow equals $2X$ (*high-hurdle*

contract); and (2) contracts that pay the GP once a single asset succeeds and fund cash flow exceeds X (*low-hurdle contract*). These two contract structures correspond to two possible equilibria, (1) a high-hurdle equilibrium or (2) a low-hurdle equilibrium.

One way to interpret the distinction between high- and low-hurdle contracts is in terms of low- versus high-carry funds. In practice, higher effective carry can arise through various contractual features, such as a higher carry rate, more generous GP catch-up provisions, a lower LP preferred return hurdle, or greater required GP co-investment. Each increases the GP's stake in the fund and thus the incentive to realize value within the legacy fund. In our simplified setting with only a few discrete cash-flow states, the payment structure could be implemented in multiple ways, not limited to a simple carried-interest contract with a hurdle rate. For clarity, we use the terminology of high- versus low-hurdle contracts, recognizing that these may reflect broader contractual features like those described above.

Solution Outline. In what follows, we first solve for the optimal contracts within the sets of high- and low-hurdle contracts. In particular, we characterize equilibria conditional on the legacy fund featuring a high hurdle (see Proposition 1) or a low hurdle (see Proposition 2). These equilibria can be interpreted as subgame-perfect equilibria following the initial choice between high- and low-hurdle contracts. We refer to them as the high-hurdle and low-hurdle equilibria. In Section 3.4, we then analyze when a high- or low-hurdle contract is optimal, thereby pinning down the full equilibrium.

3.1 High-Hurdle Contracts: Solution

The following Proposition (proven in Appendix B) characterizes the optimal high-hurdle contract, and the associated equilibrium.

Proposition 1 (Optimal High-Hurdle Contract). *The GP continues an H-type asset in states (H, L) and (H, M) . In state (H, H) , both assets are exited at $t = 1$. In state (L, L) , an L-type is continued. In states (M, L) , (M, M) , an M-type is continued. Further:*

1. *Any asset is transferred at (pooling) valuation $V = V_U$ (fair from the perspective of uninformed new LPs), i.e., the transfer price for CV shares is $v = V - I$. When the GP transfers an H-type firm and locates new informed LPs, the GP extracts, through a side deal, rents of $\alpha(1 - \theta)(V_H - V)$, with $V_H = X - w_2$.*

2. The GP is paid only in state (H, H) upon successfully exiting both assets, with payment:

$$w^* = w_2 + \lambda + \Omega, \quad \text{for } \Omega = \phi\alpha(1 - \theta)(V_H - V). \quad (1)$$

To build intuition, note first that under the high-hurdle contract the GP is paid only if both assets are successfully exited at $t = 1$, so that legacy fund cash flows equal $2X$. Unless both assets succeed, the GP’s compensation is therefore “out of the money.” When out of the money, the GP has incentives to continue its best-performing assets, since selling them to external buyers yields no payout within the legacy fund. Thus, if only one asset has succeeded—i.e., in states (H, L) or (H, M) —the GP transfers the successful H -type to the continuation vehicle, effectively creating a crown-jewel fund. If no asset is successful, the GP continues an M -type asset unless both assets are unsuccessful. If both assets are unsuccessful, the GP has nothing to lose and continues an L -type.²⁰ As a result, the GP may continue L -, M -, or H -type assets, while new investors may not observe their true quality, giving rise to adverse selection.

CV (Under-) Pricing and Inverse Selection. In equilibrium, all assets are transferred at the pooling valuation $V = V_U$. The GP cannot credibly report asset quality at CV formation, so any report is non-verifiable and therefore “cheap talk.” One interpretation is that, to justify continuation and the incentive stake w_2 , the GP characterizes any continued asset as M -type, thereby overstating quality when the asset is L -type and understating it when it is H -type. When an L - or M -type asset is transferred—or when the GP does not encounter specialists—uninformed investors are marginal and the valuation equals $V = V_U$. In this case, informed LPs recognize that the asset lies in $\{L, M\}$ but cannot distinguish between the two, whereas uninformed LPs assign positive probability to the asset being H -type and therefore attach a higher valuation.

Next, suppose an H -type asset is transferred and the GP encounters informed investors (specialists). Specialists recognize the H -type and value CV shares at $V_H = X - w_2 > V_U$. The GP may offer them the opportunity to purchase $1 - \theta$ shares at valuation $\hat{V} \geq V_U$, together with a hidden side payment to the GP of $\alpha(1 - \theta)(V_H - \hat{V})$ per share, thereby extracting a fraction α of the buyer’s rent. In equilibrium, the GP sets $\hat{V} = V_U$, so the transaction occurs at $V = V_U$. This maximizes joint rents while concealing both the side deal and the undervaluation. Effectively, the GP presents the asset as M -type and/or claims not

²⁰In Section 4.4, we introduce GP coinvestment, which can prevent L -type continuations.

to face specialists. Anticipating allocation through the side deal, informed investors have no incentive to outbid uninformed bidders in the auction, so the bid V_U comes from uninformed investors. When deciding whether to continue an H -type, the GP anticipates expected rents of $\Omega = \phi\alpha(1 - \theta)(V_H - V)$ from transferring H -type assets at undervalued terms. As we show in Section 4.4, similar undervaluation rents arise through GP coinvestment.

As a result, H -type assets are transferred at V_U , i.e., they are transferred too cheaply. Crucially, V_U corresponds to the highest bid in the price auction and equals uninformed investors' valuation of the asset, conditional on receiving the share allocation. Appendix equation (B.10) provides an expression for V_U . This expression reflects that uninformed investors account for the winner's curse when bidding for CV shares, recognizing that the GP may favor informed LPs and allocate H -types to them.

Overall, our analysis highlights that exiting legacy LPs may face more informed buyers—namely, the GP and certain new investors—giving rise to *inverse selection*. As a result, the GP transfers high-quality assets at undervalued prices, harming exiting legacy LPs and benefiting potentially informed new LPs.

Payments. When both assets succeed by $t = 1$, a binding incentive constraint determines w^* and prevents inefficient continuation of an H -type asset. If the GP deviates and continues such an asset, it receives w_2 from the $t = 2$ exit, and enjoys the private benefit λ , since no additional effort is required. Moreover, it can extract expected side-deal rents Ω when transferring the asset at undervalued terms to new investors.

Intuitively, to prevent the GP from stripping the legacy fund of successful assets, carried interest in the legacy fund must be sufficiently high to outweigh the benefits of transferring an H -type. The GP benefits from transferring H -types in two main ways: first, by receiving carried interest in the CV that is already in the money without requiring additional effort; second, by extracting additional rents or implicit kickbacks through side deals with potentially informed new LPs. Section 4.4 introduces a third channel, whereby the GP benefits from transferring H -type assets by being able to coinvest its own capital at undervalued terms. Any of these features determine w^* .

Finally, a natural question arises: why do legacy LPs not always incentivize the GP to exit successful assets in states (H, L) and (H, M) ? The reason is that providing such incentives is costly, and it can be optimal not to do so. We next examine the low-hurdle equilibrium, in which legacy LPs instead incentivize the GP to exit successful assets.

3.2 Low-Hurdle Contracts: Solution

The following Proposition (formally proven in Appendix C) characterizes the optimal low-hurdle contract, and the associated equilibrium.

Proposition 2 (Optimal Low-Hurdle Contract). *The GP continues an M -type asset in states (M, L) , (M, M) , and (H, M) . The GP continues an L -type asset in state (L, L) . In state (H, L) , the GP exits the H -type and continues the L -type with endogenous probability γ , which decreases in θ . The GP never continues an H -type asset. Further:*

1. *Any asset is transferred at (pooling) valuation $V = V_U$, i.e., the transfer price for CV shares is $v = V - I$.*
2. *In state (H, H) , the GP is paid w_H (fund cash flow $2X$). In state (H, M) , the GP is paid w_M (fund cash flow $X + V - I$).²¹ In state (H, L) , the GP is paid w_L when exiting both assets (fund cash flow X), while paid w_M when continuing the L -type and exiting the H -type (fund cash flow $X + V - I$), with:*

$$\begin{aligned} w_M &= w_2 + \Omega; & w_L &= w_2 + \lambda + \Omega, \\ w_H &= w_M + \lambda + w_2 + \Omega, & \text{for } \Omega &= \phi\alpha(1 - \theta)(V_H - V). \end{aligned} \quad (2)$$

The intuition behind the optimal low-hurdle contract is as follows. First, note that the GP is paid — that is, its compensation (akin to carried interest) is “in the money” — when one asset is successfully exited, i.e., fund cash flows exceed X . Being in the money provides the GP with incentives to exit H -type assets at $t = 1$, and to focus on M -type continuation. However, it also creates temptation to continue L -type assets in state (H, L) . As a result, the GP never continues an H -type asset but only M - and L -type assets. The payments incentivize the GP to exit successful assets. The contract must pay even after single success; otherwise, the GP would transfer H -types into the CV (for instance, in state (H, M)). Given that no H -type assets are continued, uninformed investors become marginal in the CV: all assets are transferred at (pooling) valuation $V = V_U$.

Payments. We now discuss the determination of the payments, w_L , w_M , and w_H . First, in state (H, M) , the GP receives $w_M > 0$ after successfully exiting one asset while continuing the other. This payment is set to deter the GP from shifting H -type assets into the CV

²¹By fund cash flow, we mean fund cash flow for exiting LP per unit of ownership. Indeed, an (individual) exiting LP is paid X for the successful exit, while being paid $V - I$ for the transfer.

at undervalued price. When exiting H -type and continuing M -type, the GP receives w_M from the successful exit and an expected payoff of pw_2 from the continuation fund. However, the GP could deviate by continuing the H -type asset instead—misrepresenting it as an M -type—transferring it at price V , and exiting the other at price zero. Doing so, the GP earns w_2 with certainty at $t = 2$, and enjoys private benefits λ from shirking.

Moreover, in this off-equilibrium deviation, the GP encounters informed new investors with probability ϕ , who recognize the asset’s true H -type. The GP can then strike a side deal with informed investors, allowing them to acquire CV shares at undervalued terms and extracting fraction α of the buyer’s rent. The expected side deal rents Ω are calculated analogously to the high-hurdle case.

Second, the GP must be compensated—receiving $w_L > 0$ —when both assets are exited at $t = 1$ but only one has succeeded. This discourages the GP from rolling over the successful asset into the CV, while leaving the unsuccessful behind. Third, when both assets succeed, legacy LPs incentivize the GP to exit both through payment w_H . The GP could otherwise deviate by continuing one asset and misreporting it as type M , and a sufficiently high w_H prevents this.

Finally, the payment w_H is determined analogously to w^* in the high-hurdle equilibrium, ensuring that in state (H, H) the GP exits both assets. The key difference is that in the low-hurdle equilibrium, w_H must be higher, since exiting one asset while continuing the other triggers payment w_M in the legacy fund. Thus, in state (H, H) , the pay w_M makes it relatively more attractive to transfer one asset, while exiting the other. As a result, the payment w_H must be larger than the corresponding payment w^* in the high-hurdle contract. This very feature implies higher GP compensation, rendering the low-hurdle contract expensive.

3.3 High- vs. Low-Hurdle Contracts: Comparison

We highlight key differences that arise depending whether the contract has a high or low hurdle. The next proposition provides a hypothetical comparison of the two equilibria for a given set of parameters. When comparing the two equilibria, we denote by subscript “ hh ” quantities in the high-hurdle equilibrium, and by “ lh ” quantities in the low-hurdle case.²²

Proposition 3 (Comparison). *Comparing high- and low-hurdle equilibria, we have:*

²²Note that given a set of parameter, choosing a low- or high-hurdle contract may or may not be optimal. Thus, we conduct the comparison ignoring this feature.

1. *On average, CV asset quality, cash flows, and valuations are higher in the high-hurdle equilibrium, in that $V_{hh} > V_{lh}$.*
2. *The average growth in value for CV assets — that the average difference of a continued asset’s time-2 and time-1 values — is larger in a low-hurdle equilibrium.*
3. *GP payoff is always lower in high-hurdle equilibrium. LPs’ payoff may be higher in either equilibrium, with (D.22) and (D.23) in the Appendix comparing legacy LPs’ payoff in both equilibria.*
4. *Total surplus is higher in high-hurdle equilibrium if and only if $\lambda > pX - \delta(pX - I) + \delta\gamma(I - \lambda)$, where γ reflecting the propensity to continue L -types in the low-hurdle equilibrium.*

In the low-hurdle equilibrium, the GP’s stake and compensation (carried interest) are high—it is “in the money” whenever at least one asset succeeds by $t = 1$. In contrast, in the high-hurdle equilibrium, carried interest is subject to a higher performance hurdle, in that the GP is paid only when both assets succeed, leaving compensation “out of the money” otherwise.

A high, in-the-money stake in the legacy fund incentivizes the GP to exit H -type assets and to focus on M -type continuations. The low-hurdle equilibrium features continuation of M - and L -type assets only. Thus, the average CV asset displays (relatively) high growth potential. When the GP’s stake is lower or out of the money, as in the high-hurdle equilibrium, transferring H -types to the CV becomes more attractive, but the GP foregoes M -type continuations (e.g., in state (H, M)). As such, the average CV asset has higher quality to begin with, yet displays lower growth potential.

Legacy LPs therefore face a trade-off between incentivizing exits of successful assets and minimizing agency rents. Their payoff could be higher in either equilibrium, giving rise to the two equilibrium types in the first place. On the other hand, the GP is always worse off in the high-hurdle equilibrium.

Overall surplus and thus efficiency may be higher in either case. In the high-hurdle equilibrium, the key inefficiency arises because continuing H -type assets (in state (H, M)) crowds out the continuation of M -types, resulting in foregone value equal to the expected cash flow of an M -type, pX , net of the agency cost λ . This inefficiency is smaller when δ is higher, that is, when M -types are less likely to occur. In the low-hurdle equilibrium, by

contrast, the main inefficiency stems from the continuation of unsuccessful assets. Therefore, in terms of total surplus, the high-hurdle case is more efficient when the GP’s stake in the CV (proportional to λ) is large or the fraction of rolling LPs, θ , is low.

3.4 High- vs. Low-Hurdle Contracts: Optimal Choice

We have solved for the optimal contracts within the set of high-hurdle (“*hh*”) and low-hurdle (“*lh*”) contracts, as well as characterized the equilibrium that obtains under either type of contract. Denote these optimal contracts by \mathcal{C}_{hh} and \mathcal{C}_{lh} , and the resulting (pooling) valuations by V_{hh} and V_{lh} . Further, let legacy LPs’ initial payoff be $\Pi(\mathcal{C}; V)$, given a contract \mathcal{C} and a pooling valuation of V . The optimal contract is then chosen according to:

$$\mathcal{C}(V) := \arg \max_{\hat{\mathcal{C}} \in \{\mathcal{C}_{hh}, \mathcal{C}_{lh}\}} \Pi(\hat{\mathcal{C}}; V).$$

A high-hurdle (low-hurdle) equilibrium obtains, when $\mathcal{C}(V_{hh}) = \mathcal{C}_{hh}$ ($\mathcal{C}(V_{lh}) = \mathcal{C}_{lh}$).

The following Proposition demonstrates when the optimal contract in equilibrium features a high or low hurdle. In addition, Proposition D.1 in the Appendix shows that an equilibrium always exists and is unique under mild parameter conditions — for the sake of exposition, we may focus on this case of uniqueness, although it is not essential.²³

Proposition 4. *Let $V \in (0, V_H)$, and let V_{hh} and V_{lh} the (equilibrium) valuation under high- and low-hurdle contracts, respectively. Then, a high-hurdle contract (resp. low-hurdle contract) is optimal when $\Delta(V_{hh}) \geq 0$ (resp. $\Delta(V_{lh}) \leq 0$), where the function $\Delta(V)$ is defined in Appendix equation (D.25), and, for $\theta = 1$, simplifies to:*

$$\Delta(V) = p\hat{\Delta} \quad \text{with} \quad \hat{\Delta} := [3 - 2p]\lambda - 2(1 - p)[pX - \delta(pX - I)]. \quad (3)$$

Further, the following holds:

1. For large p , $\Delta(V) > 0$, and the high-hurdle contract is optimal. Thus, high-hurdle contracts are more likely, when assets exhibit higher success likelihood.
2. $\Delta(V)$ increases in ϕ and α . And, if θ is large, also increases in δ . Thus, a high-hurdle

²³Multiplicity may arise, because legacy LPs and the GP sign the initial contract, taking as given new investors’ anticipation about the contract signed and beliefs about the type of assets continued. Thus, it can be that, when new investors anticipate the low-hurdle (high-hurdle) contract, writing such contract becomes optimal.

contracts are more likely, when the severity of (i) inverse selection (captured by ϕ, α) or (ii) adverse selection (captured by δ) is large.

3. *$\Delta(V)$ increases in θ for small ϕ or small α . Thus, high-hurdle contracts are more likely when more legacy LPs roll their stake.*
4. *For large θ , $\Delta(V)$ increases in λ (while w_2 increases in λ). Thus, high-hurdle contracts are more likely when GP has a larger stake in the CV.*

The first point simply indicates that a higher asset success probability makes a high-hurdle equilibrium more likely. This suggests a passthrough between asset quality in the legacy fund to the CV. Not surprisingly, if assets in the legacy fund are more likely to succeed, this lowers the likelihood that the CV ends up with zombie assets. We emphasize this finding is obtained as comparative static in p . Later, in Section 5.1, we endogenize the asset quality in the CV, generating a more involved link.

Second, one might expect the high-hurdle equilibrium to be more likely when fewer legacy LPs roll, yet the opposite holds as the second point demonstrates. In the high-hurdle equilibrium, the high pooling price increases the temptation for the GP and legacy LPs to transfer unsuccessful assets; with fewer rolling LPs, this temptation intensifies, destabilizing the equilibrium and favoring the emergence of a low-hurdle equilibrium.

Next, the third point states that the high-hurdle equilibrium is more likely when the GP holds a larger stake in the CV. A higher GP stake strengthens the incentive to transfer H -type assets at undervalued prices, since doing so raises the value of the GP's carried interest stake in the CV. Consequently, a larger w_2 makes it more costly to incentivize exit of H -types in all states, reinforcing the emergence of the high-hurdle equilibrium, where such exits are not enforced.

Finally, the fourth point implies that when information asymmetries among participating LPs are more severe—whether through inverse or adverse selection—a high-hurdle equilibrium becomes more likely. A key result is that contractual structure in the high-hurdle equilibrium effectively mitigates such asymmetries between legacy and new LPs.

When inverse selection is severe (i.e., new investors are likely informed), the GP is strongly tempted to transfer H -type assets at undervalued prices. In such cases, it becomes prohibitively costly to incentivize the GP to always exit H -type assets within the legacy fund. The contract therefore allows the GP to continue H -type assets. Once continuation of H -types is permitted, the GP optimally chooses to exit L -type assets whenever at least one

success occurs, preventing adverse selection in those states. Reduced adverse selection raises the price V in the high-hurdle equilibrium, further limiting opportunities to transfer assets at the discount $V_H - V$ and mitigating inverse selection.

4 Analysis and Implications

4.1 Key Contract Features and Incentive Mechanisms

We point out features that arise in both types contract.

4.1.1 Carried Interest is Lower in CVs than in Primary Funds

The model predicts that compensation for the GP is “steeper,” more convex or option-like in legacy funds relative to continuation funds. In practical terms, this means the the carried interest rate is higher in legacy funds, compared to continuation funds. To illustrate this result, we measure the “steepness” of GP compensation, that is, the change in GP pay when fund cash flow increases by X dollars in the CV or in the legacy fund, focusing on the region where the respective fund is in the money. The steepness of compensation for the GP in the CV is then captured by w_2 , i.e., raising CV cash flow from 0 to X increases GP compensation by w_2 and thus by $\frac{w_2}{X}$ per unit of additional cash flow. For the legacy fund, it depends on the type of equilibrium prevailing.

1. **High-Hurdle Contract.** Under high-hurdle contract, raising cash flows from X to $2X$ increases GP payoff by $w^* = w_2 + \lambda + \Omega > w_2$.
2. **Low-Hurdle Contract.** Under low-hurdle contract, raising cash flows from X to $2X$ increases GP payoff by $w_H - w_L = w_2 + \Omega > w_2$. In addition, an increase of cash flows from 0 to X raises GP payoff by: $w_L = w_2 + \lambda + \Omega > w_2$.

Either way, the model predicts compensation to be steeper and more convex in the legacy fund, relative to continuation funds. In practice, this manifests itself in the observation that CVs typically feature lower carry rates than legacy funds. According to our analysis, this feature can be rationalized by the GP’s incentive to transfer high-quality assets at undervalued terms: The higher carry rate in the legacy fund is needed to discourage such crown-jewel transfers and to protect legacy LPs from being stripped off their best asserts.

4.1.2 Early-Crystallized, Reinvested Carry as Incentive Mechanism

Our model rationalizes the common practice that early-crystallized carry in a CV transaction is typically reinvested rather than distributed. In our framework, this feature arises endogenously and serves as an incentive mechanism for the GP. This mechanism operates under the low-hurdle contract. In that case, the payment structure satisfies $w_L > w_M$, ensuring that the GP has no incentive to raise a CV when one asset has succeeded and the other is unsuccessful. Conditional on a successful exit, the GP is therefore paid more if it does not raise a CV. If a CV is raised, part of the earned carry must be reinvested in the vehicle. Early-crystallized carry thus serves to implement $w_L > w_M$. The mechanics of this reinvestment transaction are as follows.

First, if the GP exits exactly one company successfully at $t = 1$, it receives total carried interest of $w_L = w_M + \lambda$. Suppose that when the GP raises a CV, λ dollars of carry are crystallized early—that is, paid to the GP at the time of CV formation. The remaining carry of w_M is realized only if the non-continued asset is successfully exited at $t = 1$. Second, the GP reinvests the early-crystallized carry λ in the CV by purchasing shares at the transfer price $v = V - I$ from legacy LPs and contributing I per share as capital. In total, the GP acquires $\frac{\lambda}{v}$ shares at valuation V (assuming $\frac{\lambda}{v} < 1 - \theta$ for simplicity).

Third, this equity investment of early-crystallized carry already provides the GP with effort incentives. Recognizing this effect, the CV contract can be adjusted by reducing the stake to \tilde{w}_2 (so as to maximize CV LP value). Thus, \tilde{w}_2 is the minimum carry stake such that the incentive constraint $p\tilde{w}_2 + \frac{\lambda}{v}p(X - \tilde{w}_2) \geq \lambda$ is satisfied, so that $\tilde{w}_2 = \frac{V\lambda}{p(V-\lambda)}$. Hence, the overall stake of the GP (i.e., the pay upon CV success) becomes $\frac{\lambda}{p}$.

Overall, the payment structure $w_L > w_M$ can be implemented by introducing early-crystallized carry that the GP coinvests in CV shares, while the GP’s carried interested is adjusted accordingly to meet the effort incentive constraint.

4.2 The Role of LP Liquidity Needs

We analyze the role of LP liquidity needs, captured by the parameter θ . Higher liquidity needs correspond to a lower θ , i.e., a larger share of CV shares is sold by exiting LPs to new LPs. The following Proposition studies the effect of θ on asset quality and payoffs.

Proposition 5 (LP Liquidity Needs). *The following holds:*

1. *Asset quality does not vary with θ in the high-hurdle contract but strictly increases with θ in the low-hurdle equilibrium when $\gamma \in (0, 1)$, remaining unchanged otherwise.*
2. *Legacy LP payoffs increase with θ , and GP payoff decreases with θ .*

Thus, CV asset quality generally declines with liquidity needs, i.e., increases in θ . Intuitively, when fewer legacy LPs exit, they have more skin-in-the-game in the CV and thus incentivize the GP not to transfer L -types; by contrast, strong liquidity needs create pressure for the GP to exit investments by rolling them into the CV.

In a low-hurdle equilibrium, higher θ helps prevent continuation of L -types and mitigates adverse selection. In a high-hurdle equilibrium, the effect of θ is zero, as θ has no impact on the GP's propensity to continue L -types. Combined with the finding from Proposition 4 that high-hurdle contracts — associated with higher quality CVs — become more likely for larger θ , the model implies that a higher rollover fraction θ is linked to higher asset quality.

We find that overall LP payoffs increase with θ , while GP payoffs decline with θ . In particular, the GP benefits from having fewer LPs roll their stakes. The reason is that the GP can exploit its intermediary position between selling LPs and buying LPs, especially when more LPs sell and do not roll. For instance, the GP can transfer high-quality assets at undervalued terms to new LPs, while extracting some rents via a side-deal. These rents are larger, when θ is lower. In contrast, higher θ reduces the role of the GP as intermediary between buying and selling LPs, and thus also the extent to which the GP can exploit it, resulting in higher legacy LP payoffs and lower GP rents.

4.2.1 When Do (and Should) LPs Roll their Stakes?

For simplicity, we have taken θ as an exogenous parameter in our baseline. This assumption reflects that the rolling decision is mostly constrained by liquidity needs or institutional constraints. Nonetheless, it is intriguing to examine whether, if given the choice, legacy LPs are better off rolling or exiting.

Proposition 6. *An individual legacy LP's payoff from rolling their stake equals:*

$$R := \mathbb{E}[(X - w_2)\mathbb{I}\{CV \text{ cash flow is } X\} \mid \text{Legacy LPs}] - V.$$

where the first part is legacy LP's valuation of CV shares (gross of capital call) and V is the valuation at which the transfer occurs. The following holds:

1. **High-Hurdle Contract.** Legacy LPs are strictly better off rolling, $R > 0$.

2. **Low-Hurdle Contract.** Legacy LPs are indifferent between rolling or not, $R = 0$.

To understand R , note that when an LP rolls it gains CV share that pays $X - w_2$ at $t = 2$ if successful, but must contribute I dollars of capital call to the CV. When exiting, the LP is paid the transfer price $v = V - I$. Overall, the capital call drops out, and the net payoff from rolling relative to exiting is captured by R .

Notably, above Proposition reveals that legacy LPs are strictly better off rolling into the CV in the high-hurdle contract case. To understand this finding, recall that, under the high-hurdle contract, the GP occasionally transfers H -type assets to informed investors at undervalued terms. The valuation is set by uninformed investors' bid in the price auction (i.e., $V = V_U$). Crucially, uninformed investors realize that, due the presence of specialists who "cherry-pick" assets, they are allocated worse assets. Indeed, they are (sometimes) excluded from the best deals, facing a winner's curse or adverse selection in the types of assets offered. This winner's curse does not apply to legacy LPs, who cannot be excluded by the GP. As a result, legacy LPs apply a higher valuation for CV shares than the marginal new investors, making rolling at the equilibrium valuation V_U strictly optimal. Crucially, the winner's curse and adverse selection are more pronounced, when higher quality and, specifically, H -types are transferred, raising the scope for strategic undervaluation is larger.

In contrast, with a low-hurdle contract, only M - and L -types are transferred, which reduces the scope for strategic undervaluation and the winner's curse for new investors. As we show, in the low-hurdle contract case, legacy LPs and new investors therefore value CV assets the same, making legacy LPs indifferent between rolling or not.²⁴

To summarize, the model suggests that, absent liquidity considerations or institutional constraints, rolling into the CV is optimal for legacy LPs, as the GP may transfer companies at undervalued terms to select buyers, especially when CV assets are of higher quality. This effect induces a winner's curse for secondary buyers, reducing the deal's valuation to the extent that rolling becomes more attractive than exiting for legacy LPs at that valuation.

²⁴Admittedly, this outcome is also driven by our specific information structure, where specialists can only observe whether the asset is H -type. In Section 5.3, we allow specialists to observe the state of the asset (L, M, H), showing that the winner's curse re-appears (yet is weaker than in the high-hurdle case). Indeed, the GP may then allocate preferentially the M -types to specialists, creating scope for undervaluation even in the low-hurdle case.

4.2.2 Endogenous Rolling Decision

With these insights in hand, one could endogenize the rollover decision of legacy LPs. In this Section, we do so by focusing separately on the high- and low-hurdle cases; we do not endogenize the choice between these two contracts here.²⁵

To this end, we have a unit mass of ex-ante identical legacy LPs (indexed by $i \in [0, 1]$), each holding an equal fraction of legacy fund ownership. Suppose fraction ξ of legacy LPs, i.e., those indexed $i \in [0, \xi]$, are unconstrained. LPs roll their shares, if indifferent between rolling and exiting, and are atomistic, i.e., they do not take into account any strategic considerations (for instance, that their rolling decision could send a signal). They are also ex-ante identical, i.e., at $t = 0$, they do not anticipate their future liquidity need, for simplicity.

LPs indexed $i \in [\xi, 1]$ are constrained, in that they discount time-2 payoffs at a discount factor $1 - \rho \in [0, 1]$, where ρ is uniformly distributed on $[0, \bar{\rho}]$ and captures a given LP's liquidity need. LPs indexed $i \in [0, \xi]$ do not discount (i.e., their discount factor is one). Hence, if interior, the marginal LP's liquidity need $\hat{\rho}$, who rolls their stake, satisfies:

$$(1 - \hat{\rho})\mathbb{E}[(X - w_2)\mathbb{I}\{\text{CV cash flow is } X\} \mid \text{Legacy LPs}] = V, \quad (4)$$

where the left-hand-side captures the (gross) payoff when rolling (discounted at factor $1 - \hat{\rho}$ as it occurs at time $t = 2$), and the right-hand-side captures the (gross) payoff from exiting at valuation V . Notice that the capital call I drops out: When exiting, the LP is paid $V - I$; when rolling, it realizes time-2 cash flow but must contribute I dollars at time $t = 1$.

Then, the fraction of legacy LPs rolling is determined according to:

$$\theta = \min \left\{ \xi + \frac{(1 - \xi)\hat{\rho}}{\bar{\rho}}, 1 \right\}, \quad (5)$$

with $\hat{\rho}$ solving (4). As a result, endogenizing rollover decision would then pin down θ via (4) and (5), while leaving all the other model elements unchanged.²⁶

The following Corollary shows that, when endogenizing the rolling decision, the high-

²⁵Endogenizing both the choice between high- and low-hurdle contracts and the rolling decision would come with additional complications, as the rolling decision of legacy LPs might reveal information about the legacy fund contract. This would become relevant upon deviation, where the actual legacy fund contract differs from the one anticipated by new LPs.

²⁶That is, the structures of low- and high-hurdle contracts, as well as the associated continuation decisions, would remain the same, except that γ (propensity to continue L -types in low-hurdle case) would change due to its dependence on θ . Moreover, payments to the GP would depend on the endogenous rollover decision only via the expected side deal rent, Ω .

hurdle equilibrium features a higher rollover rate than the low-hurdle equilibrium.

Corollary 1 (LPs’ Decision to Roll). *Suppose that θ is determined according to (4) and (5). In the low-hurdle contract, we have $\theta = \xi$. In the high-hurdle contract, we have $\theta > \xi$ (when $\phi > 0$). Thus, more LPs roll under the optimal high-hurdle than low-hurdle contract.*

The Corollary’s result mirrors our previous result from Proposition 6 that rolling in the high-hurdle case becomes more profitable relative to exit, due to the GP’s incentives to strategically undervalue assets.

4.3 Multi-Asset Continuation Vehicles

The baseline assumed that at most one asset can be continued in a CV from $t = 1$ to $t = 2$, in line with observed practice that many CVs contain a single asset and are almost always smaller than the legacy funds. We now relax this assumption, and allow the GP to continue two assets in the CV, giving rise to single-asset and multi-asset (two-asset) CVs. We sketch the solution here, with details being deferred to Appendix I-A.

In case of a single-asset CV, the CV contract is as in the baseline, characterized by GP stake $w_2 = \frac{\lambda}{p}$ (paid when CV cash flow is X) — which provides effort incentives while minimizing GP rent (for M -types). We focus on analogous CV contracts for two-asset CVs, namely, the “cheapest” contracts for LPs that (always) induce GP effort, even if the LPs do not know the assets’ types. The resulting CV-contract pays the GP w_2 when the CV produces cash flow X , and $2w_2$ when it produces cash flow $2X$.²⁷

The next Proposition (proven in Appendix I-A) summarizes the equilibrium.

Proposition 7 (Two-Asset CVs). *There exists a unique equilibrium with a low-hurdle contract, whereby the GP never continues an H -type asset. Further:*

1. *In states (L, L) , (M, L) , and (M, M) , the GP raises a two-asset CV continuing both assets at valuation V_2 . The GP receives zero payment in the legacy fund.*
2. *In state (H, M) , the GP continues the M -type and exits the H -type: the GP raises a single-asset CV at valuation V_1 and is paid w_M in legacy fund. In state (H, L) , the GP*

²⁷In states (M, L) , (M, M) , the GP receives no legacy fund payment and continues both assets (receiving the same CV contract). To incentivize effort in (M, L) -CVs, the GP must be paid w_2 for cash flow X . To incentivize effort in (M, M) -CVs, the GP must, additionally, be paid $2w_2$ for cash flow $2X$. Thus, the above payment structure is the only one (and cheapest one) that induces GP effort for all two-asset continuations, when LPs do not know the types but attach positive probabilities to states (M, L) , (M, M) . Only paying the GP for double-success (CV asset cash flow is $2X$) could not induce effort for an (M, L) CV.

exits the H -type and continues L -type with probability γ , raising a single-asset CV and being paid w_M . Otherwise, with probability $1 - \gamma$, the GP exits both assets, raises no CV, and is paid w_L . In state (H, H) , the GP exits both assets and is paid w_H , with:

$$\begin{aligned} w_M &= w_2 + \Omega_2 + \lambda; & w_L &= w_2 + \Omega_2 + 2\lambda, \\ w_H &= 2w_2 + 2\lambda + 2\Omega_2, & \text{where } \Omega_2 &= \phi\alpha(1 - \theta)(X - w_2)[1 - (1 - \delta)p]. \end{aligned} \tag{6}$$

When the GP can continue both assets, there is only one type of equilibrium, namely, one in which no H -type is continued and CV assets are either L - or M -type. This finding suggests that a limitation on the number of assets that can be transferred to a CV — for instance, arising from industry norms, market discipline, or from resistance by LPs — can provide the GP with incentives to raise higher-quality CVs. Crown-jewel funds, containing H -types, do not arise when multiple assets can be continued. However, in this case, CVs focus on assets with higher growth potential.

A related implication is that multi-asset CVs contain lower-quality assets. Indeed, in this model variant, single-asset CVs are of higher quality than multi-asset CVs. The transfer price of a single-asset CV, V_1 , exceeds the transfer price of the multi-asset CV, scaled by the number of assets, i.e., $\frac{V_2}{2}$, as shown in the following Corollary.

Corollary 2. *The following holds:*

1. *Single asset-CVs are raised when the legacy fund is in the money (i.e., at least one asset succeeds by time $t = 1$), while multi-asset CVs are raised when the legacy fund is out of the money (i.e., no asset succeeds by time $t = 1$).*
2. *Single-asset CVs have higher average quality than multi-asset CVs, in that $V_1 > \frac{V_2}{2}$.*

4.4 GP Coinvestment in Continuation Vehicle

We extend the model to allow for GP coinvestment in CV shares (see Appendix I-B.1 for details). While introducing novel features, the possibility of coinvestment leaves our key findings largely similar. Consider the GP has A dollars available at CV formation, which it coinvests in CV shares at CV formation (in addition, to an equity stake, the GP still gets the carried interest stake $w_2 = \frac{\lambda}{p}$ in the CV). The capital A represents the GP's own capital,

independent of any distributions from the legacy fund.²⁸

When transfers occur at valuation V , the GP can acquire $\theta_{GP} = \frac{A}{V}$ shares. Indeed, the GP buys θ_{GP} shares from legacy LPs at transfer price $V - I$ and then contributes per-share I dollars to the CV, thereby paying a total of V dollars per share bought. For simplicity, we assume $1 - \theta > \theta_{GP}$. That is, coinvestment is not too large or legacy liquidity needs are sufficiently large, so that there is need to bring in new LPs at CV formation (consistent with reality). Hence, the GP buys from exiting legacy LPs. Moreover, we break ties in favor of not continuing L -types in state (L, L) where GP payments are zero in case of indifference. The following Proposition (proven in Appendix I-B.1) characterizes the optimal high- and low-hurdle contracts with coinvestment (most features remain similar to baseline).

Proposition 8 (GP Coinvestment). *In state (L, L) , an L -type asset is continued, if $\lambda > A$ (otherwise no asset). In states (M, L) , (M, M) , an M -type is continued. All transfers occur at valuation $V = V_U$, and the GP acquires fraction $\theta_{GP} = \frac{A}{V}$ of CV shares. Further, the legacy fund contract takes one of two forms:*

1. **High-Hurdle Contract.** *The GP continues an H -type asset in states (H, L) and (H, M) , and extracts rents from a side with new LPs (with probability ϕ) of $\alpha(1 - \theta)(V_H - V)$. The GP is paid if and only if the fund generates cash flow $2X$, with:*

$$w^* = w_2 + \lambda + \Omega, \quad \text{for } \Omega \equiv [\phi\alpha(1 - \theta) + (1 - \phi\alpha)\theta_{GP}](V_H - V).$$

2. **Low-Hurdle Contract.** *In state (H, L) , the GP continues an L -type asset with endogenous probability γ , which decreases in θ and in A . The GP never continues an H -type asset. In state (H, M) , the GP is paid w_M . In state (H, L) , the GP is paid w_L when not continuing, while paid w_M when continuing, with:*

$$\begin{aligned} w_M &= w_2 + A + \Omega - \theta_{GP}pV_H\mathbb{I}\{\gamma = 0\}, & w_L &= w_2 + \lambda + \Omega, \\ w_H &= w_M + \lambda + w_2 + \Omega, & \text{for } \Omega &\equiv [\phi\alpha(1 - \theta) + (1 - \phi\alpha)\theta_{GP}](V_H - V). \end{aligned}$$

A key take-away is that GP coinvestment presents a double-edged sword: it discourages low-quality CVs, improving CV asset quality and mitigating adverse selection, but creates

²⁸We assume that the capital endowment at CV formation is exogenous and that the GP always coinvests the full amount. We abstract from signaling considerations. In our context, signaling would be subject to non-trivial trade-offs: Unlike in standard settings, the GP, in fact, has incentives to bring down the valuation, rather than to boost it.

a temptation for the GP to transfer high-quality at undervalued terms, worsening inverse selection. On the one hand, coinvestment gives the GP skin-in-the-game in the CV. This mechanism may prevent the continuation of L -types. In particular, in state (L, L) , the GP refrains from continuing an L -type if and only if $A \geq \lambda$. In a low-hurdle contract, the propensity to continue an L -type likewise declines with coinvestment A . On the other hand, coinvestment creates incentives for the GP to transfer assets at undervalued terms, so as to be able to coinvest at favorable terms. Similar to forming side deals with specialists, coinvestment increases the GP's rent from undervaluing assets, Ω .

Early-Crystallized, Reinvested Carry. We earlier discussed how to implement the low-hurdle contract — and, specifically, the payment $w_L > w_M$ — with early-crystallized carry that is reinvested. In doing so, we assumed that reinvestment results in an equity stake, yet the carried interest stake is adjusted to meet the incentive constraint for effort, in a way that the GP's total stake in the CV remains unchanged (at a level that leads to payout of $\frac{\lambda}{p}$ in case of success). One could easily accommodate that reinvestment occurs according to the protocol from this Section, where the carry stake w_2 is taken as given and not adjusted. To do that, the GP would buy $\theta_{GP} = \frac{A+w_L-w_M}{V}$ shares of the CV (instead of $\frac{A}{V}$), provided $w_L > w_M$. The analysis would go through with using this updated expression for θ_{GP} . The determination of the optimal payment would then require solving a fixed point problem, as payments w_M, w_L depend on Ω and θ_{GP} , while θ_{GP} depends on $w_L - w_M$. This would add some complications, yet not significantly alter the economic forces.

5 Other Results and Extensions

5.1 Initial Screening Effort and Endogenous Legacy Fund Quality

We introduce initial time-0 effort, corresponding to screening or selection portfolio assets at $t = 0$, as, e.g., in [Vanasco \(2017\)](#). This way, we endogenize the quality of assets in the legacy fund and as such their likelihood to succeed by time $t = 1$. Following [Vanasco \(2017\)](#), we consider continuous effort e_0 against a convex, private cost for the GP. We deliberately model continuous effort, instead of binary effort, at time $t = 0$ to allow for some margin of adjustments, allowing us to examine how the option to raise CVs affects the initial screening and selection of legacy fund portfolio companies. One could model analogously binary effort, which would be analogous to time-1, but would not yield additional predictions and insights.

We model effort as follows.

1. The GP exerts hidden (unobserved to LPs) effort $e_0 \in [0, 1)$ against quadratic cost $\frac{\kappa e_0^2}{2}$, where $\kappa > 0$ is large enough to ensure $e_0 < 1$ in optimum.
2. Given effort e_0 , any company succeeds and becomes H -type by time $t = 1$ with i.i.d. probability e_0 . With probability $1 - e_0$, a company is not successful by $t = 1$, in which case it becomes L -type (unsuccessful) with probability δ and, otherwise with probability $1 - \delta$, becomes M -type (high-potential).
3. In case of continuation, the model from $t = 1$ to $t = 2$ becomes identical to the baseline, conditional on the state of the continued company. Specifically, continuation costs $I > 0$; an L -type or H -type continuation yield cash flows of zero and X with certainty, respectively. When an M -type is continued, the GP exerts binary effort $e_1 \in \{0, 1\}$ at $t = 1$, where not providing effort yields private benefits λ . An M -type asset succeeds with probability pe_1 by time $t = 2$. The CV contract pays the GP $w_2 = \frac{\lambda}{p}$ in case the CV asset succeeds at time $t = 2$, and zero otherwise.

Crucially, our modeling makes a few simplifying assumptions. First, the same effort applies to both assets, which has no bearings on our findings. Second, initial effort e_0 affects the continuation stage and CV formation only by influencing the likelihood of success, and thus by influencing the probabilities with which individual states $S = (s_A, s_B)$ realize and thus the beliefs of new LPs. However, conditional on the state S , the continuation technology remains unchanged. The solution to the model with initial effort is concisely summarized in the following Proposition (proven in Appendix I-B.2).

Proposition 9 (Endogenous Asset Quality). *The legacy fund contract has either a high hurdle (“hh”) or low hurdle (“lh”). Continuation decisions and CV formation remain unchanged, conditional on the time-1 realized state $S = (s_A, s_B)$. The legacy LP value is $\Pi_i^{LP}(e_0)$ and GP payoff (gross of effort cost) is $\Pi_i^{GP}(e_0)$, for $i \in \{lh, hh\}$. Effort solves the incentive condition $\frac{\partial \Pi_i^{GP}(e_0)}{\partial e_0} = \kappa e_0$. Further:*

1. **High-Hurdle Contract.** *The GP is paid only in state (H, H) upon successfully exiting both assets, with the payment satisfying $w^* \geq w_{Min}^* := w_2 + \lambda + \phi\Omega$. Effort $e_0 = e_{hh}$ satisfies $e_{hh} \geq e_{hh}^{Min}$ with $e_{hh} > e_{hh}^{Min}$ if and only if $w^* > w_{Min}^*$, and*

$$e_{hh}^{Min} = \frac{2(\Omega + w_2)}{\kappa + 2(\Omega + w_2)}.$$

2. **Low-Hurdle Contract.** In state (H, M) , the GP is paid $w_M = w_2 + \Omega$. In state (H, L) , the GP is paid $w_L = w_M + \lambda$ when not continuing, while paid w_M when continuing. In state (H, H) , the GP is paid w_H , with $w_H \geq w_{H,Min} := w_M + \lambda + w_2 + \Omega$. Effort $e_0 = e_{lh}$ satisfies $e_{lh} \geq e_{lh}^{Min}$ with $e_{lh} > e_{lh}^{Min}$ if and only if $w_H > w_{H,Min}$, and:

$$e_{lh}^{Min} = \frac{2(\Omega + w_2)}{\kappa}.$$

The idea behind above Proposition is the following. When endogenizing asset quality, legacy LPs deal with an additional, initial moral hazard problem, in addition to the agency conflicts brought by the GP's ability to transfer select assets to a CV.

Since the model, after initial effort, remains basically unchanged relative to the baseline, the *same* incentive constraints apply in either equilibrium, in order to ensure the GP follows the prescribed continuation strategy. The agency conflicts associated with continuation already give the GP some stake in the legacy fund, and thus some incentives to exert effort.

If the contract provides the cheapest incentives for continuation — that is, it takes the structure of the baseline contracts with $w^* = w_{Min}^*$ (high-hurdle equilibrium) and $w_H = w_{H,Min}$ (G equilibrium) — it induces effort levels e_{Min}^{hh} and e_{Min}^{lh} respectively. If legacy LPs would like to incentivize higher effort than that, they optimally adjust incentives via the payment the GP receives for successfully exiting both assets. A higher level of effort is then achieved by raising w^* or w_H above w_{Min}^* and $w_{H,Min}$, respectively.

It is then interesting to see what type of equilibrium leads to higher efforts and how these efforts compare to a setting in which no continuation fund can be raised, i.e., when the model ends at $t = 1$. In this very simple benchmark, we have a single-period agency problem over effort, with incentives provided by paying the agent upon (double) success. The following Proposition (proven in Appendix I-B.2) summarizes the main insights.

Proposition 10 (Optimal Screening Efforts). *The following holds:*

1. Without the option to raise a continuation fund, effort equals $e_{NC} = \frac{2X}{\kappa}$. We have $e_{lh}^{Min}, e_{hh}^{Min} < e_{NC}$.
2. A low-hurdle equilibrium generally leads to higher screening effort, in that $e_{lh}^{Min} > e_{hh}^{Min}$.

Above Proposition exploits the minimum effort level in either equilibrium. We numerically illustrate in Figure 2 that these patterns hold more generally and for efforts that may

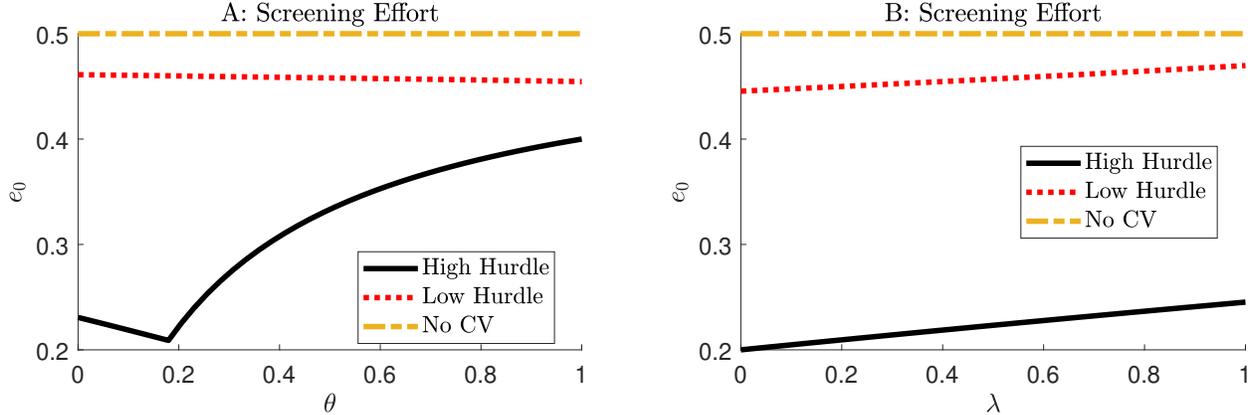


Figure 2: **Numerical Example with** $p = 0.5$, $X = 5$, $I = 2$, $\lambda = 1$, $\delta = 0$, $\phi = 0$, $\kappa = 40$.

exceed the lower bound. The model yields intriguing predictions, which we illustrate by comparing hypothetical effort levels across equilibria.

First, the option to raise a CV leads to lower screening efforts and thus lower legacy fund asset quality. Intuitively, a strict deadline at $t = 1$ provides incentives to the GP to exert effort to achieve success. The option to raise a CV weakens these incentives by softening the deadline, i.e., by allowing continuation of one asset. As a result, the GP generally ends up with lower incentives to select high-quality assets into the CV.

Second, the GP has stronger incentives to exert effort in a low-hurdle equilibrium, relative to a high-hurdle equilibrium. This difference arises from the GP’s incentives and compensation structure. A high-hurdle equilibrium occurs when the GP’s legacy fund compensation is relatively low and becomes in the money only upon double success, i.e., the GP faces a high hurdle to earn carry. In contrast, in a low-hurdle equilibrium, the GP receives higher compensation that is more frequently in the money and faces a lower hurdle. The relatively high level of compensation in low-hurdle equilibrium — which materializes if at least one company succeeds by time $t = 1$ — strengthens incentives to exert effort. These findings suggest a nuanced link between legacy fund and CV asset quality: higher CV quality in equilibrium is associated with lower GP payoff, which weakens screening incentives and reduces the quality of assets in the legacy fund.

Third, in a high-hurdle equilibrium, the legacy LPs incentives to implement high effort by raising GP compensation are weakened too, because successful assets are often transferred to a CV. Thus, implementing high effort is costly for legacy LPs as it requires to raise GP compensation, but the gains are shared with CV investors.

Figure 2 numerically illustrates these findings. Panels A and B of Figure 2 plot screening efforts e_0 in the high-hurdle equilibrium (solid black line), low-hurdle equilibrium (dotted red line), and the no CV benchmark (dashed yellow line) against θ and λ . Across all configurations, we see that the effort in high-hurdle equilibrium lies below the effort in low-hurdle equilibrium, which, in turn, falls short of the effort in the no CV benchmark.

5.2 Initial Investment

We now model the time-0 investment. Suppose the GP is endowed at $t = 0$ with capital A_0 and raises $I_0 - A_0$ dollars to invest I_0 at time 0. Cash flows, asset size (including interim capital needs and private benefits/cost of effort), and private benefits scale with initial investment, I_0 . That is, the asset parameters satisfy $X = xI_0$, $I = \iota I_0$, $\lambda := \Lambda I_0$, where x, ι, Λ are positive parameters. Holding I_0 fixed, the model becomes akin to the baseline. That is, the same contract and equilibrium structure applies, when contracts are chosen to maximize LP value.

We next demonstrate that, with endogenous time-0 investment and the GP choosing the legacy fund contract, the GP maximizes financing scale and thus the pledgeable income and external financing capacity, which boils down to designing the contract that maximizes LP value, thus micro-founding our initial assumption.

Coming back to the model with flexible financing scale, present value of the legacy fund can be written as $PV = vI_0$, the legacy LPs' payoff can be written $\Pi_{LP} = \pi_{LP}I_0$, and the GP's payoff can be written as $\Pi_{GP} = \pi_{GP}I_0$. Note that total fund value (scaled by I_0) satisfies $v = \pi_{LP} + \pi_{GP}$. The GP can raise maximally $I_0 - A_0 \leq \Pi_{LP}$ dollars from legacy LPs, subject to them breaking even. We assume $v > 1$ — that is, financing at any scale has positive NPV — and $\pi_{LP} < 1 \iff \Pi_{LP} < I_0$, that is, financing is not feasible without coinvestment.

Appendix I-B.3 proves the following Proposition.

Proposition 11 (Investment Scale). *If the GP chooses the contract to maximize its own payoff, legacy LPs break even with $\Pi_{LP} = I_0 - A_0$ and, given I_0 , the legacy fund contract maximizes pledgeable income (legacy fund payoff) Π_{LP} .*

5.3 Alternative Information Structure

Our baseline assumed that, with probability ϕ , the GP meets new investors who can recognize the time-1 value of the transferred project (i.e., X or 0), but not the state $s \in \{L, M, H\}$. We now solve the model when informed specialist investors can recognize the full state, showing that our key findings remain unchanged. The details are presented in Appendix I-B.4.

Crucially, as we show, the findings do not materially change for the high-hurdle contract, i.e., the optimal high-hurdle contract remains unchanged and Proposition 1 also applies under the altered information structure. The low-hurdle contract changes, and is described in the following Proposition:

Proposition 12 (Low-Hurdle Contract). *The GP continues an M-type asset in states (M, L) , (M, M) , and (H, M) . The GP continues an L-type in state (L, L) . In state (H, L) , the GP continues an L-type, exiting the H-type. The GP never continues an H-type. Let V_U non-specialist LPs' equilibrium valuation, satisfying $V_U < V_M := p(X - w_2)$. Then:*

1. *When an L-type is continued, CV shares are always sold to non-specialist LPs at valuation $V = V_U$. In states (M, L) , (M, M) , the M-type is continued and CV shares are sold to non-specialist LPs at $V = V_U$. In state (H, M) , the M-type is continued and CV shares are sold to informed LPs at $V = V_M$, if the GP finds them (with probability ϕ); otherwise, with probability $1 - \phi$, CV shares are sold to non-specialist LPs at $V = V_U$.*
2. *In state (H, H) , when legacy fund cash flow equals $2X$, the GP is paid w_H . In state (H, M) , the GP is paid w_M^- (if transfer occurs at valuation $V = V_U$) and it is paid w_M^+ (if transfer occurs at valuation $V = V_M$). In state (H, L) , the GP is paid w_L when exiting both assets (and legacy fund cash flow equals X), while paid w_M when continuing the L-type (exiting the H-type), with:*

$$\begin{aligned} w_L &= \lambda + w_2 + \Omega; & \Omega &:= \phi\alpha(1 - \theta)(V_H - V_U); \\ w_M^- &= w_2 + \Omega; & w_M^+ &= w_2 + \Omega + \alpha(1 - \theta)(V_M - V_U); \\ w_H &= w_2 + \lambda + w_M^- + \Omega. \end{aligned}$$

By and large, the findings — especially the continuation decision and the broader payment structure — remain similar to those obtained under the baseline information structure. However, a few additional implications arise.

Notably, M -type transfers may occur at two different valuations. In state (H, M) , the GP may sell CV shares to specialists at valuation V_M or, if unable to find informed LPs, at valuation $V = V_U$ to non-specialist ones. Crucially, the payout in this state is contingent on the valuation, with the GP earning a “bonus” for transferring assets at high valuation. This bonus, $w_M^+ - w_M^- = \alpha(1 - \theta)(V_M - V_U)$, puts the GP indifferent between transferring the assets at a discount to specialists and extracting side rents, or transferring them at specialists full willingness to pay, $V_M = p(X - w_2)$.

5.4 Single-Asset Legacy Fund

This Section considers the model with a single-asset legacy fund which can be continued in a CV. All other elements remain analogous to the baseline. Given that, there are three possible states at time $t = 1$, corresponding to the company’s state: L , M , and H . The following Proposition (proven in Appendix I-B.5) summarizes the unique equilibrium.

Proposition 13 (Single-Asset Setting). *In states L (M), the GP continues an L -type (M -type), receiving no legacy fund payment. In state H , the GP exits the asset, being paid*

$$w_1 = w_2 + \lambda + \Omega, \quad \text{where} \quad \Omega = \phi\alpha(1 - \theta)[1 - (1 - \delta)p](X - w_2). \quad (7)$$

With a single asset, the equilibrium features continuation of M -types, and exit of H -types, while L -types are continued if and only if $\lambda > A$. The outcome that H -types are never continued mirrors that of Section 4.3 and Proposition 7, and is driven by the fact that the GP may continue all legacy fund assets in the CV. Put differently, it is precisely the restriction that a CV needs to be smaller than the legacy fund, which leads to H -type continuations and crown-jewel funds in equilibrium.

The model with one asset also highlights what additional key insights arise in the two-asset baseline model, as we discuss below in greater detail:

1. Performance on one asset affects the continuation decision for the other. For instance, the model can capture whether other assets are in or out of the money, and how this affects the continuation decision for the asset in question. This is key for the empirical predictions that link a fund’s moneyness to asset quality and equilibrium outcomes.
2. With only one asset, there is no notion of being in or out of the money—when an asset is continued, the GP always receives zero compensation in the legacy fund. This

setting cannot capture how carry earned on other deals can incentivize the GP not to continue unsuccessful assets.

3. With one asset, contracts simplify and cannot capture the optionality and convex structure of GP compensation, which often requires multiple successes (high returns) before the GP is paid. In particular, one cannot distinguish between fund- and deal-level compensation.
4. A single-asset setting cannot capture that CVs are smaller than legacy funds, which matters for the strategy space: raising a CV becomes a valuable option, and the continuation decision must account for the opportunity cost of losing this option.
5. In the single-asset model, the phenomenon of crown-jewel funds does not arise. This requires the CV to be strictly smaller than the legacy fund.

6 Conclusion

We develop a theory of private equity continuation vehicles (CVs), modeling them as an embedded option available to the general partner (GP) over a fund's life. The framework combines moral hazard with two information asymmetries—adverse and inverse selection—to capture the GP's dual role as seller for the legacy fund and buyer for the CV. Continuation can create value by extending the horizon of high-potential assets but also generates inefficiencies when low-quality assets are rolled forward or successful ones are retained. Because the GP acts as both buyer and seller, CV formation faces two informational frictions that worsen when fewer legacy limited partners (LPs) roll over their stakes: adverse selection, where new LPs overpay for low-quality assets, and inverse selection, where the GP underprices high-quality assets and legacy LPs sell too cheaply.

We show that coinvestment and carried interest can either mitigate or amplify these conflicts, depending on whether the GP's carry is in or out of the money and its relative size across funds. Moderate coinvestment aligns incentives, whereas excessive coinvestment can backfire by encouraging the GP to transfer successful assets at undervalued prices. High legacy-fund compensation that is in the money can reduce CV asset quality, while greater carried interest in the CV can improve it. Finally, endogenizing legacy-fund asset quality shows that the option to raise a CV weakens the GP's screening incentives, ultimately lowering the quality of underlying assets.

By embedding CVs in a contracting framework, we clarify when they create value and when they merely redistribute it. The central message is that CVs are neither inherently value-enhancing nor purely rent-extractive: their efficiency depends on contract design, incentive alignment, and market conditions. The challenge for practitioners and policymakers is to preserve value creation while limiting rent extraction.

References

- Abuzov, R., W. Gornall, S. Shive, I. Strebulaev, and M. S. Weisbach (2025). Selling to yourself: Continuation vehicles in private equity. *Working Paper*.
- Albuquerque, R. A. and A. Zawadowski (2025). Private credit: Risks and benefits of a maturity wall. *Available at SSRN 5189740*.
- Axelson, U., P. Strömberg, and M. S. Weisbach (2009). Why are buyouts levered? the financial structure of private equity funds. *The Journal of finance* 64(4), 1549–1582.
- Casamatta, C. (2003). Financing and advising: optimal financial contracts with venture capitalists. *The journal of finance* 58(5), 2059–2085.
- Donaldson, J. R., G. Piacentino, and A. Thakor (2021). Intermediation variety. *The Journal of Finance* 76(6), 3103–3152.
- Ewens, M., A. Gorbenko, and A. Korteweg (2022). Venture capital contracts. *Journal of Financial Economics* 143(1), 131–158.
- Gryglewicz, S. and S. Mayer (2023). Dynamic contracting with intermediation: Operational, governance, and financial engineering. *The Journal of Finance* 78(5), 2779–2836.
- Hochberg, Y. V., A. Ljungqvist, and A. Vissing-Jørgensen (2014). Informational holdup and performance persistence in venture capital. *The Review of Financial Studies* 27(1), 102–152.
- Holmstrom, B. and J. Tirole (1997). Financial intermediation, loanable funds, and the real sector. *the Quarterly Journal of economics* 112(3), 663–691.
- Holmström, B. and J. Tirole (1997). Financial intermediation, loanable funds, and the real sector. *The Quarterly Journal of Economics* 112, 663–691.
- Ivashina, V. and J. Lerner (2019). *Patient capital: The challenges and promises of long-term investing*. Princeton University Press.
- Kastiel, K. and Y. Nili (2023). The rise of private equity continuation funds. *U. Pa. L. Rev.* 172, 1601.
- Lazard (2025). Secondary market report 2024.

- Luepertz, L., P. Roosenboom, and M. Verbeek (2025). From exit to extension: The rise of continuation vehicles in private equity. Rotterdam School of Management, Erasmus University, working paper.
- Malenko, A. and N. Malenko (2015). A theory of lbo activity based on repeated debt-equity conflicts. *Journal of Financial Economics* 117(3), 607–627.
- Maurin, V., D. T. Robinson, and P. Strömberg (2023). A theory of liquidity in private equity. *Management science* 69(10), 5740–5771.
- Mayer, S. (2022). Financing breakthroughs under failure risk. *Journal of Financial Economics* 144(3), 807–848.
- Nadauld, T. D., B. A. Sensoy, K. Vorkink, and M. S. Weisbach (2019). The liquidity cost of private equity investments: Evidence from secondary market transactions. *Journal of Financial Economics* 132(3), 158–181.
- Persaud, A. (2024). GP-led secondaries: Reshaping the landscape. Industry report, Ropes & Gray.
- Schmidt, K. M. (2003). Convertible securities and venture capital finance. *The Journal of Finance* 58(3), 1139–1166.
- Vanasco, V. (2017). The downside of asset screening for market liquidity. *The Journal of Finance* 72(5), 1937–1982.

Appendix

A Formal Setup and Equilibrium Definition

Types perfectly describe assets' underlying quality. In other words, asset numbering does not matter — asset A and B of the same type are equivalent. Consequently, the relevant state space at time $t = 1$ before CV formation can be summarized by the set \mathcal{S} , with

$$\mathcal{S} := \{(L, L), (M, L), (H, L), (M, M), (H, M), (H, H)\}.$$

At time $t = 1$, the state $S \in \mathcal{S}$ realizes. The GP privately observes S . Let \mathcal{X} denote the realized cash flow of the legacy fund, and let \mathcal{X}_{CV} denote the realized cash flow of the CV.

Further, denote by V the all-in price (“valuation”) at which an asset is transferred, where $V \equiv v + I$ and v is the transfer price that exiting LPs are paid for their shares. For convenience, we work throughout the Appendix with the valuation or the all-in price, V , instead of transfer price, v . This is without loss of generality, as one price is a simple transformation of the other. We also state auction bids in all-in prices.

Contracts. The CV contract is denoted w_2 and specifies continuation fund payments when the CV produces cash flow X and zero otherwise. It is parameterized by the fixed stake $w_2 = \frac{\lambda}{p}$ — see Internet Appendix I-C.1 for a micro-foundation. This stake is such that the GP always exerts effort ($e_1 = 1$) for M -type continuations; in contrast, the GP never exerts effort and thus derives private benefits λ for L - and H -type continuations.

The legacy fund contract — signed between initial, legacy LPs and the GP — is a tuple $\mathcal{C} = (W, \Gamma)$, stipulating payments to the GP, W , and a continuation strategy, Γ , where:

- $\Gamma = \Gamma(S)$ is the continuation strategy, mapping each state $S \in \mathcal{S}$ to $\{L, M, H, \emptyset\}$, indicating which asset type—if any—is continued (potentially with randomization). Here, $\Gamma(S) = \emptyset$ indicates no continuation. Note that $\Gamma(S)$ also pins down which assets are exited, as any asset that is not continued is exited by default. Naturally, if $\Gamma(S) = s$, then s must correspond to an actual asset type contained in tuple S . The GP chooses continuation strategy $\hat{\Gamma} = \hat{\Gamma}(S)$, which may differ from Γ .

Define

$$\mathcal{I}_C := \mathbb{I}\{\hat{\Gamma}(S) \neq \emptyset\},$$

where $\mathbb{I}\{\cdot\}$ is the indicator function. Thus, \mathcal{I}_C indicates whether the GP continues an asset at $t = 1$ (in state S). Note that while \mathcal{I}_C is publicly observed, $\hat{\Gamma}$ is generally not observable or verifiable to legacy LPs or uninformed LPs. (Specialist LPs may observe and verify $\hat{\Gamma}$, when H -type is continued; otherwise, they don't observe it either, but can infer, given their information, whether or whether not an H -type was continued.)

- $W = W(\mathcal{X}, \mathcal{I}_C, V)$ specifies payments to the GP as a function of realized legacy fund cash flows \mathcal{X} , and observed continuation, \mathcal{I}_C , and observed all-in price (valuation), V . These payments satisfy the feasibility constraint $W \leq \mathcal{X}$, as well as $W = 0$ for $\mathcal{X} < X$.

Reports. One could include a (state or progress) report from the GP to legacy LPs in the contract; such report would be non-verifiable (not observable for outsiders) and thus truthful reporting would need to be incentive-compatible. Naturally, this report \mathcal{R} would be a map from the state space \mathcal{S} onto itself. Such report would be relevant, only if it mattered for continuation decision. However, given this, one can discard the report and simply stipulate a continuation strategy. In other words, given the contract stipulates a state-contingent continuation strategy, a report from GP to legacy LPs is redundant. Put differently, the GP’s report can be identified with the continuation action; hence we omit an explicit reporting stage.²⁹

Any public report from the GP to new investors is cheap talk. The GP has no credible information that it can display to new investors, given that the legacy fund contract and asset types are unobserved. We therefore abstract from including such public reports.

Overall, we focus on contracts only condition on observable and verifiable information.

New Investors’ Beliefs. Let $\bar{\eta}_U$ and $\bar{\eta}_I$ denote the beliefs of uninformed investors and specialists, respectively, about the legacy fund contract \mathcal{C} and the GP’s continuation strategy $\hat{\Gamma}$ (i.e., the mapping from states to continuation actions implied by incentives). These beliefs induce a probability distribution over the continued asset’s type conditional on a continuation occurring (i.e., conditional on $\mathcal{I}_C = 1$). Define $\bar{\eta} := (\bar{\eta}_U, \bar{\eta}_I)$. We note that legacy LPs and the GP take these beliefs $\bar{\eta}$ as given when choosing the legacy fund contract and their strategies, respectively. In equilibrium, these beliefs are consistent with the realized contract and continuation strategy.

Side Deal with Specialists. Without loss of generality, consider the auction bids, as well as the side deals, in terms of the all-in price.

Let V_U denote the highest bid in the price auction (in terms of the all-in price); the highest transfer price bid would then be $v_U = V_U - I$. When the GP continues an asset of type $s = \hat{\Gamma}(S)$ and encounters informed specialist investors, they have willingness to pay

$$V_I := \mathbb{E}^I[\mathcal{X}_{CV} | \sigma(s)],$$

where the expectation \mathbb{E}^I is under beliefs $\bar{\eta}_I$ and conditional on $\sigma(s)$. Moreover, $\sigma(s) = X$ for $s = H$ and $\sigma(s) = 0$ for $s = L, M$; that is, $\sigma(s)$ captures specialists’ information. Recall that specialists can recognize the asset’s time-1 value (0 or X): they can identify H -types but cannot distinguish between L - and M -types.

When $V_I > V_U$, the GP may offer specialists to buy fraction $1 - \theta$ of CV shares at valuation $\hat{V} \leq V_I$, while extracting fraction α of the buyer’s rent through a side deal; in total $\alpha(1 - \theta)(V_I - \hat{V})$. Whether to offer this side deal and \hat{V} are optimally chosen by GP, with \hat{V} determining the (actual, not expected) rents extracted:

$$\hat{\Omega} := \alpha(1 - \theta)(V_I - \hat{V}).$$

The rent extracted will be transferred to the GP through a payment from specialists, whose

²⁹That is, the “message” or “report” is effectively the continuation action (or, more precisely, whatever verifiable public signal is induced by the continuation action).

nature we do not model explicitly. In case the GP offers the specialists a side deal, they get the full share allocation of $1 - \theta$ shares if and only if they accept the side deal (where $\hat{V} = V_I$ is possible).³⁰ Rejecting the side deal means they don't get allocated. That is, allocation is at the discretion of the GP.

The side deal is accepted as long as it leaves specialists with (weakly) positive buyer's rent. Hence, the side deal goes through whenever $\hat{V} \leq V_I$, in which case the deal's valuation V becomes $V = \hat{V}$. Whenever there is no side deal or it does not go through, the valuation becomes $V = V_U$.³¹ When $V_I > V_U$ and the GP encounters specialists, the GP (weakly) prefers allocating the shares to the specialist as opposed to the highest bidder, so we can already consider the GP offers a side deal in this contingency.³² That is, specialists buy $1 - \theta$ shares and a side deal, if and only if $V_I > V_U$ and the GP encounters specialists. When $V_I < V_U$, specialists (if present) optimally exit the market, and in case $V_I = V_U$, they are indifferent and we break ties in favor of them exiting.

Let \mathcal{I}_{Side} indicate whether the GP and the specialist engage in a side deal (which is state-contingent and conditional on continuation decision and encountering specialists), and \hat{V} the offer. Let the side contract $\mathcal{C}_{Side} \in \{\hat{V}, \emptyset\}$ where $\hat{V} = \emptyset$ indicates no side contract and otherwise the side contract is parametrized by \hat{V} . The side contract naturally determines $\hat{\Omega}$. Note $\mathcal{I}_{Side} = \mathbb{I}\{\mathcal{C}_{Side} \neq \emptyset\}$, where $\mathcal{C}_{Side} = \emptyset$ whenever the GP does not encounter specialists or when $V_I \leq V_U$. Strictly speaking, $\hat{V} = V_I$ represents a side deal, but involves zero buyer's rent and rent extracted by GP ($\hat{\Omega} = 0$). Further, by convention, there is no side deal ($\mathcal{I}_{Side} = 0$), when the GP does not encounter specialists or when $V_I < V_U$.

We impose a feasibility requirement that $\hat{V} \geq V_U$. In particular, a (non-empty) side deal \mathcal{C}_{Side} is feasible — that $\mathcal{C}_{Side} \in \bar{\mathcal{C}}_{Side}$ where $\bar{\mathcal{C}}_{Side}$ is the set of feasible side contracts — only if $\hat{V} \geq V_U$. That is, the GP cannot allocate shares below the highest bid of the auction, which ensures some fairness to legacy LPs. (We will show that whenever $\alpha > 0$, the GP will optimally choose the lowest feasible offer $\hat{V} = V_U$ whenever $V_I > V_U$.)

Finally, any potential side payment and side deal are not verifiable to other LPs (they are also not contractible with other LPs). The side payment is not part of the legacy fund cash flow and does not relax the GP's limited liability in other contractual relationships; the GP cannot use the proceeds from side deals to contribute to the CV, in particular. Although V is observed, on-path we have $\hat{V} = V_U = V$, and side deals cannot be inferred from prices.

Cash Flows and deal valuation. The realized total legacy fund cash flow (before GP compensation) is given by:

$$\mathcal{X} := X \times \{\text{number of } H\text{-types exited at } t = 1\} + \mathcal{I}_C(1 - \theta)[V - I], \quad (\text{A.1})$$

which depends on observed continuation \mathcal{I}_C , and valuation V , and therefore also on S . For convenience, we include exiting legacy LPs' total payout from continuation (i.e., $(1 - \theta)(V -$

³⁰Indeed, in the presence of a side deal, the GP's payoff is maximized from giving specialists the full share allocation; we do not model this choice explicitly to avoid clutter.

³¹Indeed, in the presence of a side deal, the GP's payoff is maximized from giving specialists the full share allocation; we do not model this choice explicitly to avoid clutter.

³²The GP can always offer $\hat{V} = V_U$, which results in positive rent. Hence offering a side deal weakly dominates allocating to uninformed.

I) in the legacy fund cash flows, which depends on the realized valuation. Indeed, per share sold, exiting LPs receive $V - I$; they sell $1 - \theta$ shares in total. Note that \mathcal{X} is the total legacy fund cash flow.³³

\mathcal{X} , in fact, is a *sufficient* statistic for legacy fund performance: it allows LPs to discern whether: (1) two assets are successfully exited, (2) one asset is successfully exited and one is transferred, (3) one asset successfully exited (the other one not), (4) one asset transferred, no successful exits, and (5) zero assets successfully exited. In addition, observing \mathcal{X} , the LPs can infer continuation decision and valuation (however, these are observed separately too). It will also become clear that $(V - I)$ will always be strictly smaller than X . (Thus, a cash flow of $(1 - \theta)(V - I)$ will result in $W = 0$.)

Next, the cash flows to CV shareholders read:

$$\mathcal{X}_{CV} = (X - w_2)\mathbb{I}\{\text{CV Asset Produces } X\}. \quad (\text{A.2})$$

These cash flows are $X - w_2$ (per share), if the continued asset is successful and is sold at price $X > 0$; the CV shares pay zero otherwise. Since $X > w_2$, \mathcal{X}_{CV} is a sufficient statistic for CV performance. We refer to \mathcal{X}_{CV} simply as CV cash flow.

Legacy LP and GP Payoffs. Legacy LPs' expected payoff — taking as given new LPs' beliefs $\bar{\eta} = (\bar{\eta}_U, \bar{\eta}_I)$ — reads

$$\Pi^{LP}(\mathcal{C} \mid \bar{\eta}) = \mathbb{E}^{LP} \left[\underbrace{\mathcal{X}}_{\text{Total Leg. Fund CF}} + \underbrace{\theta \cdot \mathcal{I}_C \mathbb{E}^{LP}[\mathcal{X}_{CV} - I \mid \mathcal{I}_C]}_{\text{CV Shares of Rolling LPs}} - \underbrace{W(\mathcal{X}, \mathcal{I}_C, V)}_{\text{GP Payout}} \mid \bar{\eta} \right], \quad (\text{A.3})$$

where the expectation is taken with respect to the legacy LPs' information set and conditional on the legacy fund contract and new LPs' beliefs.

Facing contract \mathcal{C} and taking as given new investors' pricing function, GP payoffs can be written as:

$$\Pi^{GP}(\hat{\Gamma}, \mathcal{C}_{Side} \mid \mathcal{C}, \bar{\eta}) = \mathbb{E}^{GP} \left[\underbrace{W(\mathcal{X}, \mathcal{I}_C, V)}_{\text{Leg. Fund Compensation}} + \underbrace{\mathcal{I}_C(\pi_{CV} + \mathcal{I}_{Side}\hat{\Omega})}_{\text{Payoff from CV and Side Deal}} \mid \mathcal{C}, \bar{\eta} \right],$$

In the expression above, $\pi_{CV} = \pi_{CV}(\hat{\Gamma}(S))$ represents the GP's expected payoff from managing the CV, given asset $\hat{\Gamma}(S)$ continued: it equals $w_2 + \lambda$ if an H -type asset is continued, pw_2 if an M -type asset is continued, and λ if an L -type asset is continued.

Equilibrium. An equilibrium is a tuple $(\mathcal{C}, \bar{\eta})$ consisting of an optimal legacy fund contract, and new investor beliefs, such that:

1. **Legacy contract:** The legacy contract incentivizes a continuation consistent with the

³³In the main text, we often refer to “fund cash flow” as the cash flow from the perspective of exiting LPs (per unit of ownership). This cash flow would equal $X \times \{\text{number of } H\text{-types exited at } t = 1\} + \mathcal{I}_C[V - I]$, as an exiting LP receives X for each successful exit and $V - I$ for each transfer.

prescribed policy ($\hat{\Gamma} = \Gamma$), where

$$(\hat{\Gamma}, \mathcal{C}_{Side}) = \arg \max_{\hat{\Gamma}, \tilde{\mathcal{C}}_{Side}} \Pi^{GP}(\hat{\Gamma}, \tilde{\mathcal{C}}_{Side} | \mathcal{C}, \bar{\eta}),$$

subject to the continuation strategy being feasible and the side deal being feasible, i.e., $\tilde{\mathcal{C}}_{Side} \in \bar{\mathcal{C}}_{Side}$. Incentive compatibility requires $\Gamma = \hat{\Gamma}$.

Let $IC = IC(\bar{\eta})$ denote the set of all feasible, incentive-compatible legacy contracts.

2. **Legacy LP optimization:** Given beliefs $\bar{\eta}$, the legacy fund contract maximizes expected legacy LP payoffs:

$$\mathcal{C} = \arg \max_{\hat{\mathcal{C}} \in IC(\bar{\eta})} \Pi^{LP}(\hat{\mathcal{C}} | \bar{\eta}). \quad (\text{A.4})$$

To preview, throughout the paper—and specifically in Appendices B and C—we solve for optimal high-hurdle and low-hurdle contracts.

Formally, in these sections we solve problem (A.4) subject to additional restrictions on the contract space to high- and low hurdle contracts (with the remaining equilibrium definition remaining unchanged). When restricting the contracting space, we refer to the resulting equilibrium as high-hurdle and low-hurdle equilibrium, respectively.

3. **CV Pricing and Valuation:** The CV's valuation (all in price of CV shares) equals $V = V_U$ if there is no side deal between GP and specialist investors ($\mathcal{I}_{Side} = 0$), and equals $V = \hat{V}$ if $\mathcal{I}_{Side} = 1$ where \hat{V} is stipulated by the side deal.³⁴

Let $\mathcal{A}_U \in \{0, 1\}$ indicate whether uninformed investors get allocated shares during CV formation. We assume that $\phi < 1$, so there is always a chance specialists are not encountered and therefore $Prob(\mathcal{A}_U = 1) > 0$.³⁵

Since $\hat{V} \geq V_U$ and, when $V_I > V_U$, the specialist expects to obtain the allocation ex post via the side deal, bidding above V_U is suboptimal for the specialist. Thus, the highest bid v_U comes from uninformed investors, who bid their valuation (maximum willingness to pay) according to:

$$V_U = \mathbb{E}_U[\mathcal{X}_{CV} | \mathcal{A}_U = 1], \quad (\text{A.5})$$

where \mathcal{X}_{CV} is the time-2 cash flow of CV shares ($X - w_2$ in case of success; 0 otherwise). The expectation in (A.5) is under beliefs $\bar{\eta}_U$, and is conditional on being allocated shares ($\mathcal{A}_U = 1$) and on (verifiable) public information, $\mathcal{I}_C = 1$. Note that legacy fund cash flows and actual valuation V are only observed after the price auction. Further, the legacy fund contract is private and not observed by new investors. Finally, under side deal, $\mathcal{I}_{Side} = 1$, we have $\mathcal{A}_U = 0$, while $\mathcal{I}_{Side} = 0$ implies $\mathcal{A}_U = 1$.

³⁴CV investors buy shares at price $V - I$ (paid to exiting LPs) and contribute I dollars per share to the CV, yielding the all-in price, or valuation, $V = V - I + I$.

³⁵Admittedly, $Prob(\mathcal{A}_U = 1)$ is only well-defined so long as the equilibrium features continuation in some states. It is easy to recognize that the GP will always continue in states (M, M) , so an equilibrium will feature continuation. Next, the case $\phi = 1$ could be obtained by taking the limit $\phi \rightarrow 1$.

4. **Beliefs and Rational Expectation:** New investors update beliefs according to Bayes' rule whenever applicable; they form rational expectations about the legacy fund contract chosen and the continuation strategy.

B Optimal High-Hurdle Contract (Proposition 1)

We characterize the optimal high-hurdle contract, and associated equilibrium. We conjecture and verify the contract structure of the legacy fund contract \mathcal{C} , which stipulates a payment w^* to the GP, if and only if the GP exits both assets successfully, that is, in state (H, H) when the fund cash flows equal $2X$.

We will show it is optimal to incentivize the GP to exit both assets in state (H, H) via the payment w^* . Note it is not necessary here to verify optimality of stipulating zero payment in other states. If the contract were not to stipulate zero payments in the other states, we would be in the low-hurdle contract case, studied in Appendix C.

The optimal high-hurdle contract is incentive compatible (as defined in Appendix A) and maximizes legacy LP payoff (A.3), subject to constraints. Formally, we solve optimization (A.4), additionally restricting the contracting space to high-hurdle contracts. In Appendix D.2, we will formally characterize the circumstances under which choosing a high-hurdle contract is optimal (which then takes the form we characterize here).

B.1 Continuation Decision

Under a high-hurdle contract, the GP receives no payment in states (L, L) , (M, L) , and (M, M) . In state (L, L) , the GP continues an L -type, as not continuing gives payoff zero and continuing gives private benefits $\lambda > 0$. In state (M, L) , continuing an M -type asset yields the GP a payoff of $pw_2 \geq 0$, which is the same than the payoff from continuing an L -type asset. We break ties in favor of the M -type asset. Overall, the GP optimally continues an M -type asset when $S = (M, L)$ or $S = (M, M)$.

Next, consider states (H, L) and (H, M) . Not continuing yields a payout of zero, while continuation yields a weakly positive payoff. Since continuing an H -type asset is strictly better than continuing an L - or M -type asset, the GP continues the H -type asset in both (H, L) and (H, M) .

Finally, consider state (H, H) . Under the contract, the GP receives a payment w^* if both assets are exited at $t = 1$. Continuing one H -type asset while exiting the other yields zero payment from the legacy fund. If the GP continues an H -type asset, it receives w_2 at $t = 2$ under the CV contract. Because an H -type asset succeeds without additional effort, the GP sets $e_1 = 0$ and obtains private benefits λ . With probability ϕ , the GP meets informed investors and extracts surplus through side contracting, characterized in detail later. (Investor information is revealed only after the continuation decision.) Let Ω the expected surplus extracted from side contracting, where the expectation is formed before the continuation decision is made.

Consequently, the GP prefers to exit both assets over exiting one asset while continuing the other, if and only if

$$w^* \geq w_2 + \lambda + \Omega. \tag{B.6}$$

We conjecture and verify that inequality (B.6) holds in equilibrium—that is, in state (H, H) , the GP exits both assets.

To summarize, the legacy fund contract implies the following continuation strategy:

1. (L, L) : Continue an L -type asset.
2. (M, L) or (M, M) : Continue the M -type asset.
3. (H, L) or (H, M) : Continue the H -type asset.
4. (H, H) : Exit both H -type assets.

B.2 CV Formation

For convenience, we work throughout the Appendix with the valuation or the all-in price, V , instead of transfer price, v . This is without loss of generality, as one price is a simple transformation of the other, with $V = v + I$. (The all-in price combines the price per share paid to exiting LPs and the continuation investment/capital call in the CV per unit of share, I). We also state auction bids in all-in prices.

We determine the deal valuation V , showing that it coincides with uninformed investors pooling valuation of the continued asset V_U (which is also the highest bid in the price auction); we determine V_U below. We distinguish several cases:

1. Suppose the GP does not encounter informed specialists. Then, uninformed investors are marginal, and $V = V_U$.
2. Suppose the GP does encounter informed specialists, but transfers an L - or M -type. Then informed specialists — who know the asset is not H type — value the asset weakly less than uninformed investors, who still assign some probability that the asset is H -type. As such, uninformed investors value the asset more than specialists, so they are marginal and $V = V_U$.
3. Suppose the GP transfers an H -type *and* encounters informed specialists. The price auction yields highest bid, V_U . Specialists value the asset at $V_H = X - w_2$, as they recognize H -types. Consider $V_H > V_U$. The GP then offers specialists a side deal to invest at price $\hat{V} \geq V_U$ and get the full share allocation (of $1 - \theta$ CV shares sold), provided they agree to a side deal that transfers fraction α of the buyer’s rent to the GP (e.g., via a side payment).

The per-share buyer’s rent equals $V_H - \hat{V}$ and in total $1 - \theta$ shares are sold, so that the total rent (extracted from exiting LPs who sell to cheaply) is $(1 - \theta)(V_H - \hat{V})$. Thus, the GP extracts $\alpha(1 - \theta)(V_H - \hat{V})$ and the specialist extracts $(1 - \alpha)(1 - \theta)(V_H - \hat{V})$. Clearly, it is optimal for GP and specialists to set $\hat{V} = V_U$ to maximize their payoffs and rents extracted from exiting LPs.

Therefore, the asset is transferred at valuation V_U , with specialists getting the full allocation for such H -type transfers. Thus, when transferring an H -type, the GP extracts expected rent

$$\Omega := \phi\alpha(1 - \theta)(V_H - V_U),$$

where $V_U = V$.

Finally, given the above outcomes, we solve for the uninformed investors' valuation and willingness to pay for CV shares. When bidding their valuation, uninformed investors rationally take into account that the GP favors specialists in allocating H -types.

Let $\eta(s)$ the equilibrium belief that the continued asset is of type $s \in \{L, M, H\}$, conditional on the asset being continued (i.e., a CV being raised). That is:

$$\eta(s) := \text{Prob}(\text{Asset is of type } s \mid \text{Asset is continued})$$

Thus, beliefs satisfy $\eta(L) + \eta(M) + \eta(H) = 1$, with:

$$\begin{aligned} \eta(L) &= \frac{(1-p)^2 \delta^2}{(1-p)^2 + 2p(1-p)}, & \eta(M) &= \frac{(1-p)^2 (1-\delta^2)}{(1-p)^2 + 2p(1-p)}, \\ \eta(H) &= \frac{2p(1-p)}{(1-p)^2 + 2p(1-p)}. \end{aligned} \quad (\text{B.7})$$

Let $\hat{\eta}(s)$ now the probability that asset is type s , conditional on the uninformed investors getting the share allocation. That is:

$$\hat{\eta}(s) := \text{Prob}(\text{Asset is of type } s \mid \text{Asset is continued, } \mathcal{A}_U = 1),$$

where \mathcal{A}_U denotes the event that uninformed investors get a share allocation during CV formation.

We can calculate:

$$\begin{aligned} \hat{\eta}(L) &= \frac{(1-p)^2 \delta^2}{(1-p)^2 + 2p(1-p)(1-\phi)}; & \hat{\eta}(M) &= \frac{(1-p)^2 (1-\delta^2)}{(1-p)^2 + 2p(1-p)(1-\phi)}; \\ \hat{\eta}(H) &= \frac{2p(1-p)(1-\phi)}{(1-p)^2 + 2p(1-p)(1-\phi)}. \end{aligned} \quad (\text{B.8})$$

These beliefs $\hat{\eta}(s)$ account for the fact that, in case of an H -type continuation, uninformed investors get the allocation only with probability $1 - \phi$ in which case $\mathcal{A}_U = 1$ (with probability ϕ , we have $\mathcal{A}_U = 0$). For L -type and M -type transfers, they get the allocation with probability one ($\mathcal{A}_U = 1$). The denominator is the probability that a CV is raised and uninformed investors get a share allocation in the CV ($\mathcal{A}_U = 1$):

$$\text{Prob}(\{\text{CV and } \mathcal{A}_U = 1\}) = (1-p)^2 + 2p(1-p)(1-\phi). \quad (\text{B.9})$$

To understand this, note that in case no asset is successful (with probability $(1-p)^2$), a CV is always raised. Next, with probability $2p(1-p)$, state $S \in \{(H, L), (H, M)\}$ realizes, in which case an H -type asset is continued. However, in this contingency, specialists are present with probability ϕ , and gain the full allocation. Thus, when an H -type is transferred, uninformed investors get the allocation only with probability $1 - \phi$, creating a winner's curse.

The valuation of uninformed investors then becomes

$$V_U = [\hat{\eta}(M)p + \hat{\eta}(H)](X - w_2), \quad (\text{B.10})$$

which also is the highest bid in the price valuation and the deal's valuation $V = V_U$.

Based on these valuations or all-in prices, accounting for both the price new LPs pay to exiting LPs and the capital call per share of I , one can recover the transfer price $v = V - I$.

B.3 Legacy Fund Contract

For the contract to implement an incentive compatible continuation strategy, it must be that the contract calls for continuation of an H -type asset in states (H, M) and (H, L) . It stipulates continuation of M -type in states (M, L) and (M, M) , and continuation of L -type in state (L, L) . As long as (B.6) is satisfied for $\Omega = \phi\alpha(1 - \theta)(V_H - V_U)$, the GP exits both assets in state (H, H) .

At $t = 0$, the optimal high-hurdle legacy fund contract \mathcal{C} is chosen to maximize Π_{LP} from (A.3), taking as given new investors' beliefs (and thus the pooling price that applies to all transfers). Again, we restrict here the choice to legacy fund contracts with a high-hurdle, i.e., those that only pay for two successful exits.

Consider state (H, H) . We show that incentivizing the GP to exit both assets is indeed optimal in state (H, H) . Take the price V as given. Since then legacy fund contract is unobserved, the price V cannot condition on it. If LPs do not incentivize the GP to exit both assets in this state, they optimally stipulate a payment of zero to the GP. Then, their payoff in state (H, H) is

$$\pi_1(H, H) = X + (1 - \theta)v + \theta(V_H - I) = X + (1 - \theta)V + \theta V_H - I = V_H - \frac{\Omega}{\phi\alpha} - I + X,$$

where $v = V - I$. Note that $(1 - \theta)v$ is the payoff to exiting legacy LPs, while $\theta(V_H - I)$ is the expected payoff of rolling legacy LPs upon retaining share θ in the H -type CV. Observe that $V \leq V_H = X - w_2$ and $\Omega = \phi\alpha(1 - \theta)(V_H - V)$.

If they incentivize the GP to exit both assets, the cheapest way to do so is by stipulating $w^* = \Omega - \lambda + w_2$. This yields payoff:

$$\pi_2(H, H) = 2X - w^* = 2X - \Omega - \lambda - w_2 = V_H + X + \Omega - \lambda.$$

Calculate $\pi_2(H, H) - \pi_1(H, H) = \left(\frac{1}{\phi\alpha} - 1\right)\Omega + (I - \lambda) > 0$, due $I > \lambda$. Thus, it is optimal to incentivize exit of both assets in state (H, H) . The incentive constraint (B.6) optimally binds, leading to a payment for the GP of $w^* = \lambda + w_2 + \Omega$ in state (H, H) .

B.3.1 Equilibrium Payoffs.

Total surplus (present value)—split between legacy LPs, GP, and specialist investors—reads:

$$PV = 2p^2X + 2p(1 - p)[X + \lambda - I] + (1 - p)^2[(1 - \delta^2)(pX - I) + \delta^2(\lambda - I)]. \quad (\text{B.11})$$

To calculate the GP's payoff, note that in states (H, L) and (H, M) , the GP continues an H -type asset while receiving zero payout from the legacy fund contract. Continuing an H -type asset yields in expectation payoff $\Omega + \lambda + w_2$, which equals the payment w^* in equilibrium.

Given this, the GP's expected payoff can be written as (using $pw_2 = \lambda$):

$$\Pi^{GP} = [p^2 + 2p(1-p)](\Omega + \lambda + w_2) + (1-p)^2\lambda. \quad (\text{B.12})$$

The expected payoff for specialist LPs becomes:

$$\Pi^{SP} = 2p(1-p)\phi(1-\alpha)(1-\theta)(V_H - V) = 2p(1-p)\frac{(1-\alpha)\Omega}{\alpha}. \quad (\text{B.13})$$

Accordingly, the LP payoff becomes $\Pi^{LP} = PV - \Pi^{GP} - \Pi^{SP}$, with:

$$\begin{aligned} \Pi^{LP} = & p^2(2X - w_2 - \lambda - \Omega) + 2p(1-p)\left(X - I - w_2 - \frac{\Omega}{\alpha}\right) \\ & + (1-p)^2\left[(1-\delta^2)(pX - I - pw_2) - \delta^2I\right]. \end{aligned} \quad (\text{B.14})$$

Alternatively, it can be rewritten (under equilibrium price V and $G = (1-\theta)V - I$ as:

$$\Pi^{LP} = p^2(2X - w^*) + 2p(1-p)[G + \theta(X - w_2)] + (1-p)^2[(1-\delta^2)(G + \theta p(X - w_2)) + \delta^2G].$$

C Optimal Low-Hurdle Contract (Proposition 2)

Consider the legacy fund contract structure under which the GP receives payment w_H for successfully exiting both assets (fund cash flow of $2X$), payment w_M for exiting one asset successfully while continuing the other (fund cash flow between X and $2X$), and payment w_L for exiting one asset successfully without continuing the other (fund cash flow of X). Whenever $w_M > 0$ or $w_L > 0$, we say the contract features a ‘‘low hurdle.’’

We solve for the optimal low-hurdle contract, which is incentive-compatible (as defined in Appendix A). We start with a preliminary observation. The (optimal) low-hurdle contract incentivizes the exit of an H -types whenever possible. If the contract did not incentivize exit of H -types in state (H, M) and (H, L) , there is no point of paying the GP in these states (i.e., it is optimal to set $w_M = w_L = 0$ then), and the contract would collapse to a high-hurdle contract, studied in Proposition 1. Moreover, repeating the argument from the proof of Proposition 1, one can show that legacy LPs find it optimal to incentivize full exit in state (H, H) . Thus, in the context of low-hurdle contracts, we can restrict attention to contracts that incentivize the GP to always exit H -types.

At $t = 0$, the optimal low-hurdle legacy fund contract \mathcal{C} is chosen to maximize Π_{LP} from (A.3), taking as given new investors' beliefs. Formally, we solve optimization (A.4), additionally restricting the contracting space to low-hurdle contracts, i.e., those that incentivize exit of H -types and therefore pay after single successful exit.

In Appendix D.2, we complete the characterization of the overall optimal contract characterize, analyzing whether a low-hurdle or high-hurdle contract is optimal.

C.1 Continuation Decision

Given the contract structure, the GP receives no payment in states (L, L) , (M, L) , and (M, M) . In state (L, L) , the GP continues an L -type.

Continuing an M -type asset yields a payoff of $pw_2 \geq 0$, which is weakly higher than continuing an L -type asset. Thus, the GP optimally continues an M -type asset when $S = (M, L)$ or $S = (M, M)$, where we break ties in favor of the M -type, as before.

We conjecture and later verify that in state (H, H) the GP exits both assets, receiving payment w_H . In state (H, M) , the GP exits one asset and continues the M -type asset, receiving payment w_M . In state (H, L) , the GP exits the H -type and continues the L -type with probability γ , in which case it receives w_M . When exiting both assets, one successfully, the GP receives w_L . The corresponding incentive conditions (including for potential randomization) will be derived later.

To summarize, the legacy fund contract implies the following continuation strategy:

1. (L, L) : Continue the L -type.
2. (M, L) or (M, M) : Continue the M -type.
3. (H, L) : Continue the L -type with probability γ and exit the H -type.
4. (H, M) : Continue the M -type and exit the H -type.
5. (H, H) : Exit both H -types.

C.2 CV Formation

Since no H -type asset is continued in equilibrium, specialist investors do not have an information advantage. It follows that CV pricing is competitive, and all assets are transferred at pooling valuation $V = V_U$, which coincides with uninformed investors' valuation and represents the highest bid in the price auction.

Continuation of L -Type in State (H, L) . The legacy contract is unobserved and chosen by legacy LPs, taking new LPs' beliefs as given. Consider state (H, L) , where the H -type asset is exited at $t = 1$. We analyze the decision of whether to continue the L -type asset in this state, conditional on the H -type being exited.

We show that whenever the joint surplus of legacy LPs and the GP from continuing the L -type asset—relative to also exiting it—denoted by \mathcal{L} , is strictly positive, the legacy contract will prescribe continuation of the L -type. That is, \mathcal{L} is the incremental joint surplus of legacy LPs and the GP due to continuation of the L -type in state (H, L) , conditional on exiting the H -type.

Continuing L rather than exiting it generates total surplus \mathcal{L} , with ℓ_1 representing the surplus change accruing to legacy LPs and ℓ_2 the surplus change accruing to the GP. By definition, $\mathcal{L} = \ell_1 + \ell_2$.

Suppose that $\mathcal{L} \geq 0$. Consider the following cases:

1. If $\ell_1, \ell_2 \geq 0$, continuation is optimal for both legacy LPs and the GP.

2. If $\ell_1 > 0 > \ell_2$, legacy LPs prefer continuation while the GP does not. Legacy LPs can then transfer $-\ell_2 \geq 0$ to the GP upon continuation, leaving their net surplus change at $\mathcal{L} \geq 0$. (This transfer can be made through payments at the end of the legacy fund.) Hence, continuation becomes optimal for both parties.
3. If $\ell_2 > 0 > \ell_1$, continuation is suboptimal for legacy LPs but strictly optimal for the GP. Implementing no continuation would require compensating the GP with an additional payment of ℓ_2 upon non-continuation. The LPs' payoff change from not continuing (relative to continuing) would then be $-\ell_1 - \ell_2 = -\mathcal{L} \leq 0$, implying that continuation, with payoff $\mathcal{L} \geq 0$, is optimal for both parties.

Conditional on H being exited in (H, L) , the joint payoff for legacy LPs and GP from exiting L is X . The joint payoff from continuing L is $X + (1 - \theta)V + \lambda - I$. The reason is that continuation of L allows legacy LPs to sell fraction $(1 - \theta)$ of CV shares at price $V - I$. Exiting Legacy LPs receive a net payout of $(1 - \theta)(V - I)$; rolling legacy LPs contribute θI . Therefore, the total surplus of continuing L (relative to exiting it) for legacy LPs and GP reads

$$\mathcal{L} := (1 - \theta)V - I + \lambda.$$

Thus, whenever $\mathcal{L} > 0$ ($\mathcal{L} < 0$), then $\gamma = 1$ ($\gamma = 0$). Whenever $\mathcal{L} = 0$, then $\gamma = \hat{\gamma} \in [0, 1]$, potentially leading to randomization.

Equilibrium Summary. Let $\eta(s)$ denote equilibrium beliefs that the continued asset is of type s (conditional on continuation). That is:

$$\eta(s) := \text{Prob}(\text{Asset is of type } s \mid \text{Asset is continued}).$$

Legacy and uninformed investors (i.e., new LPs) will share these beliefs. The beliefs satisfy $\eta(L) + \eta(M) = 1$, i.e., no H -type is continued in equilibrium and $\eta(H) = 0$. The probability that a CV is raised equals:

$$\text{Prob}(\{\text{CV is raised}\}) := (1 - p)^2 + 2p(1 - p)[1 - \delta + \delta\gamma].$$

The probability of an L -type continuation is:

$$\text{Prob}(\{L\text{-Type CV is raised}\}) = (1 - p)^2\delta^2 + 2p(1 - p)\delta\gamma.$$

Thus:

$$\eta(L) = \frac{(1 - p)^2\delta^2 + 2p(1 - p)\delta\gamma}{(1 - p)^2 + 2p(1 - p)[1 - \delta + \delta\gamma]}, \quad \eta(M) = \frac{(1 - p)^2(1 - \delta^2) + 2p(1 - p)(1 - \delta)}{(1 - p)^2 + 2p(1 - p)[1 - \delta + \delta\gamma]}, \quad (\text{C.15})$$

while $\eta(H) = 0$. The beliefs of uninformed investors, conditional on getting share allocation, satisfy $\hat{\eta}(s) = \eta(s)$. Thus, uninformed investors use beliefs $\eta(s)$ when pricing CV shares. Therefore, we have $V = V_U$, with

$$V_U = \eta(M)p(X - w_2). \quad (\text{C.16})$$

In equilibrium, γ is determined according to:

$$\gamma = \begin{cases} 1 & \text{if } (1 - \theta)V - I + \lambda > 0, \\ \hat{\gamma} \in [0, 1] & \text{if } (1 - \theta)V - I + \lambda = 0, \\ 0 & \text{if } (1 - \theta)V - I + \lambda < 0. \end{cases} \quad (\text{C.17})$$

Proof that γ declines in θ . It is immediate to see from (C.17) that γ declines with θ . Specifically, when $(1 - \theta)V - I + \lambda \geq 0$, then $\gamma \in \{0, 1\}$ is locally insensitive to changes in θ . When $(1 - \theta)V - I + \lambda = 0$ and $\gamma \in (0, 1)$, we can totally differentiate $(1 - \theta)V - I + \lambda = 0$ with respect to θ to obtain $V = (1 - \theta)\frac{\partial V}{\partial \theta}$, i.e., $\frac{\partial V}{\partial \theta} > 0$. Note that V depends on θ only via γ , and naturally decreases in γ . Thus, $\frac{\partial V}{\partial \theta} > 0$ implies $\frac{\partial \gamma}{\partial \theta} < 0$, as desired.

C.3 Legacy Fund Contract

C.3.1 Incentive Constraints

Take as given V and w_2 . Also take as given the continuation strategy of the contract, and derive incentive constraints that implement such strategy. Note that γ is a function V only.

First, note that although a H -type asset is never transferred in equilibrium, the GP can deviate and transfer an H -type off-equilibrium. Then, the GP encounters an informed new LP (specialist) with probability ϕ . If so, the GP will allow them to buy $1 - \theta$ CV shares at valuation $V = V_U$ (highest bid of price auction), while they value CV shares at $V_H = X - w_2 > V_U$. This creates buyers' rent of $(1 - \theta)(V_H - V_U)$, of which the GP can extract fraction α via a hidden side deal.

Overall, when continuing an H -type, the GP can extract in expectation rents of:

$$\Omega = \phi\alpha(1 - \theta)(V_H - V).$$

Uninformed new LPs attach zero probability to being offered an H -type asset and cannot infer off-equilibrium side deals from prices.

We distinguish between several cases. Recall the GP receives payment w_H for successfully exiting both assets; w_M for successfully exiting one asset, while continuing the other; and w_L for successfully exiting one asset while liquidating the other.

State $S = (H, M)$. The contract prescribes in state (H, M) that the H -type asset is exited, and the M -type is continued. This yields expected payoff for the GP of w_M (from exiting H) and pw_2 dollars in expectation from the continuation fund under $e_1 = 1$. A potential deviation is to continue H instead of M . Then, the GP receives zero payment in the legacy fund, as no asset is exited successfully exited at $t = 1$. When continuing H , the GP can extract in expectation Ω through a side deal with specialists. In addition, the GP receives payment w_2 with certainty at $t = 2$ and can shirk when operating the continuation fund, deriving private benefits of λ . In combination, we obtain that the GP does not deviate by continuing H instead of M if and only if

$$w_M \geq w_2 + \Omega + \lambda - pw_2 = w_2 + \Omega, \quad (\text{IC-1A})$$

using $pw_2 = \lambda$. Moreover, the GP must be better off not stopping (i.e., exiting both assets):

$$w_M + pw_2 \geq w_L. \quad (\text{IC1-B})$$

State $S = (H, L)$. When $\gamma = 0$, i.e., the contract prescribes to exit L , it is necessary to incentivize the GP to liquidate the L -type, yielding a payment of w_L from exiting both assets. If the GP exits H and continues L , it receives a payment of w_M . In the CV, the GP then does not exert effort and derives private benefits λ . Thus, conditional on exiting the H -type, the GP is better off liquidating L (as opposed to continuing it) if:

$$w_L \geq w_M + \lambda.$$

When $\gamma \in (0, 1)$, the GP must be indifferent between liquidating the L and continuing it. Then, the above inequality must hold in equality (which will be the case in optimum). When $\gamma = 1$, above inequality is reversed. More generally, the incentive constraint regarding γ — the continuation of an L -type asset — becomes

$$w_L \begin{cases} \geq w_M + \lambda, & \text{if } \gamma = 0 \\ = w_M + \lambda, & \text{if } \gamma \in (0, 1) \\ \leq w_M + \lambda, & \text{if } \gamma = 1. \end{cases} \quad (\text{IC-2})$$

A similar incentive problem and incentive constraint arises in [Mayer \(2022\)](#), essentially requiring that the GP must be rewarded to disclose L .

Another potential deviation is to continue H and exiting L , which yields in expectation payoff $w_2 + \Omega + \lambda$. This entails a payment in the CV, Ω expected side deal rent, and λ benefits from shirking in the CV, when continuing the H -type, while there is zero payment in the legacy fund.

Whenever the contract prescribes exit of both projects at time $t = 1$ with some positive probability (i.e., when $\gamma < 1$), then the payment from exiting both projects, w_L , must exceed the payoff from continuing the H -type:

$$w_L \geq w_2 + \Omega + \lambda \quad \text{for } \gamma < 1. \quad (\text{IC-3A})$$

We note that when $\gamma \in (0, 1)$, the GP is indifferent between continuing the L -type asset and exiting both assets.

At the same time, the GP must find it worthwhile to continue the L -type asset rather than the H -type when the contract prescribes to do so with some probability, i.e., when $\gamma > 0$. Continuing the L -type and exiting the H -type gives payoff $w_M + \lambda$. Continuing the H -type yields expected payoff of $w_2 + \Omega + \lambda$. This leads to the incentive constraint:

$$w_M \geq w_2 + \Omega \quad \text{for } \gamma > 0. \quad (\text{IC-3B})$$

State $S = (H, H)$. The contract prescribes to exit both assets, which generates a payout w_H to the GP. However, the GP could deviate and continue one asset, in which case it collects payment w_M in the legacy fund. This yields expected rent from a side deal with

informed new LPs, in addition to receiving payment w_2 at time $t = 2$. Further, the GP derives benefits of λ from continuing an H -type. Thus, the GP is better off exiting both assets if and only if:

$$w_H \geq w_M + \lambda + w_2 + \Omega. \quad (\text{IC-4})$$

Summary. We conclude that the the legacy fund contract in high-hurdle equilibrium is incentive-compatible if and only if the incentive conditions (IC-1A), (IC1-B), (IC-2), (IC-3A), (IC-4) are satisfied.

C.3.2 Optimal Legacy Fund Payments

To optimize legacy LPs' payoff (from (A.3)), one minimizes the GP's rent subject to all incentive conditions (IC-1A)-(IC-4). To minimize agency rents, it is optimal to minimize payments to the GP subject to all relevant incentive constraints — a linear programming problem. The incentive constraints admit a hierarchical interdependence. First, (IC-1A) and (IC-3B) only involves w_M . Second, (IC1-B), (IC-2), and (IC-3A) only involve (w_M, w_L) . Third, (IC-4) involves all payments, w_M, w_L, w_H . Thus, we first determine w_M , then w_L , and last w_H .

Combining (IC-1A) and (IC-3B). We start by combining (IC-1A) and (IC-3B) — which are the same when $\gamma > 0$ — in order to solve for the minimum payment w_M that satisfies both constraints: $w_M = w_2 + \Omega$.

Combining (IC1-B), (IC-2), and (IC-3A). Next, given w_M determined above, we turn to incentive constraints (IC-2) and (IC-3A) to solve for w_L . We verify ex-post that (IC1-B) is then satisfied too.

First, consider $\gamma = 1$. In this case, the GP always continues as long as one asset is successful, so the payment w_L is never made. This means w_L can be set arbitrarily (e.g., to zero) and is payoff-irrelevant, as long as it induces the GP to always continue — which requires (IC1-B) and (IC-3B) to be met.

Second, consider $\gamma < 1$. Under these circumstances, the GP must find it (weakly) optimal to exit both assets at time $t = 1$ and to earn payoff w_L in state (H, L) — that is, (IC-3A) and (IC-2) must hold.

We solve for the minimum payment w_L satisfying (IC-3A): $w_L = w_2 + \Omega + \lambda = w_M + \lambda$. Observe that the incentive constraints (IC1-B) and (IC-2) are also satisfied under this choice of w_L .

Satisfying (IC-4). As a last step, consider state (H, H) . It is optimal for legacy LPs to incentivize exit of both assets in that state. The minimum payment w_H satisfying (IC-4) becomes: $w_H = w_M - \lambda + w_2 + \Omega$.

Overall, optimal payments satisfy

$$\begin{aligned} w_M &= w_2 + \Omega + \lambda - pw_2; & w_L &= w_2 + \Omega + \lambda, \\ w_H &= w_M + \lambda + w_2 + \Omega. \end{aligned} \quad (\text{C.18})$$

which is (2), as desired. One can then further expand to obtain $w_H = (2 - p)w_2 + 2\lambda + 2\Omega$.

C.3.3 Equilibrium Payoffs

New LPs do not realize positive expected payoffs in equilibrium, i.e., they merely break even. The total surplus (present value) — split between legacy LPs and GP — reads:

$$PV = 2p^2X + 2p(1 - p)[X + (1 - \delta)(pX - I) - \delta\gamma(I - \lambda)] + (1 - p)^2[(1 - \delta^2)(pX - I) - \delta^2(I - \lambda)]. \quad (\text{C.19})$$

The GP's payoff reads

$$\Pi^{GP} = p^2w_H + 2p(1 - p)\left[(1 - \delta)(pw_2 + w_M) + \delta w_L\right] + (1 - p)^2\lambda. \quad (\text{C.20})$$

In the payoff calculation, we note that under the optimal low-hurdle contract, the GP is, in state (H, L) indifferent between exiting both assets (yielding w_L) or continuing the L -type (yielding $w_M + \lambda = w_L$). As new investors' break even and do not realize positive surplus, $\Pi^{LP} = PV - \Pi^{GP}$. Thus:

$$\Pi^{LP} = p^2\left[2X - (2 - p)w_2 - 2\Omega - 2\lambda\right] + (1 - p)^2\left[(1 - \delta^2)(pX - \lambda) - I\right] + 2p(1 - p)\left[X + (1 - \delta)(pX - I) - \delta\gamma(I - \lambda) - (w_2 + \Omega + \lambda)\right]. \quad (\text{C.21})$$

Alternatively, defining $G = (1 - \theta)V - I$, we can write

$$\Pi_L^{LP} = p^2(2X - w_H) + (1 - p)^2\left[(1 - \delta^2)(G + \theta p(X - w_2)) + \delta^2G\right] + 2p(1 - p)\left[X + (1 - \delta + \delta\gamma)(G - w_M) - \delta(1 - \gamma)w_L + (1 - \delta)\theta p(X - w_2)\right].$$

D Equilibrium Analysis

D.1 Equilibrium Comparison: Proof of Proposition 3

We compare payoffs and values across the two equilibria, denoting by subscripts “ hh ” and “ lh ” the quantities associated with high-hurdle and low-hurdle equilibrium.

Price, Cash Flows, and Quality of CV. In both the high- and low-hurdle cases, continuation decisions coincide in states (L, L) , (M, L) , (M, M) , and (H, H) . In contrast, in states (H, M) and (H, L) , the high-hurdle equilibrium features continuation of the H -type asset, while the low-hurdle equilibrium features continuation of the M -type and/or L -type. Consequently, the deal valuation is higher— even accounting for side deals—under the high-hurdle equilibrium, that is, $V_{hh} > V_{lh}$.

Expected Cash Flows. We calculate the expected time-2 cash flows of CV shares under equilibrium beliefs, which we denote by \bar{X}_{hh} and \bar{X}_{lh} for high- and low-hurdle equilibrium,

respectively. Let the equilibrium beliefs in either equilibrium (of the continued asset being type s) be denoted $\eta_{hh}(s)$ and $\eta_{lh}(s)$ that the continued asset is of type $s \in \{L, M, H\}$.

In a high-hurdle equilibrium, the expected CV cash flow at time $t = 2$ is defined as:

$$\bar{X}_{hh} := Prob_{hh}(\text{CV Cash Flow is } X \mid \text{CV is raised}) \cdot X = [\eta_{hh}(H) + \eta_{hh}(M)p]X,$$

where beliefs $\eta_{hh}(s) = \eta(s)$ follows (B.7), that is:

$$\eta_{hh}(M) = \frac{(1-p)^2(1-\delta^2)}{(1-p)^2 + 2p(1-p)}, \quad \eta_{hh}(H) = \frac{2p(1-p)}{(1-p)^2 + 2p(1-p)}.$$

And, $\eta_{hh}(L) = 1 - \eta_{hh}(M) - \eta_{hh}(H)$.

Analogously, in the low-hurdle case, the expected CV cash flow at time $t = 2$ is defined as:

$$\bar{X}_{lh} := Prob_{lh}(\text{CV Cash Flow is } X \mid \text{CV is raised}) \cdot X = \eta_{lh}(M)pX,$$

where beliefs $\eta_{lh}(s) = \eta(s)$ follows (C.15), that is:

$$\eta_{lh}(M) = \frac{(1-p)^2(1-\delta^2) + 2p(1-p)(1-\delta)}{(1-p)^2 + 2p(1-p)[1-\delta + \delta\gamma]}.$$

It is straightforward to show that $\bar{X}_{hh} > \bar{X}_{lh}$, i.e., expected CV cash flows (at time 2) are higher in the high-hurdle equilibrium.

Growth Potential. In high-hurdle equilibrium, the probability of raising a CV satisfies:

$$Prob_{hh}(\{\text{CV is raised}\}) = (1-p)^2 + 2p(1-p).$$

In low-hurdle equilibrium, this probability satisfies:

$$Prob_{lh}(\{\text{CV is raised}\}) = (1-p)^2 + 2p(1-p)[1-\delta + \delta\gamma].$$

Let us define the average time-1 value of the continued asset (i.e., the value the continued asset would have to external buyers). The continued asset has zero value at time $t = 1$, if it is M - and L -type. It has value X , if it is H -type. Thus, in the high-hurdle equilibrium, the average time-1 value is defined as

$$\bar{x}_{hh} = Prob_{hh}(\text{Asset is type } H \mid \text{CV is raised}) \cdot X = \eta_{hh}(H)X.$$

In the low-hurdle equilibrium, we have no H -type continuations, so

$$\bar{x}_{lh} = Prob_{lh}(\text{Asset is type } H \mid \text{CV is raised}) \cdot X = 0.$$

The expected growth in asset value is defined as: $G_{hh} := \bar{X}_{hh} - \bar{x}_{hh}$ and $G_{lh} := \bar{X}_{lh} - \bar{x}_{lh}$. We show $G_{hh} < G_{lh}$. Note that $G_{hh} = \eta_{hh}(M)pX$, while $G_{lh} = \eta_{lh}(M)pX$. Further, it is straightforward to see that $\eta_{hh}(M) < \eta_{lh}(M)$, which yields the claim.

LP Payoff. In high-hurdle equilibrium, legacy LPs realize payoff (see (B.14)):

$$\begin{aligned}\Pi_{hh}^{LP} &= p^2(2X - w_2 - \lambda - \Omega_{hh}) + 2p(1-p) \left(X - I - w_2 - \frac{\Omega_{hh}}{\alpha} \right) \\ &\quad + (1-p)^2 \left[(1-\delta^2)(pX - I - pw_2) - \delta^2 I \right],\end{aligned}$$

where $\Omega_{hh} = \phi\alpha(1-\theta)(V_H - V_{hh})$, and $V_H = X - w_2$, with V_{hh} the equilibrium valuation in a high-hurdle contract.

In high-hurdle equilibrium, they realize payoff (see (C.20)):

$$\begin{aligned}\Pi_{ll}^{LP} &= p^2 \left[2X - (2-p)w_2 - 2\Omega_{lh} - 2\lambda \right] \\ &\quad + 2p(1-p) \left[X + (1-\delta)(pX - I) - \delta\gamma(I - \lambda) - (w_2 + \Omega_{lh} + \lambda) \right] \\ &\quad + (1-p)^2 \left[(1-\delta^2)(pX - I - pw_2) - \delta^2 I \right],\end{aligned}$$

where $\Omega_{lh} = \phi\alpha(1-\theta)(V_H - V_{lh})$. Calculate (using $pw_2 = \lambda$)

$$\begin{aligned}\Pi_{hh}^{LP} - \Pi_{lh}^{LP} &= p \left[3 - 2p \right] \lambda - 2p(1-p) \left[pX - \delta(pX - I) - \delta\gamma(I - \lambda) \right] \\ &\quad + p^2(2\Omega_{lh} - \Omega_{hh}) + 2p(1-p) \left(\Omega_{lh} - \frac{\Omega_{hh}}{\alpha} \right).\end{aligned}\tag{D.22}$$

Thus, whenever $\Pi_{hh}^{LP} - \Pi_{lh}^{LP} > 0$, LPs are better off in high-hurdle equilibrium, where the exact expression is given above.

When $\theta = 1$, then $\Omega_{hh} = \Omega_{lh} = 0$, as well as $\gamma = 0$, then:

$$\Pi_{hh}^{LP} - \Pi_{lh}^{LP} = p \left[3 - 2p \right] \lambda - 2p(1-p) \left[pX - \delta(pX - I) \right].\tag{D.23}$$

Total Surplus. In high-hurdle equilibrium:

$$PV_{hh} = 2p^2X + 2p(1-p) \left[X + \lambda - I \right] + (1-p)^2 \left[(1-\delta^2)(pX - I) + \delta^2(\lambda - I) \right]$$

In a low-hurdle equilibrium:

$$\begin{aligned}PV_{lh} &= 2p^2X + 2p(1-p) \left[X + (1-\delta)(pX - I) - \delta\gamma(I - \lambda) \right] \\ &\quad + (1-p)^2 \left[(1-\delta^2)(pX - I) - \delta^2(I - \lambda) \right].\end{aligned}$$

Calculate:

$$PV_{hh} - PV_{lh} = 2p(1-p) \left[\lambda(1-\delta\gamma) - \delta(1-\gamma)I - (1-\delta)pX \right].$$

Thus, the high-hurdle equilibrium is more efficient if and only: $\lambda > pX - \delta(pX - I) - \delta\gamma(I - \lambda)$. Note that, due to $I > \lambda$, $PV_{hh} - PV_{lh}$ increases in γ , while γ decreases in θ . Thus, $PV_{hh} - PV_{lh}$ decreases in θ .

GP Payoff. Note $\Pi_{hh}^{GP} = PV_{hh} - \Pi_{hh}^{LP} - \Pi_{hh}^{SP}$, where $\Pi_{hh}^{SP} = 2p(1-p)\frac{(1-\alpha)\Omega_{hh}}{\alpha}$. Likewise, $\Pi_{lh}^{GP} = PV_{hh}lh - \Pi_{lh}^{LP}$. Calculate

$$\Pi_{hh}^{GP} - \Pi_{lh}^{GP} = -p^2[(1-p)w_2 + \lambda] - \phi\left\{p^2(2\Omega_{lh} - \Omega_{hh}) + 2p(1-p)(\Omega_{lh} - \Omega_{hh})\right\}.$$

Due to $\Omega_i = (1-\theta)(V_H - V_i)$ for $i \in \{lh, hh\}$, and $V_{lh} < V_{hh}$, we have $\Omega_{hh} < \Omega_{lh}$. Thus, $\Pi_{hh}^{GP} < \Pi_{lh}^{GP}$.

D.2 Optimal Contract: Existence and Uniqueness

We have solved for the optimal contracts within the set of high-hurdle (“hh”) and low-hurdle (“lh”) contracts, as well as characterized the equilibrium that obtains under either type of contract. Denote these optimal contracts by \mathcal{C}_{hh} and \mathcal{C}_{lh} , and the resulting (pooling) deal valuations by V_{hh} and V_{lh} . Further, let legacy LPs’ initial payoff be $\Pi(\mathcal{C}; V)$, given a contract \mathcal{C} and a pooling valuation of V (new investors’ beliefs matter for this optimization only through the valuation V).

The optimal contract is then chosen according to:

$$\mathcal{C}(V) := \arg \max_{\hat{\mathcal{C}} \in \{\mathcal{C}_{hh}, \mathcal{C}_{lh}\}} \Pi(\hat{\mathcal{C}}; V). \quad (\text{D.24})$$

A high-hurdle (low-hurdle) equilibrium obtains, when $\mathcal{C}(V_{hh}) = \mathcal{C}_{hh}$ ($\mathcal{C}(V_{lh}) = \mathcal{C}_{lh}$).

The next Proposition solves this optimization and obtains the following result regarding existence and uniqueness.

Proposition D.1 (Equilibrium Existence and Uniqueness). *An equilibrium exists. Let $V \in (0, V_H)$ a given deal valuation, and V_{hh} and V_{lh} denote the equilibrium deal valuations in the high-hurdle and low-hurdle equilibrium, respectively. The following holds:*

1. *A high-hurdle -equilibrium (low-hurdle equilibrium) exists if and only if $\Delta(V_{hh}) \geq 0$ ($\Delta(V_{lh}) \leq 0$), where the function $\Delta(V)$ (of deal valuation V) is characterized in (D.25).*
2. *When $\Delta(V_{hh}) < 0 < \Delta(V_{lh})$, the only equilibrium is in mixed strategies, with LPs randomizing over offering a high-hurdle and low hurdle contract, such that the price satisfies $\Delta(V^{Mix}) = 0$ with mixing probability $\hat{\omega} = \frac{V^* - V_{lh}}{V_{hh} - V_{lh}} \in (0, 1)$.*
3. *The equilibrium is unique (modulo knife-edge cases of indifference) if one the two (sufficient) conditions holds: (1) θ is sufficiently large, or (2) $\delta \leq \frac{(2-p)\phi\alpha}{2(1-p)}$.*

This Proposition implies some of the results of Proposition 4.

D.3 Existence and Uniqueness (Proof of Proposition D.1)

For the proof, fix the beliefs of uninformed investors, $\hat{\eta}(s)$, that the continued asset is of type s , conditional on getting allocated shares. These beliefs pin down the valuation:

$$V = [\hat{\eta}(M)p + \hat{\eta}(H)](X - w_2) \quad \text{and} \quad \Omega = \phi\alpha(1-\theta)(V_H - V).$$

Indeed, uninformed investors' valuation coincides with the highest bid in the price auction and thus corresponds to the valuation or all-in price at which the CV is formed. We calculate payoffs taking beliefs and valuation V as given. Also, define $G = G(V) = (1 - \theta)V - I$. Further, let $\gamma = \mathbb{I}\{(1 - \theta)V - I + \lambda \geq 0\}$. Given valuation V , is an optimal continuation strategy in (H, L) , conditional on exiting the H -type; that is, γ is the probability with which the L -type is continued in state (H, L) , given valuation V .

We consider the two different contract forms. First, we consider the high-hurdle contract stipulating a single payment of $w^* = w_2 + \lambda + \Omega$. in case both assets are exited at $t = 1$. Second, we consider the high-hurdle contract that stipulates payment

$$\begin{aligned} w_M &= w_2 + \Omega + \lambda - pw_2; & w_L &= w_2 + \Omega + \lambda; \\ w_H &= w_M + w_2 + \lambda + \Omega = (2 - p)w_2 + 2\Omega + 2\lambda. \end{aligned}$$

Both contracts are optimal within the class of high- and low-hurdle contracts, respectively. We now consider LPs' choice between high- and low-hurdle contracts, taking V as given. That is, we solve (D.24), given V .

Deriving $\Delta(V)$. Legacy LPs' payoff under a high-hurdle contract becomes $\Pi_{hh}^{LP}(V) = \Pi_{hh}^{LP}$:

$$\Pi_{hh}^{LP}(V) = p^2(2X - w^*) + 2p(1 - p)[G + \theta(X - w_2)] + (1 - p)^2[(1 - \delta^2)(G + \theta p(X - w_2)) + \delta^2 G].$$

The payoff under a low-hurdle contract becomes $\Pi_{lh}^{LP}(V) = \Pi_{lh}^{LP}$, where:

$$\begin{aligned} \Pi_{lh}^{LP}(V) &= p^2(2X - w_H) + (1 - p)^2[(1 - \delta^2)(G + \theta p(X - w_2)) + \delta^2 G] \\ &\quad + 2p(1 - p)[X + (1 - \delta + \delta\gamma)(G - w_M) - \delta(1 - \gamma)w_L + (1 - \delta)\theta p(X - w_2)]. \end{aligned}$$

Next, we calculate $\Delta(V) := \Pi_{hh}^{LP}(V) - \Pi_{lh}^{LP}(V)$, which simplifies to:

$$\begin{aligned} \Delta(V) &= p^2[(1 - p)w_2 + \Omega + \lambda] & (D.25) \\ &\quad + 2p(1 - p)\left[\delta(1 - \gamma)G + \theta(1 - (1 - \delta)p)(X - w_2) - X + \delta(1 - \gamma)(w_2 + \Omega + \lambda) \right. \\ &\quad \left. + (1 - \delta + \delta\gamma)((1 - p)w_2 + \Omega + \lambda)\right]. \end{aligned}$$

Note that, given V , offering the (optimal) high-hurdle contract is optimal if and only if $\Delta(V) \geq 0$, while offering the (optimal) low-hurdle contract is optimal if and only if $\Delta(V) \leq 0$.

Equilibrium Existence (Pure Strategy). Let V_{hh} and V_{lh} the respective prices under equilibrium beliefs in a high-hurdle and low-hurdle equilibrium, respectively. We know that $V_{hh} > V_{lh}$. Thus, a pure-strategy equilibrium in the choice of high-hurdle and low-hurdle contract exists whenever:

1. Given valuation V_{hh} , it is optimal to choose the high-hurdle contract, \mathcal{C}_{hh} , in that:

$$\Pi_{hh}^{LP}(V_{hh}) \geq \Pi_{lh}^{LP}(V_{hh}) \iff \Delta(V_{hh}) \geq 0. \quad (D.26)$$

2. Given valuation V_{lh} , it is optimal to choose the high-hurdle contract, \mathcal{C}_{lh} , in that:

$$\Pi_{lh}^{LP}(V_{lh}) \geq \Pi_{hh}^{LP}(V_{lh}) \iff \Delta(V_{lh}) \leq 0. \quad (\text{D.27})$$

If precisely one of (D.26) or (D.27) holds, there is a unique (pure-strategy) equilibrium (see also below on uniqueness). If both (D.26) and (D.27) hold, there are two (pure-strategy) equilibria.

If neither (D.26) and (D.27) hold and $\Delta(V_{hh}) < 0 < \Delta(V_{lh})$, no pure strategy equilibrium in the contract choice exists.

Mixed Equilibrium. In the latter case, we construct a mixed-strategy equilibrium, whereby legacy LPs randomize between offering a high-hurdle and low-hurdle contract at $t = 0$. They choose a high-hurdle contract with probability $\hat{\omega}$ and low-hurdle contract with complementary probability $1 - \hat{\omega}$. The price/valuation under this strategy that new LPs charge is:

$$V^{Mix} = \hat{\omega}V_{hh} + (1 - \hat{\omega})V_{lh}.$$

Then, solve for V^{Mix} such that $\Delta(V^{Mix}) = 0$, i.e., under price V^{Mix} legacy LPs are indifferent between choosing high-hurdle and low-hurdle contract. The mixing probability is then determined according to

$$\hat{\omega} = \frac{V^{Mix} - V_{lh}}{V_{hh} - V_{lh}},$$

which gives us a mixed strategy equilibrium. It remains to show that when $\Delta(V_{hh}) < 0 < \Delta(V_{lh})$, there exists $V^{Mix} \in (V_{hh}, V_{lh})$ with $\Delta(V^{Mix}) = 0$.

Consider $\Delta(V_{hh}) < 0 < \Delta(V_{lh})$. Note that $V_{hh} > V_{lh}$. Observe that all components but γ are continuous in V . Only γ is discontinuous in V , jumping from 0 to 1 whenever $(1 - \theta)V = I - \lambda$, in that $\gamma = \mathbb{I}\{(1 - \theta)V - I + \lambda \geq 0\}$. Next, calculate

$$\frac{\partial \Delta(V)}{\partial \gamma} \propto -G - (w_2 + \Omega + \lambda) + (1 - p)w_2 + \Omega + \lambda = I - (1 - \theta)V - pw_2.$$

Due to $pw_2 = \lambda$, we have $\frac{\partial \Delta(V)}{\partial \gamma} = 0$ whenever $(1 - \theta)V - I + \lambda = 0$. Whenever $(1 - \theta)V - I + \lambda \geq 0$, then $\gamma \in \{0, 1\}$ is locally constant and insensitive to changes in V . In particular, $\Delta(V)$ is continuously differentiable in V , with: $\Delta'(V) = \frac{\partial \Delta(V)}{\partial V}$. Then, there exists by the intermediate value theorem V^{Mix} such that $\Delta(V^{Mix}) = 0$.

Taken together, we have shown that an equilibrium in the choice of contract — either pure or mixed strategies — exists.

Simplification under $\theta = 1$. When $\theta = 1$, we have $G = -I$, $\gamma = 0$, and $\Omega = 0$. Then, (D.25) simplifies to

$$\begin{aligned} \Delta(V) &= p^2 \left[(1 - p)w_2 + \lambda \right] + 2p(1 - p) \left[\lambda - \delta I - p(1 - \delta)X \right] \\ &= p[3 - 2p]\lambda - 2p(1 - p)[pX - \delta(pX - I)]. \end{aligned} \quad (\text{D.28})$$

where we used $pw_2 = \lambda$. Thus, $\Delta(V) > 0$ becomes equivalent to:

$$(2-p)\lambda + (1-p)pw_2 > 2(1-p)[pX - \delta(pX - I)]. \quad (\text{D.29})$$

Equilibrium Uniqueness. Multiple (pure-strategy) equilibria exist when $\Delta(V_{hh}) \geq 0 \geq \Delta(V_{lh})$. Since $V_{lh} < V_{hh}$, a sufficient condition for equilibrium uniqueness (in pure strategies) is that $\Delta(V)$ decreases for $V \in (0, V_H)$.

Note that $\frac{\partial G}{\partial V} = (1-\theta)$ and $\frac{\partial \Omega}{\partial V} = -\phi\alpha(1-\theta)$. Thus, holding γ constant, we have

$$\Delta'(V) = (1-\theta) \left[2p(1-p)\delta(1-\gamma) - p(2-p)\phi\alpha \right].$$

When $\theta = 1$, then $\Delta'(V) = 0$ and $\Delta(V)$ is characterized in (D.28). Clearly, then, the equilibrium is unique except in the knife edge case of indifference, where the expression in (D.28) is precisely zero. In the limit $\theta \rightarrow 1$, we have that $\Delta'(V)$ converges to zero and $\Delta(V)$ to (D.28). Equilibrium uniqueness extends to this limit case and thus holds for θ being large, as long as (D.28) is non-zero.

When $\theta < 1$, then

$$\Delta'(V) < 0 \iff \delta(1-\gamma) < \frac{2-p}{2-2p}\phi\alpha.$$

Taken together, provided it exists, the equilibrium in pure strategies is unique (1) if θ is sufficiently large, or (2) if $\delta < \frac{2-p}{2(1-p)}\phi\alpha$.

Finally, we argue that $\Delta'(V) < 0$ implies that the overall equilibrium is unique. First, when there is no pure strategy equilibrium, the mixed strategy equilibrium is unique, as it is defined via $V^{Mix} \in (V_{lh}, V_{hh})$ solving $\Delta(V^{Mix}) = 0$ and, due to $\Delta'(V) < 0$, the function $\Delta(V)$ has only one root. Second, suppose that $\Delta(V_{lh}) \leq 0$. Then $\Delta(V) < 0$ for $V \in (V_{lh}, V_{hh})$, so there cannot be a mixed strategy equilibrium. Third, suppose that $\Delta(V_{hh}) \geq 0$, so $\Delta(V) > 0$ for $V \in (V_{lh}, V_{hh})$, so there cannot be a mixed strategy equilibrium.

D.4 Proof of Proposition 4

As shown in Proposition D.1, a high-hurdle -equilibrium (low-hurdle equilibrium) exists if and only if $\Delta(V_{hh}) \geq 0$ ($\Delta(V_{lh}) \leq 0$); the function $\Delta(V)$ (of deal valuation V) is defined in Appendix Equation (D.25).

1. Note that when $p \rightarrow 1$, then $\Delta(V) \rightarrow \Omega + \lambda > 0$. In particular, for $V \in \{V_{hh}, V_{lh}\}$, we have $\Delta(V_{hh}), \Delta(V_{lh}) > 0$ so that the unique equilibrium is a high-hurdle equilibrium.
2. First, take the derivative of $\Delta(V)$ with respect to ϕ :

$$\frac{\partial \Delta(V)}{\partial \phi} = p^2 \hat{\Omega} + 2p(1-p) \left[\delta(1-\gamma)\hat{\Omega} + (1-\delta + \delta\gamma)\hat{\Omega} \right] > 0,$$

where $\hat{\Omega} = \alpha(1-\theta)(V_H - V)$. Likewise, $\frac{\partial \Delta(V)}{\partial \alpha} > 0$.

Second, consider the limit case $\theta \rightarrow 1$. In this case, $\Delta(V)$ is given in (D.28). Thus: $\frac{\partial \Delta(V)}{\partial \delta} = 2p(1-p)(pX - I) > 0$, since we assume $pX > I$.

3. Next, take the derivative of $\Delta(V)$ with respect to θ :

$$\frac{\partial \Delta(V)}{\partial \theta} = -[p^2 + 2p(1-p)]\phi\alpha(V_H - V) + 2p(1-p)[(1 - (1-\delta)p)(X - w_2) - \delta(1-\gamma)V]$$

The first term vanishes in the limit $\phi\alpha \rightarrow 0$, i.e., for small ϕ or α . When $\phi\alpha = 0$, the first term drops out, so the sign by the derivative is determined by:

$$\begin{aligned} (1 - (1-\delta)p)(X - w_2) - \delta(1-\gamma)V &> (1 - (1-\delta)p)(X - w_2) - \delta(X - w_2) \\ &= (1-\delta)(1-p)(X - w_2) > 0, \end{aligned}$$

where the first inequality uses $\gamma \geq 0$ and $V \in (0, V_H)$ with $V_H = X - w_2$. Thus $\Delta(V)$ increases in θ when ϕ or α is small.

4. Consider $\theta = 1$. Note that $w_2 = \frac{\lambda}{p}$ increases in λ . Thus, $\Delta(V)$ — which in the limit $\theta \rightarrow 1$ is given in (D.28) — increases in w_2 , and thus in λ .

D.5 Proof of Proposition 5

We distinguish between low- and high-hurdle equilibrium.

High-Hurdle Equilibrium. In a high-hurdle equilibrium, the continuation decision and therefore CV asset quality (and beliefs) are independent of θ . Legacy LP payoff is given in (C.21) and depends on θ only via Ω , while being decreasing in Ω . At the same time, $\Omega = \phi\alpha(1-\theta)(V_H - V)$ decreases in θ . Thus: $\frac{d\Pi^{LP}}{d\theta} = \frac{\partial\Pi^{LP}}{\partial\Omega} \frac{\partial\Omega}{\partial\theta} > 0$. Next, GP payoff is given in (B.12). It depends on θ via Ω and is increasing in Ω , so that $\frac{d\Pi^{GP}}{d\theta} = \frac{\partial\Pi^{GP}}{\partial\Omega} \frac{\partial\Omega}{\partial\theta} < 0$.

Low-Hurdle Equilibrium. In a low-hurdle equilibrium, beliefs and asset quality depend on θ via γ . We note that γ is determined according to:

$$\gamma = \begin{cases} 1 & \text{if } (1-\theta)V - I + \lambda > 0, \\ \hat{\gamma} \in [0, 1] & \text{if } (1-\theta)V - I + \lambda = 0, \\ 0 & \text{if } (1-\theta)V - I + \lambda < 0. \end{cases} \quad (\text{D.30})$$

If $(1-\theta)V - I + \lambda$ is strictly positive or negative, then γ is either zero or one and locally insensitive to changes in θ . When $(1-\theta)V - I + \lambda = 0$, we can totally differentiate this equality with respect to θ to obtain: $-V + (1-\theta)\frac{dV}{d\theta} = 0$ and $\frac{dV}{d\theta} > 0$. Note that $\frac{dV}{d\theta} > 0$ implies $\frac{\partial\gamma}{\partial\theta} < 0$, as the price V , clearly, decreases in the propensity to continue L -type assets γ (i.e., $\frac{\partial V}{\partial\gamma} < 0$). Thus, deal valuation and asset quality, and γ decline in θ .

As a consequence, $\Omega = \phi\alpha(1-\theta)(V_H - V)$ declines in θ too.

Next, recall legacy LP payoff which is given in (C.21). Legacy LP payoff depends on θ only via Ω (which enters negatively), and γ (which enters negatively too, due to $\lambda < I$). All these terms decline in θ , implying that Π^{LP} increases in θ . Finally, note that the GP's payoff from (C.20) depends on θ only via Ω , which declines in θ . Since the GP's payoff increases in Ω , it follows that GP payoff declines in θ . That is, $\frac{d\Pi^{LP}}{d\theta} > 0$ and $\frac{d\Pi^{GP}}{d\theta} < 0$.

D.6 Proof of Proposition 6

Let $\eta(s)$ the equilibrium belief that the continued asset is of type $s \in \{L, M, H\}$, conditional on the asset being continued (i.e., CV being raised). That is:

$$\eta(s) := \text{Prob}(\text{Asset is of type } s \mid \text{Asset is continued}).$$

Let $\hat{\eta}(s)$ now the probability that the continued asset is type s , conditional on the uninformed investors get the share allocation. That is:

$$\eta(s) := \text{Prob}(\text{Asset is of type } s \mid \text{Asset is continued, } \mathcal{A}_U = 1),$$

where \mathcal{A}_U denotes the event that uninformed investors get a share allocation during CV formation.

We note that legacy LPs hold beliefs $\eta(s)$, while uninformed LPs determine their valuation V_U — which is the equilibrium valuation, $V = V_U$ — using beliefs $\hat{\eta}(s)$ (which may or may not coincide with $\eta(s)$). In particular, V_U satisfies in equilibrium:

$$V_U = \mathbb{E}_U[(X - w_2)\mathbb{I}\{\text{CV cash flow is } X\} \mid \mathcal{A}_U = 1],$$

where the expectation is taken under uninformed LPs' beliefs and uninformed LPs condition on $\mathcal{A}_U = 1$. Therefore, we have (for $V = V_U$):

$$\begin{aligned} R &:= \mathbb{E}[(X - w_2)\mathbb{I}\{\text{CV cash flow is } X\} \mid \text{Legacy LPs}] - V \\ &= (X - w_2) \left[(\eta(M)p + \eta(H)) - (\hat{\eta}(M)p + \hat{\eta}(H)) \right]. \end{aligned}$$

First, note that in the low-hurdle case, no H -types are continued. In this case, uninformed investors always get the share allocation in the CV, in that $\eta(s) = \hat{\eta}(s) = 0$ and $R = 0$.

Second, consider the high-hurdle case, where H -types are continued but, with probability ϕ , are allocated to specialist investors, leaving uninformed investors empty handed. Therefore, $\eta(s)$ and $\hat{\eta}(s)$ may not coincide. As shown, in equilibrium, $\eta(s)$ satisfies (B.7) and $\hat{\eta}(s)$ satisfies (B.8), so that $\hat{\eta}(H) < \eta(H)$ and $\hat{\eta}(M) > \eta(M)$. In particular:

$$\begin{aligned} \eta(M) &= \frac{(1-p)^2(1-\delta^2)}{(1-p)^2 + 2p(1-p)}; & \eta(H) &= \frac{2p(1-p)}{(1-p)^2 + 2p(1-p)}. \\ \hat{\eta}(M) &= \frac{(1-p)^2(1-\delta^2)}{(1-p)^2 + 2p(1-p)(1-\phi)}; & \hat{\eta}(H) &= \frac{2p(1-p)(1-\phi)}{(1-p)^2 + 2p(1-p)(1-\phi)}. \end{aligned}$$

We calculate:

$$(\eta(M)p + \eta(H)) - (\hat{\eta}(M)p + \hat{\eta}(H)) = \frac{2p(1-p)\phi[1-p(1-\delta^2)]}{(1+p)(1+p-2p\phi)} > 0,$$

which implies $R > 0$ in the high-hurdle case.

Internet Appendix

I-A Two-Asset CVs (Proposition 7)

We provide the solution to the model, when the GP can continue two assets — as introduced in Section 4.3. The information structure is analogous to the baseline. With probability ϕ , the GP meets new informed LPs who can identify H -type assets. When transferring two assets, specialist investors only can recognize the H -types among those two assets.

A single-asset CV requires capital outlay of $I > 0$. Analogously, we assume that a two-asset CV requires capital investment of $2I$. The following arguments prove the results presented in Section 4.3.

This Appendix proceeds as follows. First, we characterize the CV contract, and payoffs from continuation through a CV. Second, we solve for the equilibrium, where we conjecture and verify the equilibrium structure (involving a low-hurdle contract). Third, we argue that this equilibrium is the only equilibrium. Fourth, we argue this equilibrium also exists.

For the arguments, we will need to make assumptions on off-equilibrium beliefs. These assumptions — specifically, Assumption 1 and 2 — will be introduced in the chain of argument, where needed.

I-A.1 CV Contract and Continuation Payoffs

CV Contract. In the baseline, the CV contract was simple and standard in the spirit of Holmstrom and Tirole (1997), with CV cash flows being binary and the GP being paid in the CV if and only if the CV generates positive cash flow. When two assets are transferred to the CV, the cash flows in the CV can in principle take three values, 0 (no asset in the CV succeeds), X (one asset succeeds), or $2X$ (two assets succeed). We focus on CV contracts of the following form:

1. If one asset is transferred (as in the baseline), the CV contract pays the GP if and only if the CV produces cash flow X , with the GP receiving w_2 satisfying $pw_2 = \lambda$.
2. If two assets are transferred, the GP is paid w_2 in case CV cash flow equals X ; it is paid $2w_2$ in case CV cash flow equals $2X$. Such compensation can be interpreted as an equity stake held by the GP or carried interest that is in the money as long as fund cash flows exceed X .

The rationale behind this contract is that it induces effort, whenever an M -type is continued. Thus, it is the minimum GP compensation needed to implement effort for all continuations. Indeed, as will become clear later, the GP will raise a two-asset CV in state (M, L) — when (M, L) prevails, the contract must pay, w_2 , in cash flow state X to induce effort for the M -type. In order to implement full effort (for both assets) in a two-asset CV, containing two M -types (i.e., in state (M, M)), the contract must pay, in addition, $2w_2$ for $2X$ cash flow. Consequently, above contract is the cheapest contract that induces effort for all continuations.

Continuation Payoffs. Let \hat{S} denote the types of the asset continued and transferred to the CV. Here, \hat{S} can be a singleton — that is, $\hat{S} = L, M, H$ — corresponding to a single-asset CV being raised. Alternatively, \hat{S} can be a tuple — such as $\hat{S} = (H, H)$, $\hat{S} = (H, L)$, $\hat{S} = (M, M)$, or $\hat{S} = (L, L)$ — corresponding to a two-asset CV. Let $F(\hat{S})$ denote the continuation payoff of the GP from raising the CV (net of coinvestment). Further, let $\Omega(\hat{S})$ denote the *expected* side-deal rent, when raising a CV that continues \hat{S} types. As in the baseline, these rents originate from a side deal the GP can form with informed new investors, in case they are present.

We calculate the GP’s expected payoff from continuation.

- **Single-Asset CVs:** $F(L) = F(M) = \lambda$, and $F(H) = w_2 + \lambda + \Omega(\hat{S})$.
- **Two-Asset CVs:** For endogenous $\Omega(\hat{S})$, we calculate the GP’s continuation payoffs.
 1. $F(H, H) = 2w_2 + 2\lambda + \Omega(H, H)$.
 2. $F(H, M) = w_2 + 2\lambda + \Omega(H, M)$.
 3. $F(H, L) = w_2 + 2\lambda + \Omega(H, L)$.
 4. $F(M, M) = F(M, L) = F(L, L) = 2\lambda$.

These payoffs are derived as in the baseline. For instance, when continuing an H -type, the GP need not exert effort, deriving private benefits λ per H -type continued, and receives payment w_2 per H -type continued.

I-A.2 Solving the Equilibrium

As outlined before, the general approach is to conjecture and verify the equilibrium structure, specifically, the continuation strategy. Given the continuation strategy, we determine the contract such that continuation strategy is incentive compatible. We then solve for the “cheapest” incentive compatible contract, which maximizes legacy LPs.

I-A.2.1 CV Formation and Continuation Decision

Upon CV formation, there are two possibilities. First, the GP raises a single-asset CV or, second, the GP raises a two-asset CV. Let us already conjecture that no H -types are continued and that single-asset CVs either contain L - or M -types. Specifically, we conjecture (and verify) the following continuation strategy at $t = 1$:

- $S = (H, H)$: Exit both assets.
- $S = (H, M)$: Exit H -type asset, and continue M -type through single-asset CV.
- $S = (H, L)$: Exit H -type asset. Continue L -type through single-asset CV with endogenous probability γ ; otherwise, exit both assets.
- $S \in \{(M, M), (M, L), (L, L)\}$: Continue both assets in two-asset CV.

Two-asset CVs contain a mixture of L - and M -type assets. This results in (pooling) valuations (all-in prices) for single-asset CVs of V_1 and two-asset CVs of V_2 . These all-in prices, as in the baseline, will be pinned down by uninformed investors, while, for H -type continuations, specialists may buy CV shares at the same price and form a side deal with the GP. Given there are no H -type continuations in equilibrium, CVs are priced competitively and fairly in equilibrium.

Investors form beliefs about the quality of the continued assets, and the prices are fair given the beliefs. Given the continuation strategy above, we have the following prices:

- **Single-Asset CV.** For a single-asset CV — which occurs in states (H, M) or (H, L) (with probability γ) — the fair competitive valuation of CV shares under equilibrium beliefs equals:

$$V_1 = \frac{(1 - \delta)}{(1 - \delta + \delta\gamma)} \cdot p(X - w_2).$$

As in the baseline, the GP can extract potential side-deal rents when transferring H -types at undervalued terms. If the GP were to deviate and continue an H -type asset, it encounters, with probability ϕ , specialist investors who recognize the H -type. The actual value of the CV shares then equals $V_H = X - w_2$. Specialists would buy $1 - \theta$ CV shares at a discount per-share of $V_H - V_1$, yielding buyer rent of the same amount. The GP can then extract fraction α of the resulting buyer rents from a side-contract with specialists. This leads to expected side-deal rents (from continuing H -types) of

$$\Omega(H) = \Omega_1 := \phi\alpha(1 - \theta)(V_H - V_1).$$

The derivation of these rents is analogous to the baseline.

In state (H, L) , the GP exits the H -type. Furthermore, the GP continues the L -type, rather than liquidating it, if this increases the joint surplus of legacy LPs and the GP; see proof of Proposition 2 for formal arguments proving this claim. The joint surplus equals:

$$\mathcal{L} = (1 - \theta)V_1 - I + \lambda.$$

When $\mathcal{L} < 0$ ($\mathcal{L} > 0$), we have $\gamma = 0$ ($\gamma = 1$), while, when $\gamma \in (0, 1)$, we have $\mathcal{L} = 0$. More generally, γ is determined according to:

$$\gamma = \begin{cases} 1 & \text{if } (1 - \theta)V_1 - I + \lambda > 0, \\ \hat{\gamma} \in [0, 1] & \text{if } (1 - \theta)V_1 - I + \lambda = 0, \\ 0 & \text{if } (1 - \theta)V_1 - I + \lambda < 0. \end{cases} \quad (\text{I-A.1})$$

- **Two-Asset CV.** Two-asset CVs only arise in states $S \in \{(M, M), (M, L), (L, L)\}$. With probability $(1 - p)^2$, such state S — where neither asset is successful — realizes. Conditional on no asset being successful, the probability that any asset is M -type equals $1 - \delta$, while it is L -type with probability δ . Naturally, only uninformed investors participate, and they do not know the assets' types. This yields the fair price:

$$V_2 = 2(1 - \delta)p(X - w_2).$$

Next, we derive the potential rents the GP can extract by engaging in a side deal with informed investors.

1. First, suppose that both assets are successful, i.e., $S = (H, H)$, and new investors are informed that both assets are H -type (they recognize the H -types). Then, the fair value of CV shares from their perspective equals $2V_H = 2(X - w_2)$. As in the baseline, the GP can then transfer $1 - \theta$ CV shares at (per-share) discount of $2V_H - V_2$. That is, the GP can extract expected side-deal rents of

$$\Omega(H, H) = \phi\alpha(1 - \theta)[2V_H - V_2],$$

when continuing both assets in state (H, H) at valuation V_2 .

2. Second, suppose that one asset is successful, but the other one remains L - or M -type. That is, we are in state $S = (H, L)$ or $S = (H, M)$. Suppose the GP encounters specialist investors, who recognize the H -type asset (but do not know whether the other asset is L - or M -type).

We make the **assumption** that specialists attach probability $1 - \delta$ of the other asset being M -type. Formally:

Assumption 1. *Consider that two-asset CVs containing an H -type — that is, (H, M) or (H, L) CVs — do not arise in equilibrium. Then, when presented a two-asset CV containing an H -type (off-equilibrium), informed specialists recognize the H -type and believe the asset of unknown type is M -type with probability $1 - \delta$ and L -type with probability δ .*

Thus, informed investors' valuation of CV shares (given their beliefs) equals

$$[1 + (1 - \delta)p](X - w_2) = V_H + \frac{V_2}{2}.$$

Consider that a two-asset CV with one H -type is formed at valuation V_2 . The GP can then offer informed investors to buy $1 - \theta$ CV shares at a per-share discount of $V_H + \frac{V_2}{2} - V_2 = V_H - \frac{V_2}{2}$. This generates buyer's rent of the same amount for the specialists (per-share), of which the GP can extract fraction α .

Hence, in states (H, M) or (H, L) , upon continuing both assets and facing informed LPs, the GP can extract side deal rents of $\alpha(V_H - \frac{V_2}{2})$ per share sold. This yields total expected side-deal rents of

$$\Omega(H, M) = \Omega(H, L) = \Omega_2 := \phi\alpha(1 - \theta) \left[V_H - \frac{V_2}{2} \right],$$

when continuing both assets in states (H, L) or (H, M) .

We make several observations. First, note that $\Omega(H, H) = 2\Omega(H, M) = 2\Omega_2$. Second, observe that $2V_1 \geq V_2$ and $\Omega_1 \leq \Omega_2$, with the inequalities being strict as long as $\gamma < 1$.

I-A.2.2 Incentive Conditions and Low-Hurdle Contract

The legacy fund contract structure is that of a low-hurdle contract. First, the GP is paid w_H if it successfully exits both assets at time $t = 1$ (fund cash flow equals $2X$). Second, the GP is paid w_M if it exits one asset successfully, while continuing the other in a single-asset CV (fund cash flow greater than X). Third, the GP is paid w_L when exiting both assets, while one is successful (fund cash flow equal to X). Fourth, when continuing both assets, the GP is paid nothing.

We next derive the incentive conditions to ensure the prescribed continuation strategy is incentive-compatible:

- **State $S = (H, H)$.** The GP has two potential deviations from the prescribed strategy, which involves exiting both assets. The GP can (1) continue one H -type in a single asset CV or (2) continue both assets in a two-asset CV. The following incentive constraint precludes both deviations, with the first inequality precluding deviation (1) and the second inequality precluding deviation (2):

$$\begin{aligned} w_H &\geq w_M + w_2 + \lambda + \Omega_1 && \text{(Single-Asset CV)} \\ w_H &\geq 2w_2 + 2\lambda + 2\Omega_2. && \text{(Two-Asset CV).} \end{aligned} \tag{I-A.2}$$

- **State $S = (H, M)$.** The prescribed strategy involves exiting the H -type, while continuing the M -type. The GP has two major deviations: (1) continuing the H -type in a single-asset CV while exiting the M -type, or (2) continuing both assets in a two-asset CV. The following incentive constraint precludes both deviations, with the first inequality precluding deviation (1) and the second inequality precluding deviation (2):

$$\begin{aligned} w_M &\geq \Omega_1 + w_2 && \text{(Single-Asset CV)} \\ w_M &\geq \Omega_2 + w_2 + \lambda. && \text{(Two-Asset CV).} \end{aligned}$$

To understand the second constraint, note that the prescribed strategy yields $w_M + pw_2$, while the deviation yields $\Omega_2 + w_2 + \lambda + pw_2$, with pw_2 cancelling out.

Due to $\Omega_2 \geq \Omega_1$, the relevant incentive constraint becomes the second one:

$$w_M \geq \Omega_2 + w_2 + \lambda. \tag{I-A.3}$$

In addition, the GP must find it optimal to continue the M -type rather than exiting both assets, leading to $w_M + pw_2 \geq w_L$.

- **State $S = (H, L)$.** We have to distinguish several cases:
 1. $\gamma = 0$. Then, the GP must find it optimal to exit both assets, rather than to raise a single- or two-asset CV, which is precluded by:

$$\begin{aligned} w_L &\geq w_2 + \lambda + \Omega_1, && \text{(Single-Asset CV)} \\ w_L &\geq w_2 + 2\lambda + \Omega_2. && \text{(Two-Asset CV).} \end{aligned}$$

Due to $\Omega_2 \geq \Omega_1$, the second constraint implies the first one.

2. $\gamma \in (0, 1)$. Then, the GP must be indifferent between liquidating and continuing the L -type, while not finding it optimal to either continue the H -type in a single- or two-asset CV. Thus:

$$\begin{aligned} w_L &= w_M + \lambda; & w_L &\geq w_2 + \lambda + \Omega_1; \\ w_L &\geq w_2 + 2\lambda + \Omega_2. \end{aligned}$$

3. $\gamma = 1$. Then, set without loss of generality $w_L = 0$. Since continuing an M - or L -type in a single-asset CV yield the same payoff to the GP, above incentive constraints from state (H, M) ensure the GP finds it optimal to exit the H -type, while continuing the L -type.

- **States** $(M, M), (M, L), (L, L)$. The GP continues both assets, deriving payoff 2λ .

I-A.2.3 Optimal Contract and Payoffs

Similar to the proof of Proposition 2, we can combine above incentive constraints and find the lowest possible payments that adhere to these incentive constraints, thereby maximizing LP payoff. We start by binding (I-A.3), yielding $w_M = w_2 + \lambda + \Omega_2$.

Given this, note from (I-A.2) that the second-line equality implies the first-line inequality. Binding the second-line inequality, we obtain $w_H = 2w_2 + 2\lambda + 2\Omega_2$.

Finally, determine the payment w_L . The constraint toughest to satisfy is $w_L \geq w_2 + 2\lambda + \Omega_2$. When $\gamma = 1$, set $w_L = 0$. Provided $\gamma < 1$, set $w_L = w_2 + 2\lambda + \Omega_2$. It follows that $w_L = w_M + \lambda$, so the payment structure keeps the GP indifferent in states (H, M) and (H, L) between exiting both assets or only exiting the H -type. These payments are the lowest payments that satisfy all IC constraints.

Optimal GP Payments. Overall, the payments in the optimal contract satisfies

$$\begin{aligned} w_H &= 2w_2 + 2\lambda + 2\Omega_2; \\ w_M &= w_2 + \lambda + \Omega_2; & w_L &= w_2 + 2\lambda + \Omega_2. \end{aligned}$$

Note that $w_H = w_M + w_2 + \lambda + \Omega_2$, as well as $w_L = w_M + \lambda$.

Payoffs. The GP's payoff equals

$$\Pi^{GP} = p^2 w_H + 2p(1-p)[w_M + \lambda] + 2(1-p)^2 \lambda.$$

The present value (total surplus split between legacy LPs and GP) equals:

$$PV = 2p^2 X + 2p(1-p)[X + (1-\delta)(pX - I) + \delta\gamma(\lambda - I)] + 2(1-p)^2 [(1-\delta)pX + \delta(\lambda - I)].$$

Legacy LP payoff becomes $\Pi^{LP} = PV - \Pi^{GP}$. (There are no H -type transfers, so there is no specialist rent in equilibrium).

We can write more explicitly for $G = (1 - \theta)V_1 - I$:

$$\begin{aligned} \Pi^{LP} = & p^2(2X - w_H) + (1 - p)^2[2(1 - \delta)\theta p(X - w_2) + \theta V_2 - 2I] \\ & + 2p(1 - p)[X + (1 - \delta + \delta\gamma)(G - w_M) - \delta(1 - \gamma)w_L + (1 - \delta)\theta p(X - w_2)]. \end{aligned}$$

I-A.2.4 Equilibrium Uniqueness

The contract structure resembles that of a low-hurdle contract arising in a low-hurdle equilibrium from Proposition 2. A potential (and the only) alternative strategy for LPs would involve writing a legacy fund contract that only pays when both assets are successfully exited in the legacy fund, analogous to the high-hurdle contract from Proposition 1. We evaluate this possibility and show that this is not optimal for legacy LPs, giving us a unique equilibrium under below assumption 2 (which refines off-equilibrium beliefs).

We establish uniqueness as follows. Suppose (to the contrary) that an equilibrium with high-hurdle contract exists. In this equilibrium, the legacy fund pays the GP w^* for exiting two assets successfully at time $t = 1$ (in state (H, H)); the GP is paid zero in all other states. In the proposed high-hurdle equilibrium, we determine the optimal high-hurdle contract and the GP's continuation decision, as well as equilibrium valuations of a single-asset CV, V_1 , and two-asset CV, V_2 . We then show that, given these equilibrium valuations, legacy LPs prefer deviating to a low-hurdle contract, so that a high-hurdle equilibrium cannot exist.

Crucially, a single-asset CV may not be raised in equilibrium. In this contingency, raising a single-asset CV would constitute an off-equilibrium deviation, so off-equilibrium beliefs will pin down the valuation of a single-asset CV, V_1 . We make the following assumption:

Assumption 2. *If a single-asset CV does not occur in equilibrium, but is raised off-equilibrium, the deal valuation paid by uninformed LPs satisfies $V_1 = \frac{V_2}{2}$.*

This assumption allows us to establish uniqueness of the low-hurdle equilibrium. The rationale is that off-equilibrium beliefs are consistent with the average quality of the asset continued. All CVs will have the same valuation V_2 and consist of two assets: Thus, each individual asset's part has valuation $V_2/2$. The valuation for off-equilibrium single-asset CVs has to be consistent with that, in that Assumption 2 holds.

Continuation Decision. In states $(H, M), (H, L)$, given that the GP is only paid for double-success, the GP optimally continues both assets. Likewise, whenever there is no success, i.e., in states $(L, L), (M, M), (M, L)$, the GP continues both assets. In state (H, H) , the GP will exit both assets, with the payments providing appropriate incentives for the GP to do so.

Thus, in the proposed equilibrium, all CVs involve two assets, and the valuation/price V_2 is determined in equilibrium and pinned down by equilibrium beliefs. However, a single-asset CV would constitute an off-equilibrium deviation, so off-equilibrium beliefs will pin down the valuation of a single-asset CV, V_1 , according to assumption 2.

Incentive Condition. One can verify that in state (H, H) the best possible deviation is for the GP to transfer both assets, rather than exiting them both and collecting payment

w^* . Legacy LPs naturally preclude this behavior, which requires, analogously to (I-A.2):

$$w^* \geq 2w_2 + 2\lambda + 2\Omega_2, \text{ where } \Omega_2 := \phi\alpha(1 - \theta) \left[V_H - \frac{V_2}{2} \right]. \quad (\text{I-A.4})$$

When transferring two H -types at valuation V_2 , the GP encounters, with probability ϕ , informed specialists, who value the CV at $2V_H = 2(X - w_2)$. Then, the GP can extract fraction α of the buyer's rent, that is, $\alpha(1 - \theta)(2V_H - V_2)$. Thus, the expected rents the GP can extract from transferring two H -types becomes: $2\phi\alpha(1 - \theta)(2V_H - V_2) = 2\Omega_2$. The incentive constraint (I-A.4) optimally binds. This payment takes the *same form* as in the previously characterized contract (for given set of beliefs), in that

$$w^* = 2w_2 + 2\lambda + 2\Omega_2.$$

Note that if the GP were to raise a single-asset CV, the valuation would satisfy $V_1 = \frac{V_2}{2}$ by assumption 2. If an H -type is transferred, the GP meets with probability ϕ informed specialists, extracting rent $\alpha(V_H - V_2)$ via a side deal. Thus, the expected side deal rent from raising a single-asset H -type CV equals Ω_2 .

Continuation Payoffs. Let $\hat{V}_1 = (1 - \delta)p(X - w_2)$ denote specialist investors' equilibrium valuation for a continued asset which is not H -type. If a specialist is presented a CV consisting of (H, M) or (H, L) , it values its shares at $V_H + \hat{V}_1$. Naturally, $\hat{V}_1 \leq \frac{V_2}{2}$, so that

$$\Omega_1 := \phi\alpha(1 - \theta)[V_H + \hat{V}_1 - V_2] \leq \Omega_2 = \phi\alpha(1 - \theta) \left[V_H - \frac{V_2}{2} \right].$$

Here, Ω_1 is the GP's expected side deal rent when continuing (H, M) or (H, L) in a CV.

Continuation in states (H, M) and (H, L) involves raising a two-asset CV. In both states, the GP derives equal net payoff:

$$\Pi^{GP}(H, M) := \Omega_1 + w_2 + 2\lambda \leq \Omega_2 + w_2 + 2\lambda.$$

Next, consider state (H, M) . Legacy LPs' continuation payoff in that state — given that the GP raises a two-asset CV — reads:

$$\Pi^{LP}(H, M) = (1 - \theta)V_2 - 2I + \theta(1 + p)(X - w_2).$$

In state (H, L) , legacy LPs' continuation payoff equals:

$$\Pi^{LP}(H, L) = (1 - \theta)V_2 - 2I + \theta(X - w_2).$$

Deviation to Low-Hurdle Contract. Suppose the legacy LPs were to alter the contract by stipulating a payment $w' := \Pi^{GP}(H, M) - \lambda$ to the GP whenever the GP exits one asset successfully while continuing the other. That is, legacy LPs deviate to a low-hurdle contract. Then, in states (H, M) and (H, L) , the GP would find it optimal to exit the H -type while

continuing the M - or L -type, as this yields precisely payoff

$$w' + pw_2 = \Pi^{GP}(H, M) = \Pi^{GP}(H, L),$$

by construction. Note that

$$w' \leq \Omega_2 + w_2 + \lambda. \quad (\text{I-A.5})$$

Even if this payment is introduced, the GP payment $w^* = w_H$ remains unchanged and provides incentives to exit both assets in state (H, H) . Indeed, w^* makes it optimal to exit both assets, rather than continuing both, by virtue of (I-A.4). And, raising a single asset CV, continuing the H -type yields payment w' plus an expected side-deal rent of Ω_2 , yielding total payoff:

$$w' + \Pi^{GP}(H, M) - \lambda + \Omega_2 = \Omega_1 + \Omega_2 + w_2 + \lambda \leq 2\Omega_2 + w_2 + \lambda = w^*,$$

Thus, facing the payments w', w^* , the GP prefers exiting both assets in (H, H) .

In state (H, M) , legacy LPs' payoff in this case upon deviation becomes:

$$\begin{aligned} \widehat{\Pi}^{LP}(H, M) &= (1 - \theta)V_1 - I + \theta p(X - w_2) + X - w' \\ &\geq (1 - \theta)V_1 - I + \theta p(X - w_2) + X - w_2 - \lambda - \phi\alpha(1 - \theta) \left(X - w_2 - \frac{V_2}{2} \right) \\ &\geq (1 - \theta)V_2 - I + \theta(1 + p)(X - w_2) - (1 - \theta)(X - w_2) - \lambda \\ &= \Pi^{LP}(H, M) + I - \lambda, \end{aligned}$$

where we used (I-A.5) (first inequality), $V_1 = V_2/2$, the definition of Ω_2 , as well as $\phi\alpha \leq 1$ (second inequality). Thus:

$$\widehat{\Pi}^{LP}(H, M) - \Pi^{LP}(H, M) \geq I - \lambda > 0$$

Likewise, in state (H, L) , legacy LPs' payoff becomes

$$\widehat{\Pi}^{LP}(H, L) > \Pi^{LP}(H, L).$$

In all other states, legacy LPs' payoff remains unchanged by the deviation. Since the deviation does not affect the probabilities with which these states realize, it follows that the deviation to the low-hurdle contract makes the legacy LPs better off.

This destabilizes the proposed high-hurdle equilibrium. Hence, the aforementioned equilibrium is unique under assumption 2. The unique equilibrium features a low-hurdle contract.

I-A.3 Existence

The existence argument follows the same structure as the uniqueness argument. One can show that, given equilibrium valuations of single- and two-asset CVs (V_1 and V_2), a high-hurdle contract is strictly dominated by a low-hurdle one.

Take (V_1, V_2) as given. The payoff under low-hurdle contract equals:

$$\begin{aligned}\Pi^{LP}(\gamma) &= p^2(2X - w_H) + (1 - p)^2[2(1 - \delta)\theta p(X - w_2) + \theta V_2 - 2I] \\ &\quad + 2p(1 - p)[X + (1 - \delta + \delta\gamma)(G - w_M) - \delta(1 - \gamma)w_L + (1 - \delta)\theta p(X - w_2)],\end{aligned}$$

where $G = (1 - \theta)V_1 - I$ and γ is the equilibrium value, satisfying (I-A.1). Calculate (using $w_L = w_M + \lambda$):

$$\frac{\partial \Pi_{LP}}{\partial \gamma} = 2p(1 - p)\delta(G - w_M + w_L) = 2p(1 - p)\delta[(1 - \theta)V_1 - I + \lambda].$$

As γ is positive only if $(1 - \theta)V - I + \lambda \geq 0$, evaluating above expression at $\gamma = 1$ yields a lower bound, in that $\Pi_{LP}(\gamma) \geq \Pi_{LP}(1)$.

The high-hurdle contract would pay the GP only upon double success, where

$$w^* = 2w_2 + 2\lambda + 2\Omega_2 = w_H.$$

Legacy LPs' payoff under high-hurdle contract therefore becomes

$$\begin{aligned}\Pi_{Dev}^{LP} &= p^2(2X - w_H) + (1 - p)^2[2(1 - \delta)\theta p(X - w_2) + \theta V_2 - 2I] \\ &\quad + 2p(1 - p)[\theta(1 + (1 - \delta)p)(X - w_2) + (1 - \theta)V_2 - 2I].\end{aligned}$$

Note that for $V_H = X - w_2$, $w_M = w_2 + \lambda + \Omega_2$, as well as:

$$\begin{aligned}\Pi^{LP}(1) - \Pi_{Dev}^{LP} &\propto X + (1 - \theta)(V_1 - V_2) + I - w_M - \theta V_H \\ &= (1 - \theta)V_H + (1 - \theta)(V_1 - V_2) + (I - \lambda) - \Omega_2 \\ &\geq (1 - \theta)\left(V_1 - \frac{V_2}{2}\right) + I - \lambda > 0.\end{aligned}$$

The first inequality uses that:

$$\Omega_2 = \phi\alpha(1 - \theta)\left[V_H - \frac{V_2}{2}\right] \leq (1 - \theta)\left[V_H - \frac{V_2}{2}\right].$$

The second inequality uses $I > \lambda$ and $V_1 \geq \frac{V_2}{2}$. Thus, in the low-hurdle equilibrium, it is strictly optimal not to deviate.

Hence, the proposed equilibrium, featuring a low-hurdle contract, both exists and is unique.

I-B Other Results and Extensions

I-B.1 GP Coinvestment (Proposition 8)

We sketch outcomes with GP coinvestment of exogenous amount of A dollars. (The GP is endowed with this amount at the time of CV formation.) A key implication is that in state (L, L) , coinvestment deters the continuation of an L -type, whenever the benefits of

continuation (λ) fall short of the required coinvestment (A). Thus, the GP continues an L -type in (L, L) if and only if $\lambda > A$ — where we break ties in favor of not continuing in case of indifferent. Let $\mathcal{I} = \mathbb{I}\{\lambda > A\}$ indicate whether the GP continues an asset in (L, L) .

We solve for high- and low-hurdle equilibria. As in the baseline, all asset will be transferred at the same pooling valuation $V = V_U$ (with the exact value depending on the type of equilibrium). Thus, as argued in the main text, the GP can acquire fraction $\theta_{GP} = \frac{A}{V}$ of the CV shares at valuation V . Indeed, the GP uses A dollars to buy θ_{GP} shares at transfer price v and contributes $\theta_{GP}I$ to finance the continuation investment. Overall, $A = \theta_{GP}(v + I) = \theta_{GP}V$. We assume that $1 - \theta > \theta_{GP}$ and that the GP buys shares from exiting LPs, while the retention of CV shares by rolling LPs remains the same at θ . Thus, $1 - \theta - \theta_{GP}$ shares are sold to new investors.

In either equilibrium, the GP may form a side deal when transferring an H -type, which has fair value $V_H = X - w_2$. In case it encounters informed investors, which happens with probability ϕ , the GP can undervalue and sell the asset at $V = V_U$, and extracting fraction α of the buyer's rent. The per-share buyer's rent is $V_H - V$, As $1 - \theta - \theta_{GP}$ shares are sold to new investors, the total buyer's rent equals $(1 - \theta - \theta_{GP})(V_H - V)$. In addition, the GP is buyer itself, and can capture a buyer's rent of

$$\theta_{GP}(V_H - V) = \theta_{GP}V_H - A$$

when buying the H -type at valuation V .

Taken together, the GP's total expected rent from transferring an H -type at valuation V becomes:

$$\Omega := \phi\alpha(1 - \theta - \theta_{GP})(V_H - V) + \theta_{GP}(V_H - V) = [\phi\alpha(1 - \theta) + (1 - \phi\alpha)\theta_{GP}](V_H - V).$$

Most of the analysis goes now through as in the baseline, recognizing the GP may not continue L -types (when $A \geq \lambda$) and subject to re-defining Ω .

I-B.1.1 High-Hurdle Contract

In the high-hurdle contract, the GP is only paid for exiting both assets successfully, i.e., in state (H, H) . The payment w^* is such that the GP has incentives to do so, in that: $w^* \geq w_2 + \lambda + \Omega$. The last term Ω captures (1) the expected side-deal rent by allocating shares at low valuation to informed new investors, and (2) the GP's own buyer's rent (trading gain). The remainder of the analysis remains as in the baseline, with a similar continuation strategy. That is, in states (H, M) and (H, L) , the GP continues the H -type. In states (M, L) and (M, M) , the GP continues the M -type. In state (L, L) , the GP continues an L -type if and only if $\lambda > A$.

All assets are transferred at the same valuation V , coinciding with uninformed investors' valuation, who take into account that the GP may allocate H -types to informed investors. The valuation satisfies

$$V = V_U := (\hat{\eta}(M)p + \hat{\eta}(H))(X - w_2)$$

where

$$\hat{\eta}(M) = \frac{(1-p)^2(1-\delta^2)}{(1-p)^2(1-\delta^2 + \delta^2\mathcal{I}) + 2p(1-p)(1-\phi)};$$

$$\hat{\eta}(H) = \frac{2p(1-p)(1-\phi)}{(1-p)^2(1-\delta^2 + \delta^2\mathcal{I}) + 2p(1-p)(1-\phi)},$$

where we account for the fact that the GP continues in (L, L) if and only if $\lambda > A$.

Note that in states (M, L) , (M, M) , the GP payoff from continuing equals:

$$\lambda + \theta_{GPP}(X - w_2) - A = \lambda + A \left(\frac{V_M}{V} - 1 \right).$$

One can assume that parameters are such that this term is positive (even when $A > \lambda$), i.e., the GP indeed has incentives to continue in state M .

I-B.1.2 Low-Hurdle Contract

The low-hurdle contract takes the familiar form, paying the GP w_H for exiting both assets successfully, paying w_M for exiting one asset successfully while continuing the other, and paying w_L for exiting both assets, one successfully. The payments are determined by binding incentive constraints. We only consider the relevant constraints:

1. The payment w_H is such that the the GP exits both assets in state (H, H) :

$$w_H \geq w_M + \lambda + w_2 + \Omega.$$

This constraint binds: $w_H = w_M + \lambda + w_2 + \Omega$.

2. The payment w_L is such that in state (H, L) , the GP exits both assets, rather than continuing the H -type:

$$w_L \geq w_2 + \lambda + \Omega.$$

This constraint also binds, i.e., $w_L = w_2 + \lambda + \Omega$.

3. The payment w_M incentivizes the GP to exit the H -type, and to continue the M -type in state (H, M) . If the GP continues the M -type and coinvests A , it obtains a stake θ_{GPP} in an M -type, which is worth to the GP $\theta_{GPP}V_H$ where $V_H = X - w_2$. Thus, the “trading gain” (buyers’ rent) for the GP is $\theta_{GPP}V_H - A$. Therefore, the GP has incentives to exit H and continue M , if:

$$w_M + (\theta_{GPP}V_H - A) \geq w_2 + \Omega.$$

Since $V < pV_H = p(X - w_2)$ in equilibrium (i.e., the average project is a mixture of L - and M -types), we will have that $(\theta_{GPP}V_H - A) > 0$.

4. In state (H, L) , when the contract calls for continuing the L -type ($\gamma > 0$), the payment w_M must be such that the GP prefers exiting the H -type and continuing the M -type,

rather than exiting both (and earning w_L). Thus:

$$w_M + \lambda - A \geq w_L \quad \text{if } \gamma > 0.$$

This constraint simplifies to $w_M - A \geq w_2 + \Omega$, using above expression for w_L .

Next, we distinguish two cases.

First, when $\gamma = 0$, then the latter constraint does not apply, and we set $w_M = w_2 + \Omega - (\theta_{GPP}V_H - A) = w_2 + \Omega + A - \theta_{GPP}V_H$. Second, when $\gamma > 0$, we have

$$w_M - A = \max\{w_2 + \Omega, w_2 + \Omega - \theta_{GPP}V_H\} \implies w_M = w_2 + \Omega + A.$$

Taken together, we can write:

$$w_M = w_2 + \Omega + A - \theta_{GPP}V_H \mathbb{I}\{\gamma = 0\}.$$

The remainder is analogous to the baseline. The common valuation at which assets are transferred equals the competitive, fair valuation, satisfying:

$$V = V_U = \eta(M)p(X - w_2) = \eta(M)pV_H,$$

where

$$\eta(M) = \frac{(1-p)^2(1-\delta^2) + 2p(1-p)(1-\delta)}{(1-p)^2(1-\delta^2 + \delta^2\mathcal{I}) + 2p(1-p)[1-\delta + \delta\gamma]}.$$

In equilibrium, γ is determined according to:

$$\gamma = \begin{cases} 1 & \text{if } (1-\theta)V - I + \lambda > 0, \\ \hat{\gamma} \in [0, 1] & \text{if } (1-\theta)V - I + \lambda = 0, \\ 0 & \text{if } (1-\theta)V - I + \lambda < 0. \end{cases} \quad (\text{I-B.1})$$

I-B.2 Time-0 Effort (Propositions 9 and 10)

We provide the solution with an initial time-0 effort, as outlined in Section 5.1. To obtain some interesting margin of variation, let us consider an effort $e_0 \geq 0$ against a convex cost $\kappa(e_0) = \frac{\kappa e_0^2}{2}$ for some positive, large enough constant κ . We assume parameters are such that optimal effort e_0 is interior in $(0, 1)$, i.e., $e_0 \in (0, 1)$. We also assume that κ is large enough such that any second order condition in effort optimization satisfied (for brevity, we do not formally check these conditions). Further, we sometimes write e instead of e_0 .

We model the effects of initial effort as follows (as also discussed in Section 5.1):

1. The GP exerts hidden effort $e_0 \in [0, 1)$ against convex cost, taking as given the contracts and the beliefs of new LPs. Effort is private, i.e., it neither observable or verifiable by legacy or new LPs.
2. Given effort e_0 , any assets succeeds and becomes H -type by time $t = 1$ with i.i.d. probability e_0 . With probability $1 - e_0$, an asset is not successful, in which case it

becomes L -type with probability δ and, otherwise with probability $1 - \delta$, becomes M -type.

3. In case of continuation, the model from $t = 1$ to $t = 2$ becomes identical to the baseline, conditional on the state of the continued asset. Specifically, continuation entails a cost $I > 0$; an L -type or H -type continuation yield time-2 cash flows of zero and X , respectively. When an M -type is continued, the GP exerts binary effort $e_1 \in \{0, 1\}$ at $t = 1$; not providing effort yields private benefits of λ . An M -type asset succeeds with probability pe_1 by time $t = 2$, producing cash flows X .
4. The CV contract pays the GP w_2 in case the CV asset succeeds and zero otherwise. As in the baseline, we set $w_2 = \frac{\lambda}{p}$.

Crucially, our modeling makes several important assumptions to maintain tractability and to simplify. First, the same effort applies to both assets, which has no bearings on our findings. Second, initial effort e_0 affects the continuation stage and CV formation only by influencing the likelihood of success in $t = 1$. That is, e_0 only influences the probabilities with which individual states $S = (s_A, s_B)$ realize and thus the beliefs of new LPs. However, conditional on the state S , the continuation technology remains unchanged. We characterize the high-hurdle and low-hurdle equilibria that may emerge, but do not analyze existence or uniqueness.

I-B.2.1 High-Hurdle Contract

Conditional on the state S being realized, the model and solution become analogous to the baseline, with formal arguments of the continuation decision and CV formation presented in Appendix B (and Proposition 1). The high-hurdle contract for the legacy fund pays the GP if and only if the GP exits two assets successfully by time $t = 1$. The corresponding payment is denoted w^* and set such that the GP indeed finds it optimal to exit both assets at $t = 1$ in state (H, H) .

To summarize, the legacy fund contract implies the following continuation strategy:

1. (L, L) : Continue the L -type asset.
2. (L, M) or (M, M) : Continue the M -type asset.
3. (H, L) or (H, M) : Continue the H -type asset.
4. (H, H) : Exit both H -type assets.

Take beliefs of new LPs and the deal valuation V as given. Also recall that when transferring an H -type at valuation V , the GP can extract side-deal rents, with the expected rents being equal to $\Omega = \phi\alpha(1 - \theta)(V_H - V)$ for $V_H = X - w_2$.

Legacy Fund Contract. To incentivize the GP to exit both assets at $t = 1$ in state (H, H) , the payment w^* must satisfy (analogous to Proposition 1):

$$w^* \geq \Omega + \lambda + w_2 =: w_{Min}^*.$$

In addition to incentivizing the appropriate continuation and exit strategy, legacy LPs also design the contract to incentivize the desired level of effort, e_0 . The cheapest way to provide effort incentives is to raise w^* above the minimum level w_{Min}^* (required to incentivize exit). Raising w^* above that level also does not cause any further distortions.

We next characterize the GP's effort incentives. Under effort $e = e_0$, GP payoff (gross of effort cost) is

$$\Pi^{GP}(e; w^*) = e^2 w^* + 2e(1 - e)(\Omega - \lambda + w_2) + (1 - e)^2 \lambda$$

The payoff net of effort cost therefore reads $\Pi^{GP}(e; w^*) - \frac{\kappa e^2}{2}$.

Effort Incentives. The GP chooses effort to maximize $\Pi^{GP}(e; w^*) - \frac{\kappa e^2}{2}$, taking as given the contracts and beliefs of new LPs. The first-order condition with respect to effort e becomes,

$$(\Pi^{GP})'(e; w^*) = 2ew^* + (2 - 4e)(\Omega + \lambda + w_2) - 2(1 - e)\lambda = \kappa e.$$

(We assume κ is large enough such that the second order condition is satisfied.) Suppose the continuation incentive constraint is tight, i.e., $w^* = w_{Min}^*$. Under $w^* = w_{Min}^* = \Omega + \lambda + w_2$, the GP's first order condition for effort can be solved for $e = e_{hh}^{Min}$:

$$e_{hh}^{Min} = \frac{2(\Omega + w_2)}{\kappa + 2(\Omega + w_2)}.$$

Legacy LP Payoff. Let $G = (1 - \theta)V - I$. We now characterize the legacy LPs' expected payoff *gross of (i.e., excluding) payments to the GP*:

$$\pi^{LP}(e) = 2e^2 X + 2e(1 - e)[G + \theta(X - w_2)] + (1 - e)^2 [(1 - \delta^2)(G + \theta p(X - w_2)) + \delta^2 G].$$

Note that legacy LPs' payoff net of payments to the GP become:

$$\Pi^{LP}(e) = \pi^{LP}(e) - \Pi^{GP}(e, w^*).$$

Optimal Effort. We next solve for the optimal effort level, distinguishing two cases.

First, if $w^* = w_{Min}^*$, then $e = e_0 = e_{hh}^{Min}$. Otherwise, if $w^* > w_{Min}^*$, optimal effort e must satisfy legacy LPs' first order condition, that is: $(\Pi^{LP})'(e) = 0$. Due to the GP's incentive condition — that is, $(\Pi^{GP})'(e; w^*) = \kappa e$ — this first order condition becomes: $(\pi^{LP})'(e) = \kappa e$. Solving for $e = e_{hh}^*$, we obtain:

$$e_{hh}^* = \frac{\theta[(1 - \delta^2)p - 1](X - w_2)}{2(1 - \theta)X + 2\theta w_2 + (1 - \delta^2)\theta p(X - w_2) - G - \kappa/2}$$

The optimal contracted effort $e = e_0$ then satisfies $e = e_{hh}$, with:

$$e_{hh} = \max\{e_{hh}^*, e_{hh}^{Min}\}.$$

Since these expressions are rather involved, we provide the following simplification.

Simplification for $\theta = 1$ and $\delta = 0$. Then, we have $G = -I$ and

$$e_{hh} = \max\left\{\frac{2w_2}{\kappa + 2w_2}, \frac{(1-p)(X - w_2)}{\kappa/2 - I - p(X - w_2) - 2w_2}\right\}.$$

I-B.2.2 Low-Hurdle Contract

Conditional on the state S being realized, the model and solution become analogous to the baseline, with formal arguments of the continuation decision and CV formation presented Appendix C (and Proposition 2). The low-hurdle contract for the legacy fund pays the GP if and only if the GP exits at least one asset successfully by time $t = 1$. The payment for exiting two assets successfully is w_H . The payment for exiting one asset successfully, while continuing the other, equals w_M . The payment for exiting both assets, one successfully, equals w_L . To recall, the low-hurdle contract implies the following continuation strategy:

1. (L, L) : Continue the L -type.
2. (M, L) or (M, M) : Continue the M -type.
3. (H, L) : Continue the L -type with probability γ and exit the H -type.
4. (H, M) : Continue the M -type and exit the H -type.
5. (H, H) : Exit both H -types.

Payments and Incentives. In addition to incentivizing this continuation strategy, legacy LPs also need to incentivize the appropriate effort $e_0 = e$. The cheapest way to provide effort incentives is via the payment w_H (obtained upon double success). Therefore, the payments satisfy:

$$\begin{aligned} w_M &= w_2 + \Omega + \lambda - pw_2; & w_L &= w_2 + \Omega + \lambda, \\ w_H &\geq w_{H,Min} := w_M + \lambda + w_2 + \Omega. \end{aligned} \tag{I-B.2}$$

The payments w_M and w_L are analogous to the baseline (see Proposition 2). These payments are set in order to provide appropriate incentives for the continuation strategy in the cheapest manner. The payment w_H satisfies $w_H \geq w_{H,Min}$, where $w_{H,Min}$ is the lowest payment required to incentivize the GP to exit both successful assets in state (H, H) . It is clear that the cheapest way to provide effort incentives is to adjust w_H and to potentially raise it above $w_{H,Min}$. Take the continuation strategy (i.e., γ) and the beliefs of new LPs and the deal valuation V as given.

Effort Incentives. GP payoff (gross of effort cost) reads

$$\Pi^{GP}(e) = e^2 w_H + 2e(1-e) \left[(1-\delta)(pw_2 + w_M) + \delta w_L \right] + (1-e)^2 \lambda,$$

where we suppress the dependence of payoff on the contract for brevity.

The GP chooses effort $e = e_0$ in order to maximize $\Pi^{GP}(e) - \frac{\kappa e^2}{2}$. Effort $e = e_0$ therefore solves the first-order condition:

$$(\Pi^{GP})'(e) = \kappa e.$$

Suppose that $w_H = w_{H,Min}$. Then, we can solve this first-order condition for e under $w_H = w_M + \lambda + w_2 + \Omega$:

$$e_{lh}^{Min} = \frac{2(\Omega + w_2)}{\kappa}.$$

Legacy LP Payoff. Let $G = (1-\theta)V - I$. We now characterize legacy LPs' expected payoff gross of (*i.e.*, excluding) payments to the GP:

$$\begin{aligned} \pi^{LP}(e) &= 2e^2 X + 2e(1-e) \left[X + (1-\delta + \delta\gamma)G + (1-\delta)\theta p(X - w_2) \right] \\ &\quad + (1-e)^2 \left[(1-\delta^2)(G + \theta p(X - w_2)) + \delta^2 G \right]. \end{aligned}$$

Note that legacy LPs' payoff net of payments and effort costs satisfies: $\Pi^{LP}(e) = \pi^{LP}(e) - \Pi^{GP}(e)$.

Optimal Effort. We next solve for the optimal effort level, distinguishing two cases.

First, if $w_H = w_{H,Min}$, then $e = e_0 = e_{lh}^{Min}$. Otherwise, if $w^* > w_{H,Min}$, optimal effort e must satisfy legacy LPs' first order condition, that is: $(\Pi^{LP})'(e) = 0$. Due to the GP's incentive condition — that is, $(\Pi^{GP})'(e) = \kappa e$ — this first order condition becomes: $(\pi^{LP})'(e) = \kappa e$. Solving for $e = e_{lh}^*$, we obtain:

$$e_{lh}^* = \frac{\delta(1-\gamma)G - X + \theta\delta(1-\delta)(pX - \lambda)}{(2\delta(1-\gamma) - 1)G - (1-\delta)^2\theta(pX - \lambda) - \kappa/2}.$$

Optimal effort satisfies $e = e_0 = e_{lh}$, with: $e_{lh} = \max\{e_{lh}^*, e_{lh}^{Min}\}$.

Simplification for $\theta = 1$ and $\delta = 0$. Further, a simplification can be attained for $\theta = 1$ and $\delta = 0$, in which case $G = -I$. Then:

$$e_{lh} = \max \left\{ \frac{2w_2}{\kappa}, \frac{X}{\kappa/2 + pX - \lambda - I} \right\}.$$

I-B.2.3 Proof of Proposition 10

No Continuation Fund Benchmark. Assume the model ends after $t = 1$. Then, the optimal contract is straightforward: The GP is paid w_{NC} upon double success (cash flow $2X$), while paid zero otherwise. Indeed, using standard arguments, one can show that

concentrating payments in the double-success state is optimal (see, e.g., [Maurin et al. \(2023\)](#)). The incentive condition becomes:

$$e = \arg \max_{\hat{e}} \left(\hat{e}^2 w_{NC} - \frac{\kappa \hat{e}^2}{2} \right).$$

Therefore: $w_{NC} = \frac{\kappa}{2}$. Then, we can calculate optimal effort maximizing:

$$\Pi_{NC}^{LP} = 2eX - e^2 w_{NC} = 2eX - \frac{\kappa e^2}{2},$$

after plugging in the incentive constraint. This leads to $e = e_{NC} = \frac{2X}{\kappa}$.

Results. Note that $\Omega = (1 - \theta)(X - w_2 - V) < X - w_2$ and thus $\Omega + w_2 < X$. Thus, we have $e_{lh}^{Min}, e_{hh}^{Min} < \frac{2X}{\kappa} = e_{NC}$.

Next, note that in a high-hurdle equilibrium, the deal valuation is lower, i.e., Ω is larger. Therefore, $e_{lh}^{Min} > e_{hh}^{Min}$.

I-B.3 Time-0 Investment and Flexible Scale (Proposition 11)

We now model the time-0 investment, I_0 , which scales up the fund size. Suppose the GP is endowed at $t = 0$ with capital A_0 and raises $I_0 - A_0$ dollars to invest I_0 at time 0. The model parameters satisfy $X = xI_0$, $I = \iota I_0$, $\lambda := \Lambda I_0$, i.e., cash flows private benefits, and interim capital needs and GP endowments scale with I_0 . That is, x, ι, Λ are all positive parameters. Let $\alpha_0 = \frac{A_0}{I_0}$. One can verify that all payments to the GP and as such the legacy fund contract also scale with I_0 .

All payoffs scale with I_0 too. Thus, the legacy LPs' payoff can be written $\Pi^{LP} I_0$, and the GP's payoff can be written as $\Pi^{GP} I_0$. Define legacy LPs' and GP's joint payoff, $Y := \Pi^{LP} + \Pi^{GP}$. Legacy LPs must break even, in that $\Pi^{LP} I_0 \geq I_0 - A_0$, that is:

$$\Pi^{LP} \geq 1 - \alpha_0 \iff I_0 \leq \frac{A_0}{1 - \Pi^{LP}}. \quad (\text{I-B.3})$$

We make two critical assumptions that model parameters must satisfy (without deriving more explicit characterization, for brevity). First, we assume that, under the optimal contract, $PV > 1$, which means that financing at any scale is financially profitable for the GP and legacy LPs. Thus, it is optimal to scale up the legacy fund by raising I_0 , as much as possible.

Second, we assume that $\Pi^{LP} < 1$ (already used above), in that financing is only feasible when the GP coinvests and α_0 . The latter assumption ensures that the maximum scale that can be financed is finite — without this assumption, we would need to impose an exogenous upper bound.

Optimal Contract for GP. We solve for the legacy fund contract (within the set of incentive-compatible contracts, $\mathcal{C} \in IC$) maximizing the GP's payoff subject to legacy LPs' breaking even. That is, we solve:

$$\mathcal{C} = \arg \max_{\mathcal{C} \in IC, I_0 \geq A_0} I_0(PV - \Pi^{LP}) - A_0 \quad \text{s.t.} \quad \Pi^{LP} \geq 1 - \alpha_0.$$

Alternatively, the GP's payoff and objective can be rewritten as $I_0(PV - \Pi^{LP}) - A_0$.

As $PV - \Pi^{LP} > 0$, the GP's ex-ante payoff $I_0(PV - \Pi^{LP}) - A_0$ increases in I_0 , holding Π^{LP} fixed. Thus, it must be that (I-B.3) is tight in optimum, that is:

$$\Pi^{LP} = 1 - \alpha_0 \quad \text{and} \quad I_0 = \frac{A_0}{1 - \Pi^{LP}}.$$

With this, the GP's payoff simply becomes $I_0(PV - 1)$. Due to $PV > 1$, maximizing $I_0(PV - 1)$ is akin to maximizing time-0 investment and fund size $I_0 = \frac{A_0}{1 - \Pi^{LP}}$.

Consequently, the GP chooses the legacy fund contract to maximize scale I_0 . That is, the GP chooses the contract that maximizes (scaled) legacy LPs' payoff Π^{LP} (pledgeable income) and the amount of external financing that can be raised from legacy LPs. This micro-founds the objective that the legacy fund contract maximizes legacy LPs' ex-ante value.

I-B.4 Fully Informed Specialists (Proposition 12)

Suppose now new LPs can be fully informed about the state $s \in \{L, M, H\}$ of the transferred asset, while everything else remains unchanged. We sketch the solution from Section 5.3.

I-B.4.1 High-Hurdle Contract

Define $V_M = p(X - w_2)$ and $V_H = X - w_2$, i.e., $V_M = pV_H$. Suppose $V_M \leq V$, where $V = V_U$ is the pooling valuation, derived from uninformed investors willingness to pay. Conjecture and verify any asset is transferred at valuation V . In this case, uninformed investors are always allocated L - and M -types, and they are allocated H -types only if the GP does not find informed investors (which happens with probability $1 - \phi$, conditional on continuation). When transferring an H -type, the GP transfers this asset at valuation V , while forming a side deal with specialists and allocating CV shares to them (in case it encounters them). There is no side deal for M -type transfers; L - and M -types are always sold to uninformed investors.

In this scenario, the solution remains *entirely unchanged* to the baseline, with the equilibrium described in Proposition 1 (and Appendix B). The proposed equilibrium is feasible, however, only if $V \geq V_M$. If parameters are such that this is not satisfied, GPs would also transfer M -types to specialists, worsening adverse selection for other investors. This could lead to market breakdown; we do not further consider this case.

I-B.4.2 Low-Hurdle Contract

Next, we focus on the low-hurdle case. We conjecture and verify that, as in the baseline, only M - and L -types are transferred; the GP always exits H -types. Let V_U the valuation of a transferred asset to uninformed investors. Naturally, given the above continuation strategy, we have $V_U < V_M$ where $V_M = p(X - w_2)$ (and $V_H = X - w_2$). Let V the deal's realized and observed valuation. We sketch how to solve for the equilibrium with low-hurdle contracts.

Continuation Strategy. As we will argue, all L -types will be transferred in equilibrium at valuation $V = V_U$. M -types will be transferred at valuation $V = V_U$ in case the GP does

not encounter informed specialists, who can recognize M -types.

Crucially, when the GP encounters an informed investor (i.e., specialist), which happens with probability ϕ , the GP will transfer M -types at valuation $V = V_M$, provided the contract provides incentives to the GP to transfer the M -type at valuation V_M (rather than $V_U < V_M$). Such incentives require the legacy fund contract to be in the money, in that the other asset has succeeded (that is, state (H, M) prevails); otherwise, in states (M, M) or (M, L) , the GP is paid zero in the legacy fund and thus prefers to transfer at lowest valuation possible. If an M -type transfer occurs in states (M, L) and (M, M) , the GP instead transfers at $V = V_U$, potentially forming a side deal with specialists.

To summarize, the low-hurdle contract implies the following continuation strategy:

1. (L, L) : Continue the L -type at valuation $V = V_U$.
2. (M, L) or (M, M) : Continue the M -type at valuation $V = V_U$.
3. (H, L) : Continue the L -type with probability γ (if so, at valuation $V = V_U$) and exit the H -type.
4. (H, M) : Continue the M -type and exit the H -type. The CV's valuation equals $V = V_M$, if the GP encounters informed investors, and equals $V = V_U$ otherwise.
5. (H, H) : Exit both H -types.

Side Deals. If the GP deviates and transfers an H -type (off-equilibrium), it encounters informed investors with probability ϕ . As in the baseline, the GP then can undervalue the asset and transfer it at $V = V_U$, while extracting fraction α of the buyer's rent. The expected side deal rent from continuing H -types then becomes:

$$\Omega_H := \phi\alpha(1 - \theta)(V_H - V_U).$$

If the GP continues an M -type asset and encounters informed investors, the GP has two options. First, it can undervalue the asset, transfer it at valuation $V = V_U$, while similarly extracting fraction α of the buyer's rent $V_M - V_U$ (per share). This yields expected side-deal rent from continuing M -types:

$$\Omega_M := \phi\alpha(1 - \theta)(V_M - V_U).$$

Second, the GP can also transfer the asset at valuation V_M to the informed investors without extracting any side deal rent.

Payment Structure. The low hurdle contract pays w_L for exiting both companies, one successfully (fund cash flow is X). It pays w_M^- if one asset is exited successfully, while the other is continued at valuation V_U . It pays w_M^+ if one asset is exited successfully, while the

other is continued at valuation V_M . The payments are determined as follows:

$$\begin{aligned} w_L &= \lambda + w_2 + \Omega_H \\ w_M^- &= w_2 + \Omega_H; \quad w_M^+ = w_2 + \Omega_H + \frac{\Omega_M}{\phi} \\ w_H &= w_2 + \lambda + w_M^- + \Omega_H \end{aligned}$$

Incentives. We provide some intuition behind the payment structure. When (H, M) , the GP continues an M -type. The GP will transfer the asset at high valuation V_M , earning payment w_M^+ when finding informed investors who recognize the M -type. When not finding informed investors, the GP transfers the asset at low price, $V < V_M$, otherwise, earning w_M^- .

Suppose that, in state (H, M) , the GP finds informed investors who are willing to pay V_M . The payment difference $w_M^+ - w_M^- = \alpha(1 - \theta)(V_M - V_U) = \frac{\Omega_M}{\phi}$ is equal to the side-deal rent the GP can extract by forming a side deal with informed and transferring the asset at V_U instead of V_M . Thus, $w_M^+ > w_M^-$ provides the GP with incentives to get the best price for legacy LPs, discouraging strategic undervaluation.

The remaining incentive constraints are determined as follows (and it can be shown they bind optimally, as usual):

1. In state (H, H) , the GP may deviate and continue one asset, while exiting the other. If so, the GP encounters specialists with probability ϕ . Meeting specialists, the GP can transfer the asset at valuation V_M or V_U , receiving payments in the legacy fund of w_M^+ or w_M^- , respectively. Transferring at either valuation yields the same payoff, so it is without loss of generality that, upon deviation, the GP transfers the H -type at $V = V_U$. This yields expected side-deal rents of Ω_H . The incentive constraint, $w_H \geq w_2 + \lambda + w_M^- + \Omega_H$ provides incentives to exit both assets.
2. In state (H, L) , the payment $w_L = \lambda + w_2 + \Omega_H$ makes the GP indifferent between exiting both projects, or continuing the H -type. Further, since $w_L = w_M^- + \lambda$, the GP is also indifferent between continuing the L -type or not, while exiting the H -type.

Thus, the determination of the other incentive constraints is analogous to the baseline.

Valuation and Equilibrium. When (H, L) , the GP continues an L -type with probability γ . As in the baseline, γ will be pinned down by:

$$\gamma = \arg \max_{\hat{\gamma} \in [0,1]} \hat{\gamma} [(1 - \theta)V - I + \lambda].$$

That is, $\gamma < 0$ if $[(1 - \theta)V - I + \lambda] < 0$; $\gamma = 1$ if $[(1 - \theta)V - I + \lambda] > 0$; and $\gamma \in [0, 1]$ if $[(1 - \theta)V - I + \lambda] = 0$. Given the continuation strategy, uninformed investors apply the following beliefs about the type of the offered firm s (conditional on getting an allocation):

$$\hat{\eta}(s) := \text{Prob}(\text{Asset is of type } s \mid \text{Asset is continued, } \mathcal{A}_U = 1),$$

where $\mathcal{A}_U \in \{0, 1\}$ indicates whether uninformed LPs get a share allocation. We can directly calculate:

$$\hat{\eta}(L) = \frac{(1-p)^2\delta^2 + 2p(1-p)\delta\gamma}{(1-p)^2[\delta^2 + (1-\delta^2)(1-\phi)] + 2p(1-p)[\delta\gamma + (1-\delta)(1-\phi)]}$$

$$\hat{\eta}(M) = \frac{(1-p)^2(1-\delta^2)(1-\phi) + 2p(1-p)(1-\delta)(1-\phi)}{(1-p)^2[\delta^2 + (1-\delta^2)(1-\phi)] + 2p(1-p)[\delta\gamma + (1-\delta)(1-\phi)]}.$$

Uninformed investors' valuation (i.e., their highest bid in the price auction) is then determined according to:

$$V_U = \hat{\eta}(M)p(X - w_2).$$

This valuation takes into account that uninformed investors are allocated shares of M -types, only if the GP does not encounter informed investors (which happens with probability $1 - \phi$).

I-B.5 Single-Asset Setting (Proposition 13)

We now provide the solution to the single-asset model, where all features — unless otherwise mentioned — remain as in the baseline. For brevity, we only sketch certain arguments.

CV Contract. As in the baseline, the CV contract takes the form of a payment w_2 in case the CV succeeds and produces cash flow X ; the payment equals zero otherwise. The payment satisfies, again as in the baseline: $w_2 = \frac{\lambda}{p}$

Continuation Decision. The legacy contract cannot pay the GP if no asset is successfully exited, nor continued, as the legacy fund's cash flow is zero in that case. By assumption, a zero cash flow in the legacy fund implies zero compensation. We conjecture and verify that the legacy fund contract only stipulates a payment in case the GP exits the asset successfully (by selling it to external buyers at price X) at time $t = 1$. The payment is denoted w_1 . Accordingly, the GP is better off exiting a successful asset, rather than continuing it, if and only if:

$$w_1 \geq \lambda + w_2 + \Omega, \tag{I-B.4}$$

where Ω is the expected side-deal rent, when the GP encounters informed investors (with probability ϕ). This incentive constraint resembles (B.6) from the baseline, and will be optimally tight (by standard arguments). Given the equilibrium valuation V , we have $\Omega = \phi\alpha(1 - \theta)(V_H - V)$ where $V_H = X - w_2$.

Now, consider that the GP has an L -type asset. Irrespective of whether it continues this asset, the legacy fund contract stipulates zero payment. Thus, when the GP has an M -type or L -type, it always finds it optimal to continue this asset, earning expected payoffs of λ from doing so.

CV Formation. Given the continuation decision discussed above, the GP continues in equilibrium L - and M -type assets, while H -types are always exited. Consequently, the fair price for CV shares equals:

$$V := (1 - \delta)p(X - w_2).$$

The optimal payment to the GP becomes:

$$w_1 = w_2 + \lambda + \Omega \quad \text{where} \quad \Omega = \phi\alpha(1 - \theta)[1 - (1 - \delta)p](X - w_2),$$

which is (7). This contract is always optimal for legacy LPs, so there cannot be any other equilibrium (as no other contract structure can be optimal).

I-C Micro-foundations and Robustness

I-C.1 Micro-Founding the CV Contract

Suppose that, after CV formation, continuation fund LPs design the contract, characterized by payments $w_2 \geq 0$, given their beliefs about the type of asset in the CV, $s = L, M, H$. These LPs set w_2 to maximize their own payoff. Suppose that LPs in charge of the contract have beliefs $\eta(s)$ for the asset being of type s . Let $e_1 = \mathbb{I}\{pw_2 \geq \lambda\}$ the GP's effort, which is equal to one if the incentive constraint, $pw_2 \geq \lambda$, holds, and zero otherwise.

Thus, the LPs (in charge of contract determination) maximize their residual payoff and solve the following optimization:

$$\max_{w_2 \geq 0} [\eta(H) + \eta(M)pe_1](X - w_2).$$

The optimization yields either $w_2 = 0$ or $w_2 = \frac{\lambda}{p}$ as optimal outcomes. The LP payoff under $w_2 = \frac{\lambda}{p}$ reads:

$$V_1 = [\eta(H) + \eta(M)pe_1] \left(X - \frac{\lambda}{p} \right).$$

Under $w_2 = 0$, it reads $V_0 = \eta(H)X$.

It is optimal to set $w_2 = \frac{\lambda}{p}$ if and only if, $V_1 \geq V_0$, that is:³⁶

$$\eta(M)(pX - \lambda) \geq \frac{\eta(H)\lambda}{p}.$$

Thus, as long as $\eta(H)$ is not too large, the optimization yields $w_2 = \frac{\lambda}{p}$, as desired. If $\eta(H)$ were sufficiently large in equilibrium that $w_2 = 0$ would be optimal, we could nonetheless justify the choice $w_2 = \frac{\lambda}{p}$ by restricting attention to contracts that always incentivize effort—that is, to incentive-compatible contracts—whenever there is a positive probability that the project is of type M . Focusing on incentive-compatible contracts in this way is standard in the literature.

Informed Investors as LPs. Finally, note that there could be informed investors, (introduced later) who can recognize H -types. Thus, when investing in H -type CVs, these informed LPs know that no more effort is needed and could maximize their payoff ex-post by setting $w_2 = 0$. In the presence of informed LPs, the choice of $w_2 = \frac{\lambda}{p}$ can still be supported in two main ways. First, informed LPs invest alongside uninformed rolling legacy LPs

³⁶We adopt a tie breaking rule in favor of $w_2 = \lambda/p$, if $V_1 = V_0$.

who cannot recognize H -types and have beliefs $\eta(H) < 1$. One could assume that rolling legacy LPs are in charge of the contract; they have $\eta(H) < 1$ and solve above optimization, yielding $w_2 = \frac{\lambda}{p}$ (unless $\eta(H)$ is too large). In practice, only a relatively small subset among CV LPs may be informed: therefore, one could assume that the contract w_2 is set under equilibrium beliefs (of uninformed LPs), which makes it optimal to choose $w_2 = \frac{\lambda}{p}$

Second, as we show, in equilibrium, informed investors will invest in H -types through an arrangement that involves a side deal with the GP, with the GP undervaluing the asset and pretending it is M -type. In this contingency, we could assume that GP and informed investors jointly pretend the asset is M -type and set the CV contract consistent with this pretense (and this may be agreed upon in the private side deal): they set $w_2 = \frac{\lambda}{p}$ which is clearly optimal for M -types. Intuitively, both the GP and informed specialists have reputational concerns and would like to avoid that their undervalued transfer of an H -type (or side deal) is detected by other LPs and investors.

I-C.2 How the GP can Elicit Investors' Valuation

Our baseline assumes that the GP knows the information of new investors. In particular, the GP observes whether a new investor is informed about the asset's time-1 value. We now show that the mechanism and our results continue to hold even if the GP cannot observe investors' information directly. In this case, the GP can elicit both information and valuation through the auction mechanism.

To this end, note that when L - or M -types are transferred, informed investors have no information advantage and always value the asset (weakly) less than uninformed investors. Then, as in the baseline, the GP sells to uninformed investors, and informed investors can be ignored.

Next, consider the case in which the GP transfers an H -type and approaches potential buyers. Rather than observing directly whether a given investor is informed, the GP can only distinguish between (i) investors who are certainly uninformed and (ii) specialized secondary investors (specialists) who may be informed with probability ϕ . However, whether the specialist is informed is its private information. To facilitate side deals, we interpret our setting as featuring a small group or a single representative specialist, with whom the GP can interact, coordinate, and form side deals. (As usual, we work with all-in prices V , instead of the transfer price $v = V - I$.)

Suppose that the price auction yields highest bid V_U (in terms of all-in price). If new investors are informed, their willingness to pay is $V_H = X - w_2$. As long as α is not too small, the GP can now screen for and elicit specialist investors' information.

In particular, the GP makes an offer to specialists, who may be informed (with probability ϕ) or not. This offer grants specialists the full share allocation (i.e., $1 - \theta$ CV shares) at valuation V_U , in exchange for a hidden side payment of $\alpha(1 - \theta)(V_H - V_U)$. When rejecting the offer, the specialists are excluded from the transaction.

Suppose that α is not too small. Then, this offer is accepted if and only if specialist investors are informed, recognize the H -type, and accordingly value CV shares at V_H .

If specialist investors are uninformed, they value CV shares at some level $\hat{V} \in [V_U, V_H]$; this level will depend on equilibrium beliefs and is strictly lower than V_H . Consequently,

uninformed specialist investors reject this offer, provided $\hat{V} - \alpha(V_H - V_U) - V_U < 0$. Thus, the side deal elicits new investors' information and this works so long as α is not too small.

As in the baseline, anticipating the side deal with the GP, the specialist has no incentives to outbid uninformed investors in the price auction. Thus, the highest bid comes from uninformed investors.

I-C.3 What If Specialists Bid Competitively in the Price Auction

The baseline assumed the GP can form side deals with informed specialists, while the price auction yields as highest bid (in terms of all-in price) uninformed investors' valuation of the transferred asset V_U , rather than that of specialist, V_I . When the specialist's valuation exceeds that of uninformed investors in that $V_I > V_U$ (which can only occur for H -type transfers), specialists have no incentives to outbid uninformed investors, as they anticipate that they can gain the full share allocation through the side deal with the GP.

We now introduce the possibility that, with exogenous probability $1 - \rho \in [0, 1]$, specialist investors bid their maximum willingness to pay when H -quality assets are transferred and they are present (with probability ϕ). This changes the findings and price formation as follows. First, when the GP transfers L - or M -type assets or does not locate informed specialists, the valuation becomes, as before, $V = V_U$.

The only change occurs when an H -type is transferred and informed specialists are participating (their valuation is $V_I = V_H$). Then, with probability ρ , they do not outbid uninformed investors and the valuation becomes $V = V_U$. As in the baseline, specialists then form a side deal with the GP, allowing them to invest at this low valuation, V_U . With probability $1 - \rho$, they bid their full valuation in the price auction, so the deal's valuation becomes $V = V_H$, and there is no side deal.

We briefly summarize how it changes the two types of equilibria, finding that our key findings remain qualitatively unchanged.

1. **Low-Hurdle Equilibrium.** In the low-hurdle equilibrium, H -type transfers are off-equilibrium. Thus, ρ only affects the GP's rent extraction when deviating and transferring an H -type and forming a side deal. Such deviation generated in the baseline expected rents of $\Omega = \phi\alpha(1 - \theta)(V_H - V)$. Indeed, the GP would meet with probability ϕ informed specialists, transfer the asset at pooling valuation $V = V_U$, and extract $\alpha(V_H - V)$ via a side deal with specialists.

The equilibrium remains unchanged, subject to expected side-deal rents becoming $\Omega = \phi\rho\alpha(1 - \theta)(V_H - V)$. Indeed, upon deviation, the GP meets with probability ϕ specialist. With probability ρ , these specialists sustain the pooling valuation, leading to rents $\alpha(V_H - V)$ per share (as before); otherwise, they bid up the valuation to V_H (in this case the asset is transferred at fair value and there are no side deal rents). Thus, the only change is that the expected side-deal rents from transferring H -types are reduced.

2. **High-hurdle equilibrium.** In the high-hurdle equilibrium, the continuation strategy remains unchanged, and the payment structure remain unchanged, subject to

re-defining $\Omega = \phi\alpha\rho(1 - \theta)(V_H - V)$. Here, $V = V_U$ is the CV's valuation which pertains, unless informed specialists bid their valuation V_H in H -type transfers. Indeed, in states (H, M) or (H, L) , an H -type is transferred. Then, with probability $1 - \rho$, this asset transfers at valuation V_H ; otherwise, it transfers at valuation V . In all other states, transfers also occur at V .

We conclude that allowing for specialists bidding their maximum willingness to pay, V_I , in the price auction leaves the equilibrium qualitatively unchanged in all major aspects, except that it reduces the GP's rents from transferring high-quality asset at undervalued terms. The parameter ρ has similar effects as α .