Spreading Sunshine in Private Equity: Financial Intermediation and Regulatory Oversight*

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Abstract

This paper studies the impact of regulation on market transparency and financial intermediation in private equity (PE) markets. Using regulatory filings, I examine an unanticipated reform that substantially expanded theregulation of PE funds which subjects them to examinations, rules, and disclosure. The expansion of regulation increases investors' PE market participation while diminishing their incentives to bypass fund intermediation. The impact is stronger when investors and fund managers face greater incentive misalignment. These findings highlight the limits of market discipline and demonstrate the potential role of regulation in improving intermediation in PE markets.

Keywords: Financial Regulation, Governance, Private Equity, Market Organization, Institutional Investors, Dodd-Frank Act

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1 Introduction

A long-standing debate in financial economics concerns the benefits of regulation, given that market forces can potentially discipline conflicts of interest. This debate has been increasingly salient in private equity (PE), an important yet opaque asset class constituting a growing share of portfolios among institutional investors.[1] These investors include pension funds, endowments, and insurers, collectively known as limited partners (LPs), and are in principle capable of enforcing market discipline on PE fund advisers, or general partners (GPs). On the one hand, market imperfections such as information frictions, market power, and externalities may result in weak market discipline, which limits investors' incentives to participate and creates a role for regulation (Stiglitz, 1993; Shleifer, 2005; Zingales, 2009). On the other hand, regulators are not inherently better informed than investors and face their own incentive problems, and the political process of regulation may be susceptible to regulatory capture by the very industries it aims to oversee, potentially making regulation ineffective or even costly for investors (Coase, 1960; Stigler, 1971; Posner, 1974). Therefore, it remains unclear whether market discipline is sufficient to ensure GP-LP incentive alignment, or whether gaps persist that leave room for financial regulation in PE markets.

This paper fills this research gap by studying how regulation of PE funds affects investors' market participation, based on a unique and exogenous regulatory shift that significantly expanded the oversight of PE funds. Historically, most PE fund advisers in the US faced little regulatory scrutiny, since they could avoid SEC registrations under an exemption provided by the Investment Advisers Act of 1940. This exemption was applied to advisers with fewer than 15 clients, counting each fund as a single client regardless of the number of investors within a fund (SEC, 2011b). However, the Dodd-Frank Act *unexpectedly* eliminated this exemption in 2012, introducing substantially narrower exemptions based primarily on advisers' size and investment strategies rather than on potential agency conflicts (see Section 2.2). These changes reflect regulators' concerns about *systemic risks* in private funds following the Global Financial Crisis, which originated outside the PE industry. Consequently, many advisers, including large GPs, were required to register for the first time, becoming subject to *examinations, rules, and disclosure*.

I document that the reform is strongly enforced and indeed substantially expanded the regulatory oversight of PE funds. First, the Dodd-Frank Act led to a *sharp* and *permanent rise* in registrations clustered at the compliance deadline, with the share of registered GPs rising from around 25% pre-reform to nearly 50% when the intervention became effective.[2]

[1] See, for example, "Private equity's opaque costs mystify the pensions that pay them", *Bloomberg*, March 2022; "Investment industry welcomes SEC efforts to reform private equity fees", *Financial Times*, February 2022; "US appeals court strikes down SEC private equity, hedge fund oversight rule", *Reuters*, June 2024.

[2] The strong enforcement partially reflects GPs' limited ability and incentives to manipulate their regis-

Second, the reform contributed to a persistent increase in public disclosure by registered GPs through Form ADV filings, routinely submitted to the SEC to report detailed information on their operations, disciplinary histories, and other relevant aspects. Third, registration improves GPs' fund governance, such as accounting and custody practices, and increases monitoring by regulators. Overall, these stylized facts suggest that the expanded regulation of PE funds enhances market transparency and limits GPs' opportunistic behaviors.

Since both the timing and exemption of the reform were largely unanticipated by LPs and GPs, I use the intervention as a quasi-natural shock to assess how regulatory oversight of PE funds affects LPs' PE market participation. To establish the causal relationship, I first document that LP-GP relationships are sticky. Therefore, LPs are arguably more exposed to the regulatory shock if they have more *pre-existing* relationships with GPs that became *newly registered* following the Dodd-Frank Act. To identify these GPs in Preqin, I manually match the data with Form ADV by searching the Investment Adviser Public Disclosure database based on GP names. The novel use of Form ADV allows me to accurately track the SEC registration status of each GP over time (see Figure C.1). Moreover, I show that the cross-sectional variation of LPs' shock exposure cannot be explained by LP institutional types or headquarter states known to influence LP-GP matching (Lerner, Schoar, and Wongsunwai, 2007; Hochberg and Rauh, 2013), mitigating concerns of potential selection into newly registered GPs.[3] Using a difference-in-differences (DiD) design that exploits within-LP variation, I compare investment behaviors between LPs with a high versus low share of newly registered GPs in their pre-existing relationships, before and after the shock.

I find that regulatory oversight of PE funds increases investors' market participation and diminishes their incentives to bypass intermediation. The DiD estimates indicate a 28% increase in the probability of committing capital to PE funds and a 35% decrease in the probability of making direct investments among LPs with high exposure to newly registered GPs. In direct investments, LPs bypass PE funds and directly acquire shares of private companies thus reducing agency costs in outsourced relationships (Fang, Ivashina, and Lerner, 2015; Braun, Jenkinson, and Schemmerl, 2020; Lerner, Mao, Schoar, and Zhang, 2022). Moreover, there are no differential trends in the years leading up to the reform, but a persistent difference emerges in the outcome variables between LPs with different exposure to the regulatory shock. A back-of-the-envelope calculation suggests that the dollar amount of increased capital commitments outweighs the decrease in direct investments implying a net

tration status due to the short compliance deadline and costs in changing their fund characteristics to meet the new registration exemptions.

[3]Section C.5 further demonstrates that key pre-intervention characteristics of public pensions, such as size, financial health, investment assumptions, type, investment returns, and asset allocation, do not correlate with a pension's probability of having high exposure to newly registered GPs in its pre-existing relationships.

increase in capital supply to PE markets. My findings suggest that the improved regulation of PE funds may have been another key driver of the expansion of PE markets, in addition to different contributing factors such as the growing importance of intangible assets and other regulatory changes in the private or public markets (Kahle and Stulz, 2017; Ewens and Farre-Mensa, 2020; Ewens, Xiao, and Xu, 2024)

GPs' disciplinary histories, as disclosed in Form ADV, provide a direct link between my results and the agency costs of financial intermediation. LPs arguably respond more strongly to regulatory oversight of PE funds when their GPs are more prone to agency conflicts. Meanwhile, regulatory oversight would be more beneficial when geographic distance makes it difficult for LPs to monitor and acquire information about their GPs. These predictions are supported by a triple-difference analysis that exploits cross-sectional variation in LPs' exposure to GPs with prior misconduct and their geographical distance to pre-existing GPs. Notably, the impact of regulatory oversight is concentrated among LPs connected to GPs with prior misconduct and LPs that are farther away from their GPs, as these GPs' incentives tend to diverge from their LPs' interests.

I consider and rule out several alternative mechanisms for my findings. First, the new registration exemptions are tied to GP size and investment strategy, raising concerns that the effects might stem from differences in investment opportunities and market dynamics between small and large GPs, or between GPs managing different types of funds. To address this concern, I re-estimate my baseline regressions, allowing LP outcomes to evolve on flexible time trends based on LPs' exposure to these GPs in their pre-existing relationships, and obtain similar findings. Moreover, within-GP estimation further mitigates this concern by suggesting that GPs with different sizes or investment strategies do not experience differential dynamics in their fundraising outcomes before and after the intervention. Second, the Dodd-Frank Act introduced contemporaneous regulatory interventions, including the Volcker Rule, which restricts banks from investing in private equity (Chen and Ewens, 2024). To address these potential confounders, I re-estimate the DiD design using different subsample of LPs and controlling for year-by-LP-type fixed effects, which take into account systematic differences across LP types. The results remain qualitatively similar, supporting the robustness of my findings. Third, I reject other alternative explanations, including changes in the supply of PE funds, shifts in co-investments, and reporting bias, which are detailed in Section 5.3.

These findings indicate potential benefits of regulation in PE markets due to limits of market discipline. First, information is a public good, creating a free-rider problem—market participants have insufficient incentive to produce or acquire information since they cannot fully capture the benefits (Stiglitz, 1993). GPs may withhold proprietary informa-

tion on investment strategies, portfolio company performance, and fee structures, while LPs may lack the resources or incentives to collect and verify this information (see Section 2.3). These frictions are compounded by the inherent opacity of PE investments, which lack standardized disclosure requirements and observable market prices compared to public markets. Consequently, LPs' ability to engage in effective contracting and monitoring is constrained. Second, market discipline is further limited by imperfect competition in PE markets. The bespoke nature of PE investment vehicles, GP skills, as well as search and matching frictions result in differential access to PE funds among LPs and give GPs market power, creating potential scope for rent extraction through opaque valuation and fee structures that are difficult to rationalize with investor value maximization (see Section 2.3). Regulatory interventions could potentially bridge these gaps by mandating disclosures, operational rules, and periodic examinations, which are typically difficult to achieve through private solutions in the PE market. Collectively, these measures increase market transparency by improving information flow, enforcing standardization, and limiting the discretionary power of GPs.

Lastly, I present suggestive evidence that regulation of PE funds could have capital allocation implications by shaping the PE market structure. Financing private companies is challenging due to information asymmetry and risk, which impose significant costs on investors. Unlike specialized GPs, LPs often typically lack both the expertise to evaluate private firms and the diversification benefits that PE funds provide by pooling capital. I show that, in their direct investments, LPs disproportionately finance more mature, larger companies with lower innovation intensity compared to the companies funded by GPs. This pattern suggests potential underinvestment in younger and innovative firms under disintermediation. Therefore, regulation could shift capital allocation by reducing LPs' incentives to bypass intermediation.

Overall, this paper demonstrates that basic regulation of PE funds could benefit this market by increasing investors' participation and facilitating intermediation. Despite these benefits, regulatory intervention inevitably introduces ongoing compliance and disclosure costs for PE fund advisers, much of which is likely passed on to investors. Additionally, such intervention may distort fundraising and impose opportunity costs on the SEC, given its limited resources (Charoenwong, Kwan, and Umar, 2019). Therefore, the paper provides the necessary empirical foundation for a formal welfare analysis, which, while beyond the scope of this paper, is critical for informing the active debates about the optimal level of regulation for PE funds. These debates have important implications for various institutional investors, their beneficiaries, and the broader economy, particularly as PE funds become increasingly accessible to retail investors with limited financial sophistication.[4]

[4]In the global context, regulatory frameworks for opaque asset classes—such as the EU's Alternative

Related Literature. Although financial intermediation offers various advantages, such as lower transaction costs and greater risk diversification (e.g., Benston and Smith, 1976; Leland and Pyle, 1977; Chan, 1983), it introduces delegation costs arising from incentive problems between intermediaries and investors. When there are many investors, duplicated monitoring costs and free-riding problems can make financial intermediation excessively costly or even unfeasible. Such incentive problems are first recognized and addressed in the banking literature by Diamond (1984) through diversification and committed debt-like payments to investors. In contrast, PE funds have limited portfolio diversification and issue equity-like securities to investors, and existing studies have mainly focused on different incentive contracts between LPs and GPs to address agency problems in PE funds (Gompers and Lerner, 1996, 1999; Metrick and Yasuda, 2010; Robinson and Sensoy, 2013; Chung, Sensoy, Stern, and Weisbach, 2012). My findings highlight the limits of market discipline due to inherent information frictions in LP-GP relationships and support the role of regulatory oversight in aligning incentives, a topic that has received limited exploration. In a related paper, Jiang, Mason, Qian, and Utke (2024) studies the effect of mandatory misconduct disclosure on GPs' fundraising. My paper differs by examining LP investors' PE market participation in response to an arguably exogenous expansion in regulatory oversight of PE funds, which makes this disclosure mandatory.

This paper also closely relates to the literature on the regulation of financial intermediaries. Besides the extensive research on bank regulation and supervision (e.g., Laeven and Levine, 2009; Berger and Bouwman, 2013; Buchak, Matvos, Piskorski, and Seru, 2018), a small but growing body of work examines the implications of regulations for non-bank financial intermediaries such as investment advisers, hedge funds, pension funds, and insurance companies (Charoenwong, Kwan, and Umar, 2019; Garrett, 2024; Goetzmann, Liang, and Wang, 2024; Andonov, Bauer, and Cremers, 2017; Sen, 2023). While historically facing little regulation, PE markets have recently been attracting intensified regulatory scrutiny due to their rapid growth and opaqueness. As a landmark legislative change, the Dodd-Frank Act significantly expanded the regulatory oversight of PE funds. To my knowledge, this paper is the first to empirically characterize this intervention and estimate its causal effects on the PE market, adding to the emerging literature on economic impacts of PE regulations (Ewens and Farre-Mensa, 2020, 2022; Abuzov, Gornall, and Strebulaev, 2025; Howell, Parker, and Xu, 2025). Methodologically, my paper contributes by introducing an arguably exogenous shock to agency frictions faced by GPs, resulting from changes in their SEC registration

Investment Fund Managers Directive (AIFMD) or Asia's evolving PE oversight regimes (e.g., PE fund adviser registration with the Asset Management Association of China (AMAC))—face similar trade-offs between strengthening investor protection and imposing compliance, regulatory, and opportunity costs.

status, which can be constructed from publicly available Form ADV filings.

At last, my work is complementary to the research on firm boundaries. Since Coase (1937), the literature has emphasized that firms arise to mitigate transaction costs associated with market exchanges and incomplete contracting, with subsequent work highlighting the role of relationship-specific investments and holdup problems in shaping firm boundaries (Klein, Crawford, and Alchian, 1978; Williamson, 1979; Grossman and Hart, 1986; Hart and Moore, 1990). Different from the considerable empirical work that supports this capital-allocation perspective (e.g., Frésard, Hoberg, and Phillips, 2020; Bena, Erel, Wang, and Weisbach, 2023), this study shows that institutional investors become less likely to organize PE investment activities within their own firm boundaries when regulatory oversight mitigate agency costs in outsourced relationships. This finding is established within the setting of PE investing, characterized by low asset specificity and weak holdup problems due to its human-capital intensive nature (Ewens and Rhodes-Kropf, 2015). Therefore, my paper provides novel evidence consistent with the under-explored incentive view that firm boundaries respond to agency frictions—when it is difficult to extract outputs from an outsourced relationship, firms tend to organize the relationship within themselves, which provides a wider range of incentive tools beyond market forces and improves monitoring (Holmstrom and Milgrom, 1991, 1994; Holmstrom, 1999). The findings also imply that regulation can indirectly shape the organizational structure of financial markets by changing institutions' firm boundaries through incentive alignment channels.

2 Institutional Details

This section provides a brief introduction to the market discipline of PE funds and conceptually discusses its limits in incentive alignment due to the unique features of PE markets. Then, I present the background information on the Dodd-Frank Act. Lastly, I discuss the deficiencies found in the SEC's examinations of PE funds.

2.1 Market Discipline of PE Funds and Its Limits

While various forms of market discipline, discussed below, serve as the first line of defense in mitigating conflicts of interest faced by GPs, these forces often fall short of fully aligning incentives due to pervasive information asymmetries, illiquidity, and market power.

Compensation Contracts. LPs mainly rely on compensation contracts outlined in the Limited Partnership Agreements ("LPAs") at fund inception to incentivize GPs (Gompers and Lerner, 1996, 1999; Metrick and Yasuda, 2010; Robinson and Sensoy, 2013). Key components of the compensation include management fees and carried interest. Management fees, which are not tied to fund performance, provide GPs with fixed annual revenue calculated as 1.5%-2.5% of the fee basis. After the first few years, the fee basis often transitions from committed capital to net invested capital, which is defined as invested capital minus

the cost basis of exited investments. In contrast, carried interest represents a performance-based component, typically rewarding GPs with 20% of the fund's profits after LPs achieve a pre-specified hurdle rate of return, often set at 8%.[5]

Due to information and search frictions in PE markets, both LPs and GPs have some pricing power (Lerner and Schoar, 2004; Hochberg, Ljungqvist, and Vissing-Jørgensen, 2014; Abuzov, Gornall, and Strebulaev, 2025). As a result, both the structure and level of GP compensation are to some extent determined by GPs, potentially enabling them to maximize rent extraction.[6] Empirical evidence suggests that the fixed payments tend to increase during fundraising booms, which favor GPs and may misalign their incentives with those of LPs (Robinson and Sensoy, 2013; Lerner and Nanda, 2020). These challenges are further compounded by GPs' limited disclosure and the bespoke, opaque nature of PE fee structures, making it difficult for LPs to accurately assess and monitor fees. This opacity creates potential scope for rent extraction and inefficient contracting (Phalippou, 2009; Zingales, 2009).[7]

Indirect Pay for Performance. Besides direct compensation paid by existing LPs, GPs are also incentivized through future fundraising tied to their previous performance (Chung, Sensoy, Stern, and Weisbach, 2012). However, unlike public-traded stocks that have market prices, the underlying assets of PE funds are typically valued using quarterly interim valuations provided by GPs. These valuations are inherently stale prices and usually fail to incorporate the most recent market information. Consequently, the lack of mark-to-market valuations can undermine market discipline and lead to inefficient LP capital allocation across fund managers. Moreover, if interim valuations are inflated to window-dress performance during fundraising periods, they can mislead investors, exacerbating these inefficiencies and further distorting capital flows (Barber and Yasuda, 2017; Chakraborty and Ewens, 2018; Brown, Gredil, and Kaplan, 2019).

Ex-Post Monitoring. While LPs could incentivize GPs through ex-post monitoring, this approach is often prohibitively costly due to GPs' limited disclosure and the coordination fric-

[5]This contract usually includes a catch-up provision allowing GPs to receive 100% of net exit returns until they secure 20% of all annualized profits after they reach the hurdle rate.

[6]In contrast, the shareholder/investor value maximization view in the managerial compensation literature typically assumes that the contract is decided solely by shareholders/investors or their well-incentivized representatives (Edmans, Gabaix, and Jenter, 2017).

[7]Bebchuk and Fried (2003, 2004) suggest that managerial compensation can be a part of the principal-agent problem itself and partially set by managers to maximize their rent extraction through various hidden compensation and pay for non-performance (e.g., Yermack, 2006; Harford and Li, 2007; Stefanescu, Wang, Xie, and Yang, 2018). Although enhanced transparency benefits all market participants and thus has positive externalities, each investor only partially benefits from greater disclosure and tends to use their bargaining power to extract other concessions from PE funds, resulting in a suboptimal level of disclosure (Zingales, 2009). Begenau and Siriwardane (2024) documents fee dispersion across LPs in the same PE fund due to LP-GP bargaining.

tions among LPs. This incentive cost in intermediation is extensively discussed by Diamond (1984). Moreover, LPs can influence GPs by expressing concerns through their advisory committee seats when GPs make poor investment decisions. However, such actions remains weak compared to the influence wielded by a corporate board of directors, which can directly impact decisions through voting. In fact, LPs risk losing their limited liability status if they interfere in the day-to-day operations of the fund. Furthermore, the closed-end structure and illiquidity of PE funds constrain LPs' ability to exit current funds, making it difficult for LPs to vote with their feet like investors in public companies or mutual funds.

2.2 Regulatory Oversight of PE Funds and the Dodd-Frank Act

The unique features of PE markets indicate that market forces alone may fail to sufficiently discipline PE funds, thereby highlighting a possible role for policy intervention. However, most PE fund advisers historically operated with minimal regulatory oversight in the US due to an exemption under the Investment Advisers Act of 1940. The exemption applied to advisers with fewer than 15 clients, considering each fund a single client instead of counting individual investors within the funds under management (SEC, 2011b). The primary justification for this exemption is that PE funds typically raise capital from institutional and accredited investors, who were presumed to possess the sophistication and resources necessary to conduct their own due diligence.

In 2012, Title IV of the Dodd-Frank Act eliminated these exemptions and introduced significantly narrower registration exemptions: 1) the "private fund adviser exemption", which applies to advisers solely managing private funds with less than $150 million in assets under management;[8] 2) and the "venture capital exemption", applicable to advisers exclusively managing venture capital (VC) funds that meet the SEC's regulatory definition (see Appendix A). Consequently, many previously unregistered PE fund advisers, also known as exempt reporting advisers, were required to register with the SEC for the *first time*, marking a pivotal change in the governance of the PE industry (see Section 4.1).[9]

As an important part of the Dodd-Frank Act's overhaul of financial systems after the 2008 financial crisis, which stemmed outside of the PE sector, these new registration re-

[8]The SEC considers affiliated entities as a single adviser to avoid situations where an adviser with over $150 million AUM splits itself into multiple smaller entities, each attempting to qualify for the private fund exemption (SEC, 2011a).

[9]The Dodd-Frank Act amendment was adopted by the SEC on June 22, 2011, with transition provisions that required advisers to be registered by March 30, 2012. Figure 3 shows that most advisers waited until the compliance deadline to register with the SEC, implying that advisers find registration costly. The term private fund generally includes hedge funds, PE funds, and other funds such as real estate funds and securitized asset funds. Table C.1 provides a list of the top 20 newly registered PE fund advisers in 2012 based on the total gross asset value of their PE funds as reported in their 2012 Form ADV filings. Besides the private fund adviser and venture capitation exemptions, certain foreign advisers without a place of business in the US are also exempt from registrations.

quirements reflect Congress' concern about the potential systemic risks in private funds, especially hedge funds. Although the Senate *voted to exempt* PE fund advisers in 2010 under the Investment Adviser Act, the final version of the Dodd-Frank Act enacted by Congress *ultimately subjected* them to registration requirements based primarily on fund managers' size, underlying investments, and use of leverage (SEC, 2011a). For instance, the venture capital exemption introduced in the Act is grounded by two major policy considerations. First, VC funds invest in privately-held start-ups, which are not directly connected to the public market and thus pose relatively little systemic risk to the broader financial system or retail investors. Second, VC funds use limited leverage, implying that potential losses are mainly borne by LP investors and will not propagate throughout financial markets through the credit channel or other counterparty relationships.[10] Appendix A discusses the venture capital exemption and the heated debate over the regulatory definition of a VC fund in more detail as an example illustrating the trade-offs Congress faced in balancing the need for systemic risk monitoring with the associated regulatory costs when designing the new registration requirements.

Upon registering with the SEC, PE fund advisers become subject to regulatory oversight, which includes periodic examinations, operational rules governing areas such as accounting and custody practices, as well as mandatory disclosure obligations, including the submission of Form ADV and related schedules. These publicly available regulatory filings require registered advisers to disclose information including business practices, ownership, clients, conflicts of interest, and disciplinary information.[11]

2.3 SEC's Examinations of Registered PE Funds

After the Dodd-Frank Act eliminated many PE fund advisers' registration exemptions, the SEC started its first systematic examination of these never-examined advisers to assess risks and operational issues in this market. These examinations quickly uncovered widespread deficiencies, many of which were related to PE fee structures and other practices. In its initial announcement of examination findings in mid-2014, the SEC highlighted the following observations:

> "*By far, the most common observation our examiners have made when examining PE firms has to do with the adviser's collection of fees and allocation of expenses. When we have examined how fees and expenses are handled by*

[10] In fact, many VC fund advisers still have to register with the SEC because their funds do not meet the SEC's narrow definition of VC funds based on many characteristics such as the size of non-qualifying investments basket and limits on the use of credit. See Appendix A for more detail.

[11] Besides Form ADV, registered PE fund advisers need to submit Form PF, a type of confidential filings that require detailed information about their private funds' activities and performance. However, LPs and the public do not have access to the details reported in Form PF.

advisers to PE funds, we have identified what we believe are violations of law or material weaknesses in controls over 50% of the time."[12]

The announcement highlighted three major types of misconduct including manipulated valuation of portfolio companies, misallocated expenses, and hidden fees. Conceptually, if these payments were merely alternative forms of compensation aligned with investor value maximization, it is unclear why they would be extracted in such *opaque forms*. Given the typical 10-year lifespan of a PE fund, unforeseen contingencies often arise, making the compensation contracts inherently incomplete. These agreements often feature broad wording, permitting GPs *a wide latitude of flexibility* that might enable them to charge fees and pass along expenses beyond what LPs might reasonably contemplate, further complicating the transparency issues highlighted by the SEC. Furthermore, the SEC observed that the decline in PE returns exacerbates these agency problems. As fewer GPs are able to achieve their preferred return through carried interest, they face stronger incentives to shift expenses and collect hidden fees as alternative revenue streams.

The noncompliance also partially results from LPs' limited oversight *after* fund investments despite their extensive due diligence *before* capital commitments, as observed by the SEC. It highlights two main reasons for this observation. First, PE funds typically have a large number of LPs, often making it difficult for individual LPs to coordinate or even identify each other, which creates free-rider problems and coordination failure among LPs when monitoring GPs. Second, investors may not be sufficiently staffed to monitor GPs.[13]

Agency conflicts in PE fees are both widespread and persistent. Since the Dodd-Frank Act became effective, the SEC has been consistently uncovering adviser deficiencies. In its recent alert in 2022, the SEC discovered operational issues such as miscalculating post-commitment period management fees, extending fund lives and recycling realized investment proceeds to charge extra management fees without sufficient disclosure to investors.[14] While these direct monetary costs are substantial, the indirect costs stemming from misaligned incentives may be far greater. If the managerial contract provides insufficient incentives to exert effort or induces inefficient investment decisions, investor losses can dwarf the explicit costs of hidden fees.

In response to these persistent agency conflicts, the SEC proposed a comprehensive reform of PE funds in 2023. Among other things, the proposed rules include quarterly

[12]Spreading Sunshine in Private Equity, Andrew J. Bowden, May 2014

[13]For survey evidence, see Da Rin and Phalippou (2017). The 25th (75th) percenitle value of LPs' private equity team size is 1(5) professional(s), with a mean value of 6.4.. The authors examined the team specialization of institutional investors with allocation to private equity, as well as their accounting, legal, investment, and monitoring activities at the fund and portfolio company level.

[14]Observations from Examinations of Private Fund Advisers, Division of the Examinations, January 2022

statements on detailed fees, new requirements on fund audits and bookkeeping, as well as a ban from charging certain fees and expenses to investors.[15] Although these measures aimed to increase market transparency, their scope was only limited to registered PE fund advisers. However, the reform faced significant legal challenges from PE fund managers and other interest groups, who sued the SEC for regulatory overreach. This litigation proved partially successful, resulting in a US court striking down several of the SEC's key oversight rules in 2024.[16]

3 Data and Variables

3.1 Data Sources

Preqin. My main analysis uses a comprehensive sample of private equity LPs and GPs covered by Preqin. In addition to providing detailed data on PE deals, Preqin offers granular fund-level information, including the list of LP investors and their committed capital, which allows me to observe LP-GP relationships in PE markets. Moreover, each financial institution in the dataset is assigned a unique identifier. This identifier can be used to link LPs to their fund investments and direct investments in private companies.

Form ADV Filings. Form ADV filings are legally required disclosure submitted annually by investment advisers including PE fund advisers. These filings require advisers to indicate their registration status upon submission. Unlike registered advisers, exempt reporting advisers are only obligated to complete certain sections of Form ADV. All advisers must keep their forms updated by filing periodic amendments and will face penalties, such as revocation of registration, SEC sanctions, and criminal prosecution if there are any false statements or omissions.

In my analysis, I utilize Form ADV Part 1A, the core section of the filings, as well as several supplementary schedules. Notably, both registered and exempt reporting advisers are required to disclose all disciplinary events from at least the past ten years and to complete the corresponding Disclosure Reporting Pages ("DRPs"). These filings include detailed information about each event, such as the nature of the sanctions, the initiation date, and the event's current status. Furthermore, Appendix 4.2 incorporates Schedule D, which provides information for each PE funds managed by GPs, to study the relationship between registration and fund governance.

Form ADV-W Filings. Form ADV-W is the official document used by investment advisers to withdraw their registration with the SEC or state securities authorities. Advisers typically file this form when transitioning to exempt reporting adviser under qualified registration

[15] See "SEC Enhances the Regulation of Private Fund Advisers", August 2023

[16] See, for example, "US appeals court strikes down SEC private equity, hedge fund oversight rule", Reuters, June 2024.

exemptions. I use Form ADV-W to document limited withdrawal by registered advisers.

Investment Adviser Public Disclosure (IAPD). I manually link PE fund advisers in Preqin to their respective Form ADV filings by searching each adviser's name on the Investment Adviser Public Disclosure (IAPD) website. The IAPD database, maintained by the SEC and state securities regulators, provides public access to Form ADV filings based on name searches and other information, including the adviser's legal name, SEC file number, and physical addresses, which I use to verify and establish the link.

Public Plans Data (PPD). It provides comprehensive yearly information on over 250 major state and local pension funds across the US. I leverage the PPD data to assess potential selection into newly registered GPs among the public pensions in my LP sample. See Appendix C.5 for more detail.

PatentsView. I complement my analysis with PatentsView, a platform supported by the United States Patent and Trademark Office (USPTO). PatentsView provides comprehensive data such as the assignee name, application year, grant year, and citations of published patent applications filed after 2001. The patent data allows me to assess the level of innovation in private companies funded through LP direct investment versus those funded through fund investment.

SDC Platinum. To investigate whether LPs are adversely selected into worse companies in their direct investments, I augment the Preqin PE exit database with the SDC Platinum to construct outcome variables related to IPOs and acquisitions.

3.2 Measuring LPs' Exposure to the Regulatory Shock

The Dodd-Frank Act expanded regulatory oversight of PE markets by eliminating registration exemptions for many unregistered PE fund advisers. Newly registered advisers became subject to examinations, rules, and mandatory disclosure, plausibly facing lower agency conflicts after registration. I measure LPs' differential exposure to this regulatory shock by calculating the share of GPs within LPs' *pre-existing* relationships that became *newly registered* in 2012 following the Dodd-Frank Act. Sections 5.1.2 and 5.1.3 discuss the identification assumptions behind this measure in detail.

This measure is constructed based on changes in GPs' registration status as indicated in their Form ADV filings. To compile this dataset, I first create a list of unique GP names from LPs' pre-existing relationships covered in Preqin. Then, I manually match the dataset with Form ADV filings by searching GP names in the IAPD web-based database. This procedure creates a linking table between Preqin GP identifiers and their SEC file numbers in Form ADV. Appendix B.2 provides detailed description of the matching procedure and identification of registered advisers based on their SEC file numbers. The novel use of Form ADV filings allows me to track the SEC registration status of each GP over time.

Figure C.1 shows that the share of newly registered GP in the matched Preqin-ADV dataset closely aligns with the share solely based on Form ADV filings (correlation = 0.98), validating the accurate identification of GPs' registration status in Preqin. Furthermore, this consistency mitigates concerns about potential selection biases arising from the coverage of GPs in LPs' pre-existing relationships in Preqin. Notably, while Preqin may omit cash flow data for certain high-performing funds (Kaplan and Lerner, 2016), this limitation does not affect the coverage of LP investors in these funds.[17] The figure also illustrates the variation used to construct *Regulatory Exposure*—focusing exclusively on GPs that became newly registered in 2012, the effective year of the Dodd-Frank Act, since these new registrations are plausibly exogenously introduced by the regulatory intervention.

3.3 Summary Statistics

My main sample includes all US institutional investors that have at least one LP-GP relationship before 2012, the effective year of the Dodd-Frank Act.[18] My sample includes 1,522 unique LPs. To complement my analysis and provide direct evidence that registration reduces agency frictions, I also use a sample of 47,536 unique PE funds reported in Schedule D during 2012-2021, as detailed in Section 4.2.

Table 1 shows the summary statistics of the main variables used in my analysis. In Panel A, a unit of observation is a PE fund. The variables include a rich set of fund governance measures. The governance variables show that 93% of funds have their financial statements audited annually. Of these, 86% prepare statements using US Generally Accepted Accounting Principles (GAAP). Separately, 83% of funds use a custodian to hold some or all of their assets. For Panel B, a unit of observation is an LP-year during 2001-2021. On average, the probability of LPs committing capital to any PE funds is 33% each year and the probability of making direct investments in private companies is 4%. The average amount of committed capital is $37.65 million per year and $ 1.54 million for direct investments. In Panel C, the sample consists of financing rounds raised by private companies between 2001 and 2021 in the US, covering both VC and buyout deals. This sample is used to evaluate the potential capital allocation implications of improved intermediation in PE markets. Approximately 42% of the deals are early-stage, defined as a VC deal with a round number below Series C, and the average LP ratio is 1.62% in the sample deals.

[17] For instance, while Preqin lacks cash flow data for funds managed by Sequoia Capital, LPs for many of Sequoia's funds remain observable in the database. In fact, more than 70% of PE funds have LP information.

[18] I drop 81 PE firms - some established PE firms such as Sequoia Capital, Kleiner Perkins, Accel, and New Enterprise Associates are also LPs that contribute capital to funds managed by other PE firms. Otherwise, all their PE investments would be implausibly classified as direct investments.

4 Stylized Facts of PE Fund Regulatory Oversight

In this section, I motivate the research design in Section 5.1 by presenting stylized facts about regulatory oversight of PE funds before and after the Dodd-Frank Act.

4.1 Expansion of Regulatory Oversight

Several patterns from the Form ADV filings suggest that the Dodd-Frank Act substantially expanded the regulatory oversight of PE funds. Newly registered PE fund advisers became subject to examinations, rules, and mandatory disclosure:

Sharp and Permanent Rise in Registrations. The Dodd-Frank Act eliminated registration exemptions for many previously unregistered PE fund advisers. Figure 2a shows that this intervention triggered an immediate and substantial increase in registrations during its implementation year, with the share of registered PE fund advisers jumping from 28% in 2011 to 48% in 2012.[19] The sharp discontinuity in registrations in the intervention year suggests that the regulatory change induced *exogenous* variation in registration status, as advisers had limited ability to strategically change their fund characteristics to qualify for the new exemptions.[20] This increase indicates the Act successfully addressed a major regulatory gap by subjecting previously exempt advisers to SEC oversight. The persistence of elevated registration levels in subsequent years further demonstrates the reform's lasting impact.[21]

Short Transition Period and Timely Registrations. The SEC adopted the registration amendment in 2011Q2 and established a nine-month transition period that required compliance by 2012Q1. Figure 3 reveals a sharp spike in the quarterly number of initial registrations—approximately 570 PE fund advisers registered with the SEC at the *compliance deadline*. This single-quarter surge represents nearly 30% of all initial SEC registrations over the past two decades and there are no delayed registrations after the compliance deadline. The clustering of registrations at the compliance deadline indicates both strong regulatory enforcement and potential regulatory costs perceived by GPs. Moreover, the short nine-month transition window left GPs with limited scope for strategic manipulation of their

[19] Unregistered PE fund advisers did not have to submit Form ADV filings until the Dodd-Frank Act became effective in 2012. Therefore, only the number of registered advisers is observable before 2012, while the total number of advisers remains unobservable. To address this issue, I estimate the pre-reform total using out-of-sample predictions based on the numbers derived from Form ADV with those obtained from Preqin during 2012-2021.

[20] In contrast, many post-2012 registrations may reflect endogenous choices by advisers anticipating operational changes. A notable example is Sequoia Capital, which registered with the SEC in 2021 following its restructuring around an open-ended fund structure and hold public shares long after IPOs—changes that disqualified it from the venture capital exemption under the Dodd-Frank Act.

[21] Figure C.2 indicates that the post-2012 decline is mainly driven by entry of unregistered advisers. In fact, de-registrations by active advisers are rare based on the Form ADV-W data. This pattern implies that it is difficult for advisers to undo the effects of SEC registrations.

registration status. For example, a GP that raised a $500 million buyout fund in 2010 would be required to register unless it liquidated most assets by 2012Q1—a prohibitively costly action for most funds.

Persistent Increase in Disclosure. Figure 2b presents the actual and predicted number of Form ADV filed by registered PE fund advisers each year.[22] The Dodd-Frank Act has led to a permanent increase in the number of Form ADV filings, which ask advisers to periodically report and amend information about their operation and disciplinary history. Therefore, the reform has improved the transparency of PE markets.

4.2 Registration and Improved Fund Governance

Beyond periodic examinations and mandatory disclosure, SEC-registered PE fund advisers are subject to operational rules governing areas such as accounting and custody. To quantify the effect of registration on fund governance, I analyze several governance measures derived from Schedule D of Form ADV—a supplementary filing introduced by the Dodd-Frank Act that must be completed by both registered and exempt reporting advisers for each private fund they advise. Specifically, I estimate the following cross-sectional regression using all PE funds reported in Schedule D during 2012-2021, excluding funds of funds, feeder funds, and PE fuds with initial gross asset value below 10 USD MIL.

$$\textit{Fund Governance}_i = \beta \times \textit{Registered}_i + \boldsymbol{\theta'} \boldsymbol{X} + \boldsymbol{\tau_t} + \epsilon_i \tag{1}$$

in which i indexes a PE fund. The outcome variables are: 1) *Annual Audit*, an indicator variable equal to one if the PE fund's financial statements are subject to an annual audit, and zero otherwise; 2) *GAAP*, an indicator variable equal to one if the PE fund's financial statements to auditors are prepared in accordance with US GAAP, and zero otherwise, 3) *Qualified Opinion*, an indicator variable equal to one if the PE fund ever receives a qualified opinion, and zero otherwise; and 4)*Custodians*, an indicator variable equal to one if the PE fund uses custodians to hold some or all of its assets, and zero otherwise. The coefficient of interest is the slope of *Registered*, an indicator variable equal to one if the GP is SEC-registered during the fund's lifespan, and zero otherwise. The vector $\boldsymbol{X}$ comprises fund-level control variables. The term τ_t represents initial filing year fixed effects, which control for potential differences across funds based on the calendar year their Schedule D was first filed.

Table 2 suggests that registration improves fund governance. Across all columns, the coefficient of *Registered* is large in magnitude and statistically significant at the 1% level, even conditional on fund characteristics such as size, fund number and type that potentially correlate with fund governance characteristics.[23] For example, Column (2) suggests that a

[22]The predicted value is estimated by a model fitted with a quadratic time trend for the 2001-2011 period.

[23]Since Schedule D does not ask for funds' final size, I use the first observed gross asset value reported in

fund is 5.2 percentage points more likely to have its financial statements audited annually if its GP is registered with the SEC, and the increase accounts for 5.6% (= 0.052 / 0.926) of the unconditional mean. Column (6) indicates that financial statements of a fund managed by registered GP is 3.7 percentage less likely to receive qualified opinion from auditors, while the unconditional mean is 5.6%. Appendix C.1 analyses GPs' disciplinary histories and provides additional evidence that registered GPs receive greater monitoring by regulators. Overall, these estimates provide direct evidence supporting the idea that regulatory oversight reduces the agency costs of PE funds and increase market transparency by enforcing standardization and constraining GPs' opportunistic behaviors.

5 LPs' Response to Regulatory Oversight of PE Funds

The previous section presented evidence that the Dodd-Frank Act is strongly enforced and constituted a quasi-exogenous shock that substantially expanded regulatory oversight of PE funds. The oversight subjects many newly registered GPs to mandatory examinations, rules, and disclosure requirements. In this section, I leverage this shock to examine how LPs adjust their market participation in response to increased regulatory oversight of GPs.

5.1 Identification Strategy

5.1.1 Research Design

My empirical design uses quasi-random variation in regulatory oversight of GPs among LPs' pre-existing relationships, introduced by the Dodd-Frank Act. LPs are arguably more exposed to this shock if they have more *pre-existing* relationships with GPs that became *newly registered* following the regulatory intervention. Specifically, I estimate the following difference-in-differences (DiD) regression with LP-year panel data:

$$y_{i,t} = \beta \times \textit{Regulatory Exposure}_i \times Post_t + \boldsymbol{\phi_i} + \boldsymbol{\tau_t} + \epsilon_{i,t} \tag{2}$$

in which i and t index LP and year respectively. The outcome variable y captures the delegated investment activities, measured by capital commitments and direct investments. Detailed in Section 3.2, *Regulatory Exposure* is an indicator variable equal to one if the share of newly registered GPs in the LP's pre-existing LP-GP relationships is in the top quintile group, and zero otherwise. *Post* is an indicator variable equal to one in or after 2012, the effective year of the Dodd-Frank Act, and zero otherwise.[24] $\boldsymbol{\phi_i}$ and $\boldsymbol{\tau_t}$ are LP and year fixed effects. Although LPs do not form their relationships with GPs randomly, the inclusion of LP fixed effects mitigates this concern by absorbing any time-invariant LP

Schedule D as the proxy for fund size.

[24] I choose 2012, the effective year, rather than 2011, the adoption year of Title IV of the Dodd-Frank Act, because most advisers waited until the compliance deadline in March 2012 to register, as shown in Figure 3. See Section 2.2 for more institutional details.

characteristics, such as manager selection skills and access to GPs, that might be correlated with LP-GP matching and LPs' delegated investment decisions (e.g., Lerner, Mao, Schoar, and Zhang, 2022). In an alternative specification, I control for LP size measured by the capital committed to PE funds along with the direct investments made by an LP in the past 10 years, similar to Lerner, Schoar, and Wongsunwai (2007). Standard errors are clustered at the LP level to address serial correlations.

Recent literature emphasizes that difference-in-differences estimates may be biased due to staggered or potentially endogenous timing of the treatment (e.g., Goodman-Bacon, 2021; Baker, Larcker, and Wang, 2022). Such an issue is less of a concern in my setting because the regulatory intervention has a single and plausibly exogenous timing. As discussed in detail in Section 2.2, the new registration exemptions of PE fund advisers are one of the many regulatory changes introduced by Congress through the Dodd-Frank Act to monitor systemic risks in different financial markets after the 2008 financial crisis, which originated *outside* the PE industry.

5.1.2 Sticky LP-GP Relationships

One crucial feature of my empirical design is that LP-GP relationships are sticky and costly to establish. Otherwise, LPs could costlessly switch to registered GPs beyond their pre-existing LP-GP relationships and there would be no reason to expect differential outcomes across LPs after the regulatory intervention. The strategy builds on the established literature exploiting such sticky, pre-determined connections for causal identification in financial markets (e.g., Chodorow-Reich, 2014; Bhardwaj, Ge, and Mukherjee, 2025; Bhardwaj, Gupta, Howell, and Zimmerschied, 2025).

I confirm this stickiness in my setting: LPs are approximately 40 percentage points more likely to invest in follow-on funds from GPs with whom they have a prior relationship, as shown in Appendix C.4. The pattern aligns with the general view of LPs' limited fund access in the PE fund industry and the stickiness result from various costs in establishing new relationships, such as information asymmetry, market power, search and matching frictions (e.g., Lerner, Schoar, and Wongsunwai, 2007; Sensoy, Wang, and Weisbach, 2014; Abuzov, Gornall, and Strebulaev, 2025). Consistent with Lerner and Schoar (2004), Figure 4a demonstrates a high degree of continuity in the investor base—over 50% of LPs in a PE fund have invested in an earlier fund managed by the same GP—and the percentage of returning LPs is stable for both unregistered and registered advisers.

For stickiness to generate differential exposure to the regulatory shock, LPs must also face constraints in accessing registered funds through pre-existing ties. Supply rationing provides this constraint. As Figure 4b shows, a significant proportion of funds—especially those managed by registered advisers—are oversubscribed, limiting an LP's ability to simply

increase commitments to existing registered relationships.

Overall, these switching costs imply that LPs with more pre-existing relationships to newly registered GPs are disproportionately exposed to the regulatory shock. Crucially, any post-shock switching by LPs—such as forming new relationships with registered GPs or increasing commitments to pre-existing ones that register—would likely *bias* the estimates *against* finding any effects of the shock.

5.1.3 Potential Selection into Newly Registered GPs

While LP-GP relationships are sticky, they are not formed randomly. To mitigate this endogenous matching, my empirical design focuses exclusively on pre-existing relationships formed prior to the regulatory shock. Both the timing and exemptions of the intervention were largely unanticipated by LPs and GPs, given the political economy of the regulation discussed in Section 2.2. Therefore, the cross-sectional variation in the share of newly registered GPs in LPs' pre-existing relationships is plausibly orthogonal to LP characteristics.

The short nine-month transition window between the announcement and the effective date of the intervention (see Figure 3) further limited GPs' ability to adjust their registration status strategically in the short run, which is supported by the stylized facts in Sections 4.1. Moreover, as Section C.2 demonstrates, long-run regulatory avoidance is also economically costly and rather uncommon.

Nevertheless, to assess potential selection bias in the DiD design, I estimate a linear probability model analyzing which LP characteristics are associated with high exposure to newly registered GPs. Using the same LP cross-section in my main analysis, I find that neither LP types nor states—despite their established role in LP-GP matching (Lerner, Schoar, and Wongsunwai, 2007; Hochberg and Rauh, 2013)—significantly predict exposure to newly registered GPs. As illustrated in Figure 5, nearly all coefficients are economically small and statistically insignificant, mitigating selection concerns. This result is further supported by the analysis in Appendix C.5, in which a rich set of public pension characteristics from the Public Plan Database also fails to predict selection into newly registered GPs among public pension LPs. Overall, the absence of meaningful correlations is consistent with the unexpected nature and design of the intervention in PE funds described in Section 2.2.

5.2 Main Findings

5.2.1 PE Fund Investments

As shown on the left in Figure 1, institutional investors, such as pension funds, endowments, and insurance companies, usually outsource their PE investment activities by committing capital to external fund vehicles. Although this delegated asset management provides various advantages, it also introduces agency costs arising from information frictions in LP-GP relationships (see Section 2.1). Even in the presence of market discipline, these frictions

make financial intermediation costly for LP investors despite its benefits for the broader economy.

I find that regulatory oversight of PE funds facilitates financial intermediation across several proxies for fund investments. Table 3 presents the DiD estimates from Equation (2) using outcome variables such as *Capital Commitment*, an indicator variable equal to one if the LP commits capital to PE funds in the year, and zero otherwise. Across all columns, the coefficient estimates of *Regulatory Exposure* $\times$ *Post* are positive and significant at the 1% level. For example, Columns (1) and (2) suggest that the probability of LPs committing capital to PE funds has risen by 9.4% percentage points (around 28% of the unconditional mean) per year after the Dodd-Frank Act mitigates the agency frictions of newly registered PE fund advisers. The inclusion of LP fixed effects in the even Columns allows me to control for unobservable time-invariant LP characteristics that might be correlated with both the share of newly registered GPs in LPs' pre-existing relationships and capital commitments. In Columns (3)-(6), I find consistent results using alternative measures of capital commitments based on the number of funds invested and the amount of committed capital in a year.

Figure 6a plots the event-study plot for each year with *Capital Commitment* as the dependent variable. It allows us to evaluate the parallel trend assumptions without imposing any ex-ante restrictions on when capital commitments should change. The coefficient in 2011 (t = -1) is normalized to zero. Figure 6a shows evidence that there is no significant pre-trend but a persistent increase in the likelihood of capital commitments by LPs with greater exposure to the regulatory shock.

5.2.2 PE Direct Investments

Instead of holding private equity indirectly through PE funds, investors can directly acquire shares issued by private companies through direct investments, as illustrated on the right of Figure 1 (Fang, Ivashina, and Lerner, 2015; Braun, Jenkinson, and Schemmerl, 2020). On the one hand, direct investments allow investors to mitigate agency frictions inherent in their outsourced managerial relationships.[25] On the other hand, direct investments require investors to forgo the benefits of financial intermediation, such as lower transaction costs and greater diversification (e.g., Benston and Smith, 1976; Leland and Pyle, 1977; Chan, 1983; Diamond, 1984). Therefore, investors trade off the agency costs and benefits of financial intermediation when deciding whether they should bypass PE funds.[26] If regulatory oversight

[25]Reducing PE fees is usually the most important reason for direct investments. This motivation reflects concerns for potential rent extraction and misaligned incentives in the compensation contracts—if the compensation contract were efficiently designed and implemented, investors would consider high fees justifiable since they attracts scarce managerial talent and rewards strong performance ex-post.

[26]Other benefits of direct investments include the ability to selectively invest in private companies, market timing, as well as flexibility in managing PE allocation and risk exposure (Fang, Ivashina, and Lerner, 2015).

of PE funds reduces the agency costs associated with intermediation, it should, in turn, diminishes investors' incentives to bypass intermediation in PE markets.

The results in Table 4 support this prediction. LP investors become less likely to bypass PE funds when regulatory oversight reduces the agency costs of financial intermediation. As reported in Column (1), in which *Direct Investment* is an indicator variable equal to one if the LP makes direct investments in private companies in the year and zero otherwise, the coefficient estimates of *Regulatory Exposure* $\times$ *Post* is negative and statistically significant, indicating an approximately 1.4 percentage decrease (around 35% of the unconditional mean) in the probability of making direct investments each year in the post-period for LP investors with greater exposure to the regulatory shock. The results remain quantitatively and qualitatively similar when we add LP fixed effects or use alternative proxies for LPs' direct investments, such as the number or amount of direct investments, as shown in Columns (2)-(6) of Table 4.

The identification assumption requires that direct investments would have evolved similarly between LPs with different exposure to the regulatory shock, absent the Dodd-Frank Act. The assumption is supported by the patterns observed in Figure 6b, which shows no evidence of pre-trends but significantly negative coefficient estimates following the effective year of the Dodd-Frank Act.

A back-of-the-envelope calculation indicates that increased capital commitments outweigh decreased direct investments, resulting in a net increase of $12.5 million in annual capital supply to private equity markets. According to Table 1, the average LP commits $37.65 million annually but only invests $1.54 million directly. The DiD estimates in Column 6 of Tables 3 and 4 indicates a 33% (= exp(0.288) - 1) increase in committed capital and 3.44% (= exp(-0.035) - 1) decrease in direct investments. This net effect implies that regulatory oversight of PE funds benefits capital formation by encouraging greater LP participation in the PE market.

5.2.3 Agency Frictions & Cross-sectional Heterogeneities

Using a triple-difference design, this paper provides evidence of a direct link between regulatory oversight and agency costs in the private funds industry. LPs should not indiscriminately react to regulatory oversight of their GPs. Instead, their response should be stronger if their GPs are more susceptible to agency frictions. These frictions are proxied by GPs' disciplinary history from Form ADV filings and geographic distance between LPs and GPs—a well-documented barrier to effective monitoring.[27] The results confirm that the disciplinary

[27]Existing studies have documented the importance of geographical proximity in overcoming agency frictions in various settings such as corporate payout, plant-level production, and VC investment (e.g., John, Knyazeva, and Knyazeva, 2011; Giroud, 2013; Bernstein, Giroud, and Townsend, 2016).

effect of regulation is concentrated among GPs with higher ex-ante agency problems.

Panel A of Table 5 examines heterogeneity based on GP misconduct. *Misconduct* is an indicator variable equal to one if an LP had a pre-existing relationship with any GP reported for regulatory misconduct as of the Dodd-Frank Act's effective year, and zero otherwise. The positive and significant coefficient of *Regulatory Exposure* × *Post* × *Misconduct* indicates that the impact of enhanced regulatory oversight is concentrated among LPs whose GPs had a history of misaligned incentives. This type of misconduct, as noted by Jiang, Mason, Qian, and Utke (2024), frequently involves insufficient or misleading information about fees, asset valuations, and similar matters.

Panel B of Table 5 investigates heterogeneity based on geographic distance. *Ln(1 + Distance)* is the natural logarithm of one plus the average distance between an LP investor and its pre-existing GPs. *Regulatory Exposure* × *Post* × *Ln(1 + Distance)* has positive and statistically significant slope in Columns (4) and (6), implying that regulatory oversight compliments monitoring when distance makes market discipline less effective.

Collectively, the cross-sectional heterogeneity can help reject many potential confounding explanations. An alternative story would need to explain why the positive impact of registration is mainly concentrated among LPs exposed to GPs with a history of misconduct and LPs facing higher monitoring costs due to geographic distance from their GPs.

5.3 Alternative Explanations

The absence of pre-trends in the event studies and the cross-sectional heterogeneity presented in Section 5.2.3 provide strong support for the causal impact of regulatory oversight on LPs' PE market participation. Moreover, the opposing directional changes in capital commitments and direct investments suggest that my findings are unlikely driven by unobservable LP characteristics that are correlated with broader secular trends in investors' allocation to private equity. Nevertheless, I directly address several alternative explanations in the following discussion:

Secular Trends across Different GPs. The new registration exemptions are closely linked to the size of GPs and their investment strategies (Section 2.2). This connection raises potential concerns that the observed effects of registrations may not arise from the regulatory oversight themselves but instead reflect underlying differences in investment opportunities or market dynamics, for instance, between smaller and larger GPs or between GPs managing buyout funds versus those managing VC funds. To address these concerns, I re-estimate my baseline regressions allowing LP outcomes to evolve along flexible time trends based on the characteristics of their pre-existing GPs. Table 6 Panel A reports these estimates, which are quantitatively and qualitatively similar to my main findings.

Furthermore, within-GP estimation detailed in Appendix C.6 reveals that GPs with

different size or investment focus exhibit similar fundraising outcomes before and after the Dodd-Frank Act (Figure 7). In contrast, GPs that become registered subsequently raise more capital and the difference is both statistically significant and economically large (Table 7). Overall, these findings suggest that my main findings are driven by the regulatory intervention itself, not by pre-existing LP differences in GP characteristics.

Volcker Rule. Another important regulatory intervention introduced by the Dodd-Frank Act is the Volcker Rule, which prohibits banks from investing in private equity (Chen and Ewens, 2024). It raises the possibility that my results are influenced by a concurrent shock to the supply of bank capital.

First, my analysis remains robust to excluding all bank-affiliated LPs recorded in Preqin (see Table C.5 Panel A). Second, I account for potential spillovers through local fundraising markets. Since GPs tend to raise funds from local LPs (Hochberg and Rauh, 2013), the Volcker Rule's constraints on bank LPs could potentially lead to a greater supply of PE funds to non-bank LPs in the same region and affect their PE investment decisions. I rule out this explanation by including year-by-LP-state fixed effects, which absorb any time-varying shocks at the LP-state level. The coefficient estimates reported in Table 6 Panel B remain similar quantitatively and qualitatively.

Confounding Financial Regulations. A distinct category of LPs comprises fund-of-funds (FOF) managers. As private fund advisers themselves, FOF managers are subject to the same registration exemptions and regulatory oversight under the Dodd–Frank Act as the PE fund advisers in which they invest. Panel B of Table C.5 shows that my results remain robust after excluding FOF managers, suggesting that the documented effects are not driven by regulation of FOF LPs.

Similarly, as an overhaul of the US financial systems after the 2008 financial crisis, the Dodd-Frank Act might have introduced other confounding regulations that indirectly affect financial institutions differentially. However, LPs' exposure to these potential shocks is unlikely to correlate systematically with the share of newly registered PE fund advisers in LPs' pre-existing relationships.

Furthermore, I mitigate such concerns in two ways. First, Table 6 Panel B reports results with year-by-LP-type fixed effects, taking into account the systematic differences in terms of balance sheets, investment objectives, and exposure to economic and regulatory shocks across different LP types. Second, Table C.5 Panel C restricts the sample to endowments and foundations. While being one of the most important LP investors in PE markets, they are subject to substantially lighter regulation than pensions, insurers, and banks due to their lack of guaranteed, public liabilities. The consistency of results across both specifications supports the robustness of my findings.

Supply of Co-investment Opportunities. A supply-side explanation could argue that registration requirements potentially constrained GPs' ability to offer customized co-investments to LPs due to compliance policies or potential fiduciary duty scrutiny. This potential constraint could lead to more standardized fund structures manifested through increased fund investments and reduced direct investments.

Panel A of Table C.6 rejects this explanation by demonstrating that registered GPs are actually more likely to establish co-investment funds—precisely the type of customized investment vehicles GPs would avoid if the Dodd-Frank Act were to constrain their ability to offer customization. The pattern in Table C.6 Panel A aligns with the fact that registered PE firms tend to be larger and better resourced, giving them greater capacity to structure and administer complex co-investment programs. Panel B of Table C.6 indicates that PE funds managed by registered advisers do no meaningfully differ from those managed by unregistered advisers in their probability of offering co-investment opportunities to their LP investors. In fact, the Dodd-Frank Act did not impose explicit restrictions on co-investment opportunities.[28]

Fundraising Distortion. Another supply-side alternative explanation is that advisers would systematically avoid registration by limiting fund size to qualify for the "private fund adviser" exemption. This channel would predict a relative decline in fund supply for LPs with low exposure to newly registered advisers and positive spillover to LPs' direct investments, mechanically producing the observed pattern of more fund investments and fewer direct investments for high-exposure LPs.

However, two pieces of evidence reject this fundraising distortion channel. First, it predicts that the effect on fund investments would be concentrated in buyout funds and muted in VC funds, as the size-based exemption does not distort GPs' incentives to raise smaller VC funds (see Section 2.2). Table C.7 demonstrates that my results remain quantitatively and qualitatively similar when restricting to LPs' VC market participation. Second, C.4a indicates rather limited change in the distribution of fundraising after the intervention, showing little evidence of widespread strategic exemption-seeking behavior that might drive my findings.

Reporting Bias. Commercial data providers including Preqin have incomplete coverage of PE fund investments. A potential concern is that the increased PE fund investments by high-exposure LPs might merely reflect enhanced reporting by newly registered GPs rather

[28]In 2023, the SEC adopted new rules that sought to regulate registered advisers' co-investment arrangements, including how investment advisers charge co-investment fees and expenses, and the use of side letters that grant preferential treatment to certain LP investors. However, the US Court of Appeals for the Fifth Circuit subsequently struck down these 2023 rules, finding that the SEC lacked statutory authority to impose them.

than true investment changes among LPs. However, Table C.8 mitigates this concern by demonstrating that GPs do not become more likely to report their fund-level LPs or their committed capital after becoming registered with the SEC.

6 Capital Allocation Implications of Improved Intermediation

From a social planner's perspective, the organizational structure of PE markets matters if there are capital allocation implications. Given that most LP investors, such as endowments, pension funds and insurers, lack expertise in due diligence and post-investment management of private companies, a pertinent question arises: which types of companies do LPs tend to finance directly, and do these companies exhibit lower quality compared to those financed by PE funds? This section delves into the potential implications of (dis)intermediation in PE markets on these aspects.

To investigate the first question, I estimate OLS regressions examining whether various private company characteristics correlate with *LP Ratio (%)*, the percentage of PE investors in a deal that are LPs acting as direct investors. One advantage of examining the deal-level share of LP investors is that we can largely isolate companies' demand for private capital, which is positively correlated with the denominator in the share variable. The regressions include deal year, deal type (buyout vs. VC), company state and company industry fixed effects and use Huber-White standard errors.

Table 8 presents the relationship between company characteristics and direct LP investment. Column (1) shows that early-stage companies—defined as those raising capital below a Series C round—receive a significantly lower share of capital directly from LPs. This result is consistent with information asymmetry discouraging investments in younger, more opaque firms if LPs invest without the expertise of specialized intermediaries.

We find corroborating evidence in Columns (2) and (3), which employ alternative measures of maturity: company age and funding round number. The positive and statistically significant coefficients on both variables indicate that LP direct investments become more prevalent as firms age and generate more observable information.

The role of firm visibility is further supported in Column (4). The positive and significant coefficient on *Ln(1 + Capital Raised)* suggests that LPs disproportionately invest in larger companies, which are likely more established and easier to evaluate for investors with limited direct deal-sourcing capabilities.

Finally, Column (5) introduces a measure of innovation intensity, *Number of Highly Cited Patents / Deal Size*, the number of (eventually granted) highly cited patents applied for in the next three years, scaled by the deal size. Highly cited patents are defined as those with the top quintile numbers of citations among patents granted in the same year. The variable is scaled by deal size because larger firms tend to mechanically produce more

patents. A one-standard-deviation increase in this variable would lower the LP ratio by 4%. This result suggests that it is costly for LPs to invest in highly innovative firms, potentially due to the asset intangibility and specialized knowledge required to value such assets.

Collectively, the results in Table 8 are consistent with the extreme corporate finance challenges LP investors face in financing private companies, such as information asymmetry, uncertainty, and low asset tangibility. Moreover, the large minimum investment threshold in PE deals reduces LPs' risk diversification when making direct investments, a constraint that financial intermediation through PE funds overcomes by pooling capital and spreading it across a diversified portfolio. These frictions imply that younger, more risky, and more innovative firms would be underfunded in a disintermediated PE market compared to a market with enhanced financial intermediation. Besides increased LP PE market participation shown in Section 5.2, this potential capital allocation implication provides another rationale for policy intervention to facilitate intermediation in PE markets.

In Appendix C.7, using a subsample matched on observable deal characteristics, I find suggestive evidence that LPs do not face adverse selection of companies with worse exit outcomes in direct investments. One caveat is that the result does not necessarily imply LPs earn similar net returns in direct investments and fund investments. Existing literature remains inconclusive on whether LPs underperform when bypassing financial intermediation (Fang, Ivashina, and Lerner, 2015; Braun, Jenkinson, and Schemmerl, 2020).

7 Conclusion

Financial intermediation plays a vital role in the efficiency of complex economies. However, policy intervention might be necessary when market forces fail to sufficiently align the interests of financial intermediaries with their investors' due to pervasive information frictions.

This paper provides causal evidence that regulatory oversight of PE funds mitigates agency frictions in intermediation and increases investors' PE market participation. My empirical setting utilizes the Dodd-Frank Act, a landmark change that significantly expanded the regulatory oversight of PE funds by subjecting many newly registered fund advisers to examinations, rules, and disclosure. Besides increasing net capital supply to private companies, regulatory oversight of PE funds can also potentially improve capital allocation outcomes by reducing LPs incentives in bypassing intermediation. When LPs invest directly, they tend to finance more mature, larger, and less innovative companies due to investors' limited ability to overcome asymmetric information and under-diversification when financing private companies without intermediation.

While there are several reasons to regulate PE funds, such as investor protection, market transparency, and market efficiency, new regulations usually impose operational, administrative, and transaction costs on PE fund advisers. Many of these will ultimately be passed on

to investors in the form of lower returns. Therefore, this paper can inform the active debate over the costs and benefits of regulation in PE markets, which have played an increasingly important role in nearly every sector of the economy.

References

Abuzov, R., W. Gornall, and I. A. Strebulaev (2025). The value of privacy and the choice of limited partners by venture capitalists. *Journal of Financial Economics 169*, 104063.

Andonov, A., R. M. Bauer, and K. M. Cremers (2017). Pension fund asset allocation and liability discount rates. *Review of Financial Studies 30*(8), 2555–2595.

Baker, A., D. Larcker, and C. Wang (2022). How much should we trust staggered difference-in-differences estimates? *Journal of Financial Economics 144*(2), 370–395.

Barber, B. and A. Yasuda (2017). Interim fund performance and fundraising in private equity. *Journal of Financial Economics 124*(1), 172–194.

Bebchuk, L. and J. Fried (2003). Executive compensation as an agency problem. *Journal of Economic Perspectives 17*(3), 71–92.

Bebchuk, L. and J. Fried (2004). *Pay without performance: The unfulfilled promise of executive compensation*. Harvard University Press.

Begenau, J. and E. N. Siriwardane (2024). Fee variation in private equity. *Journal of Finance 79*(2), 1199–1247.

Bena, J., I. Erel, D. Wang, and M. S. Weisbach (2023). Relationship-specific investments and firms' boundaries: Evidence from textual analysis of patents. *Fisher College of Business Working Paper* (2023-03), 027.

Benston, G. and C. Smith (1976). A transactions cost approach to the theory of financial intermediation. *Journal of Finance 31*(2), 215–231.

Berger, A. N. and C. H. Bouwman (2013). How does capital affect bank performance during financial crises? *Journal of Financial Economics 109*(1), 146–176.

Bernstein, S., X. Giroud, and R. Townsend (2016). The impact of venture capital monitoring. *Journal of Finance 71*(4), 1591–1622.

Bhardwaj, A., S. Ge, and S. Mukherjee (2025). Does loan securitization expose borrowers to non-bank investor shocks?—evidence from insurers. Technical report.

Bhardwaj, A., A. Gupta, S. T. Howell, and K. Zimmerschied (2025). Does fund size affect private equity performance? evidence from donation inflows to private universities. Technical report, National Bureau of Economic Research.

Braun, R., T. Jenkinson, and C. Schemmerl (2020). Adverse selection and the performance of private equity co-investments. *Journal of Financial Economics 136*(1), 44–62.

Brown, G. W., O. R. Gredil, and S. N. Kaplan (2019). Do private equity funds manipulate reported returns? *Journal of Financial Economics 132*(2), 267–297.

Buchak, G., G. Matvos, T. Piskorski, and A. Seru (2018). Fintech, regulatory arbitrage, and the rise of shadow banks. *Journal of Financial Economics 130*(3), 453–483.

Chakraborty, I. and M. Ewens (2018). Managing performance signals through delay: Evidence from venture capital. *Management Science 64*(6), 2875–2900.

Chan, Y.-S. (1983). On the positive role of financial intermediation in allocation of venture capital in a market with imperfect information. *Journal of Finance 38*(5), 1543–1568.

Charoenwong, B., A. Kwan, and T. Umar (2019). Does regulatory jurisdiction affect the quality of investment-adviser regulation? *American Economic Review 109*(10), 3681–3712.

Chen, J. and M. Ewens (2024). Venture capital and startup agglomeration. *Journal of Finance, Forthcoming*.

Chodorow-Reich, G. (2014). The employment effects of credit market disruptions: Firm-level evidence from the 2008–9 financial crisis. *Quarterly Journal of Economics 129*(1), 1–59.

Chung, J.-W., B. Sensoy, L. Stern, and M. Weisbach (2012). Pay for performance from future fund flows: The case of private equity. *Review of Financial Studies 25*(11), 3259–3304.

Coase, R. (1937). The nature of the firm. *Economica 4*(16), 386–405.

Coase, R. H. (1960). The problem of social cost. *Journal of Law and Economics 3*, 1–44.

Da Rin, M., T. Hellmann, and M. Puri (2013). A survey of venture capital research. In *Handbook of the Economics of Finance*, Volume 2, pp. 573–648. Elsevier.

Da Rin, M. and L. Phalippou (2017). The importance of size in private equity: Evidence from a survey of limited partners. *Journal of Financial Intermediation 31*, 64–76.

Diamond, D. (1984). Financial intermediation and delegated monitoring. *Review of Economic Studies 51*(3), 393–414.

Edmans, A., X. Gabaix, and D. Jenter (2017). Executive compensation: A survey of theory and evidence. *Handbook of the Economics of Corporate Governance 1*, 383–539.

Ewens, M. and J. Farre-Mensa (2020). The deregulation of the private equity markets and the decline in IPOs. *Review of Financial Studies 33*(12), 5463–5509.

Ewens, M. and J. Farre-Mensa (2022). Private or public equity? the evolving entrepreneurial finance landscape. *Annual Review of Financial Economics 14*(1), 271–293.

Ewens, M. and M. Rhodes-Kropf (2015). Is a VC partnership greater than the sum of its partners? *Journal of Finance 70*(3), 1081–1113.

Ewens, M., K. Xiao, and T. Xu (2024). Regulatory costs of being public: Evidence from bunching estimation. *Journal of Financial Economics 153*, 103775.

Fang, L., V. Ivashina, and J. Lerner (2015). The disintermediation of financial markets: Direct investing in private equity. *Journal of Financial Economics 116*(1), 160–178.

Frésard, L., G. Hoberg, and G. M. Phillips (2020). Innovation activities and integration through vertical acquisitions. *Review of Financial Studies 33*(7), 2937–2976.

Garrett, D. G. (2024). Conflicts of interest in municipal bond advising and underwriting. *The Review of Financial Studies 37*(12), 3835–3876.

Giroud, X. (2013). Proximity and investment: Evidence from plant-level data. *The Quarterly Journal of Economics 128*(2), 861–915.

Goetzmann, W. N., B. Liang, and J. Wang (2024). The Dodd-Frank act and hedge fund operational risk. *Available at SSRN 4701634*.

Gompers, P. and J. Lerner (1996). The use of covenants: An empirical analysis of venture partnership agreements. *Journal of Law and Economics 39*(2), 463–498.

Gompers, P. and J. Lerner (1999). An analysis of compensation in the US venture capital partnership. *Journal of Financial Economics 51*(1), 3–44.

Goodman-Bacon, A. (2021). Difference-in-differences with variation in treatment timing. *Journal of Econometrics 225*(2), 254–277.

Grossman, S. and O. Hart (1986). The costs and benefits of ownership: A theory of vertical and lateral integration. *Journal of Political Economy 94*(4), 691–719.

Harford, J. and K. Li (2007). Decoupling CEO wealth and firm performance: The case of acquiring CEOs. *Journal of Finance 62*(2), 917–949.

Hart, O. and J. Moore (1990). Property rights and the nature of the firm. *Journal of Political Economy 98*(6), 1119–1158.

Hochberg, Y., A. Ljungqvist, and A. Vissing-Jørgensen (2014). Informational holdup and performance persistence in venture capital. *Review of Financial Studies 27*(1), 102–152.

Hochberg, Y. and J. Rauh (2013). Local overweighting and underperformance: Evidence from limited partner private equity investments. *Review of Financial Studies 26*(2), 403–451.

Holmstrom, B. (1999). The firm as a subeconomy. *Journal of Law, Economics, and organization 15*(1), 74–102.

Holmstrom, B. and P. Milgrom (1991). Multitask principal-agent analyses: Incentive contracts, asset ownership, and job design. *Journal of Law, Economics & Organization 7*, 24.

Holmstrom, B. and P. Milgrom (1994). The firm as an incentive system. *American Economic Review*, 972–991.

Howell, S. T., D. Parker, and T. Xu (2025). Tyranny of the personal network: The limits of arm's length fundraising in venture capital. Technical report, National Bureau of Economic Research.

Jiang, F., P. Mason, Y. Qian, and S. Utke (2024). Does mandatory disclosure matter for private equity funds? *University of Connecticut School of Business Research Paper* (22-21).

John, K., A. Knyazeva, and D. Knyazeva (2011). Does geography matter? firm location and corporate payout policy. *Journal of Financial Economics 101*(3), 533–551.

Kahle, K. M. and R. M. Stulz (2017). Is the us public corporation in trouble? *Journal of Economic Perspectives 31*(3), 67–88.

Kaplan, S. and J. Lerner (2016, August). Venture capital data: Opportunities and challenges. Working Paper 22500, National Bureau of Economic Research.

Klein, B., R. G. Crawford, and A. A. Alchian (1978). Vertical integration, appropriable rents, and the competitive contracting process. *Journal of Law and Economics 21*(2), 297–326.

Laeven, L. and R. Levine (2009). Bank governance, regulation and risk taking. *Journal of Financial Economics 93*(2), 259–275.

Leland, H. and D. Pyle (1977). Informational asymmetries, financial structure, and financial intermediation. *Journal of Finance 32*(2), 371–387.

Lerner, J., J. Mao, A. Schoar, and N. Zhang (2022). Investing outside the box: Evidence from alternative vehicles in private equity. *Journal of Financial Economics*.

Lerner, J. and R. Nanda (2020). Venture capital's role in financing innovation: What we know and how much we still need to learn. *Journal of Economic Perspectives 34*(3), 237–261.

Lerner, J. and A. Schoar (2004). The illiquidity puzzle: Theory and evidence from private equity. *Journal of Financial Economics 72*(1), 3–40.

Lerner, J., A. Schoar, and W. Wongsunwai (2007). Smart institutions, foolish choices: The limited partner performance puzzle. *Journal of Finance 62*(2), 731–764.

Metrick, A. and A. Yasuda (2010). The economics of private equity funds. *Review of Financial Studies 23*(6), 2303–2341.

Phalippou, L. (2009). Beware of venturing into private equity. *Journal of Economic Perspectives 23*(1), 147–166.

Posner, R. A. (1974). Theories of economic regulation. *Bell Journal of Economics and Management Science 5*, 335.

Robinson, D. and B. Sensoy (2013). Do private equity fund managers earn their fees? Compensation, ownership, and cash flow performance. *Review of Financial Studies 26*(11), 2760–2797.

SEC (2011a). Release No. IA-3222. *https://www.sec.gov/files/rules/final/2011/ia-3222.pdf*.

SEC (2011b). SEC adopts Dodd-Frank Act Amendments to Investment Advisers Act. *https://www.sec.gov/news/press/2011/2011-133.htm*.

Sen, I. (2023). Regulatory limits to risk management. *Review of Financial Studies 36*(6), 2175–2223.

Sensoy, B., Y. Wang, and M. S. Weisbach (2014). Limited partner performance and the maturing of the private equity industry. *Journal of Financial Economics 112*(3), 320–343.

Shleifer, A. (2005). Understanding regulation. *European Financial Management 11*(4), 439–451.

Stefanescu, I., Y. Wang, K. Xie, and J. Yang (2018). Pay me now (and later): Pension benefit manipulation before plan freezes and executive retirement. *Journal of Financial Economics 127*(1), 152–173.

Stigler, G. (1971). The theory of economic regulation. *Bell Journal of Economics 2*(1), 3–21.

Stiglitz, J. E. (1993). The role of the state in financial markets. *The World Bank Economic Review 7*(suppl_1), 19–52.

Williamson, O. E. (1979). Transaction-cost economics: The governance of contractual relations. *Journal of Law and Economics 22*(2), 233–261.

Yermack, D. (2006). Flights of fancy: Corporate jets, CEO perquisites, and inferior shareholder returns. *Journal of Financial Economics 80*(1), 211–242.

Zingales, L. (2009). The future of securities regulation. *Journal of Accounting Research 47*(2), 391–425.

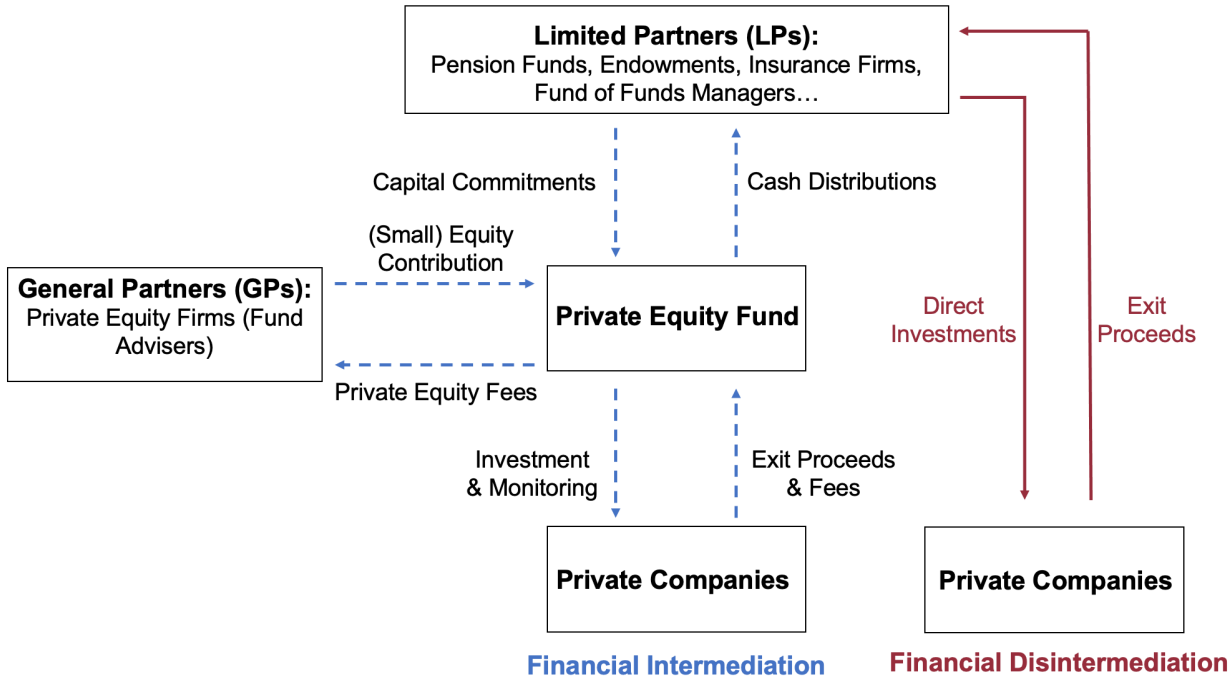
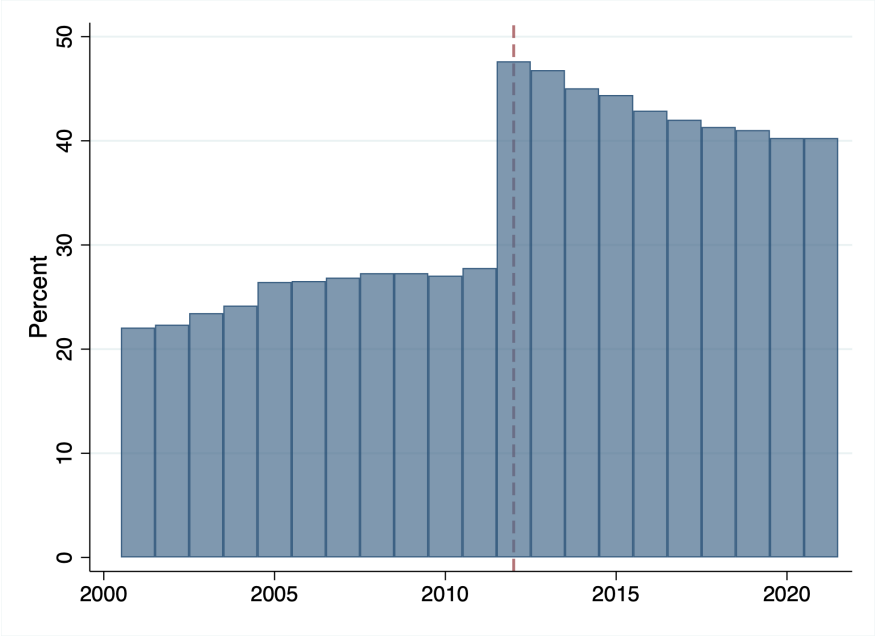
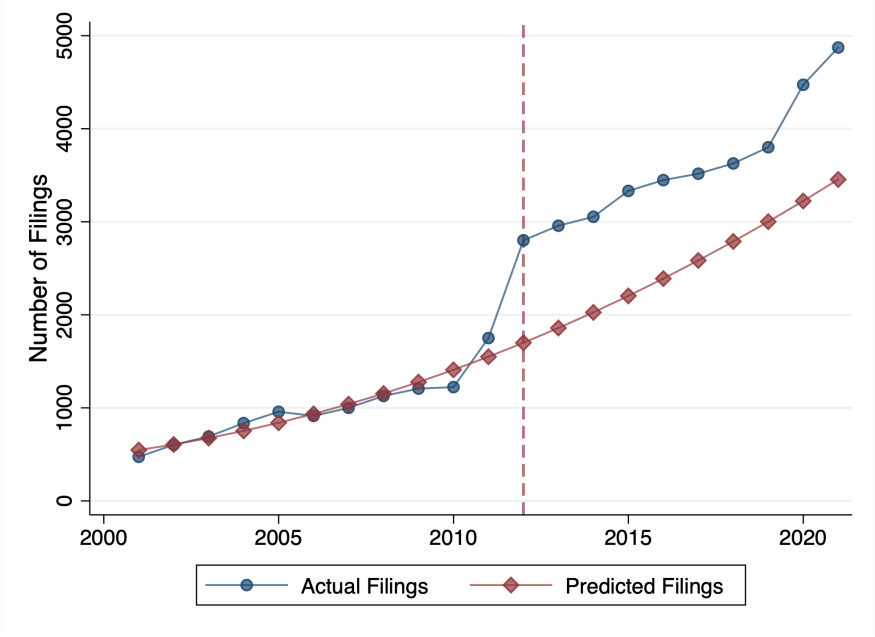


Figure 1: Stylized Representation of the PE Market Organizational Structure

This figure illustrates the stylized representation of the PE market organizational structure. On the one hand, the market is intermediate by PE funds, as shown in the blue dashed arrows on the left (Da Rin, Hellmann, and Puri, 2013). In this setting, PE fund advisers, also referred to as general partners (GPs), select, monitor, and exit private companies on behalf of their limited partner (LP) investors in exchange for various fees discussed in more detail in Section 2.1. On the other hand, these institutional investors can directly purchase private equity issued by companies without the intermediation of PE funds, as shown in the red solid arrows on the right (Fang, Ivashina, and Lerner, 2015; Braun, Jenkinson, and Schemmerl, 2020). This process is known as LP direct investing and allows LPs to reduce agency costs in outsourced relationships.



(a) Share of Advisers Registered with the SEC



(b) Number of Form ADV Filed by Registered Advisers

Figure 2: Dodd-Frank Act and the Expansion of Regulatory Oversight of PE funds

Figure 2a shows the share of PE fund advisers that are registered with the SEC over time. Registered advisers are subject to the SEC's regulatory scrutiny, rules, and disclosure requirements. The total number of advisers is unobservable before 2012 and estimated using out-of-sample predictions based on a regression that fits the numbers derived from Form ADV with those obtained from Preqin during 2012-2021. Figure C.2a shows the number registered advisers over time. Figure 2b displays the actual and predicted number of Form ADV filed by registered PE fund advisers each year. The predicted value is estimated using a model fitted with a quadratic time trend for the 2001-2011 period. In each figure, the red vertical dashed line indicates 2012 when the Dodd-Frank Act became effective and significantly narrowed PE fund advisers' registration exemptions.

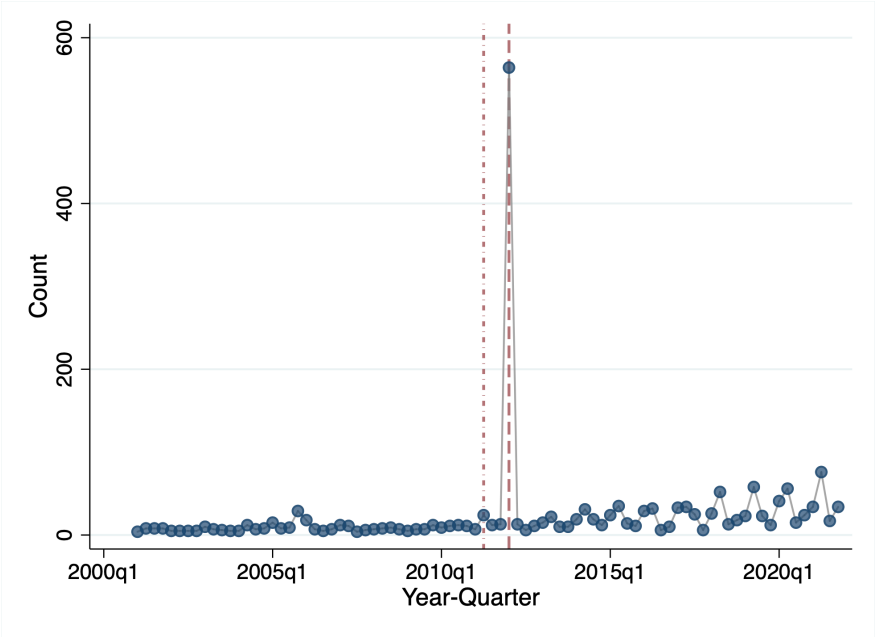
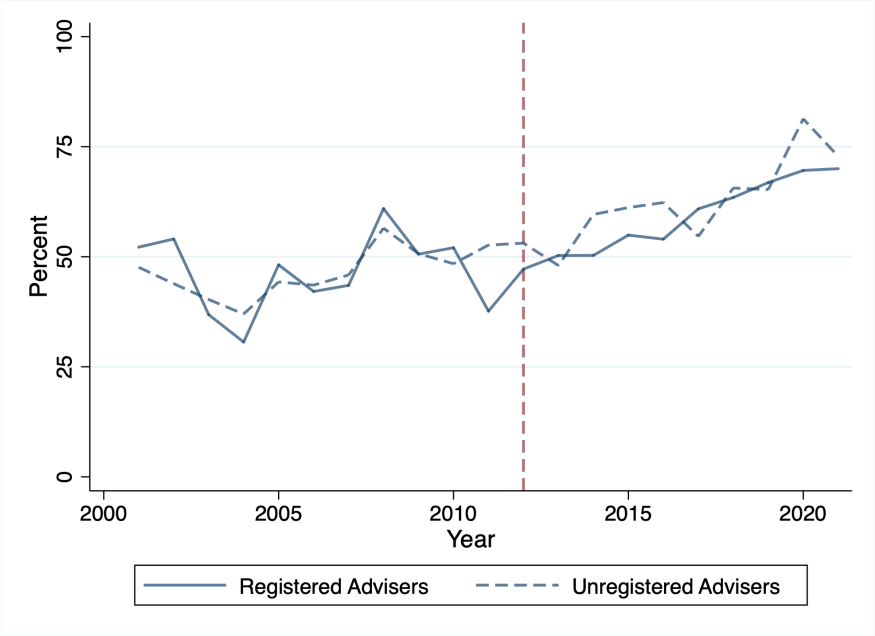
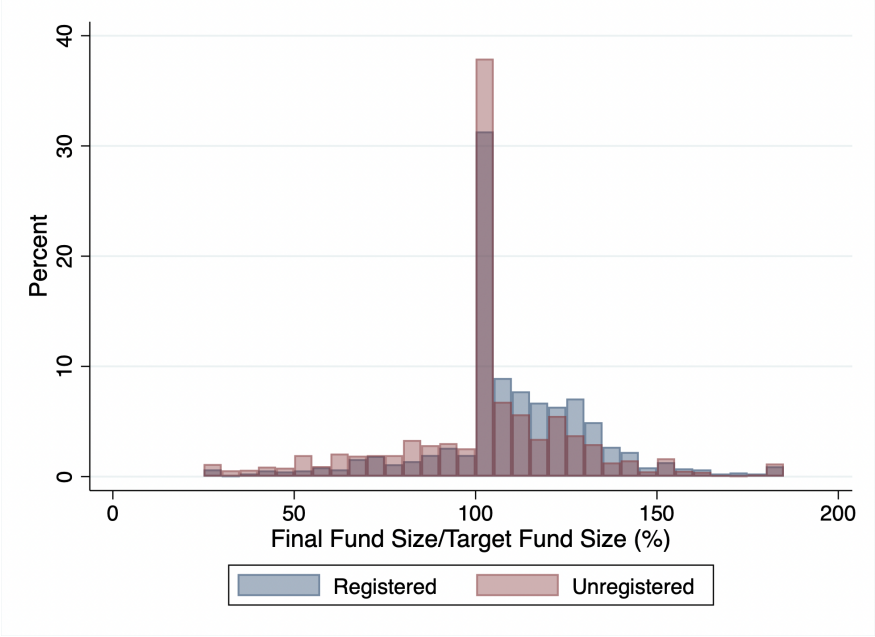


Figure 3: Registration Timing - Quarterly Number of Initial Registrations

Figure 3 highlights the registration timing by showing the quarterly number of initial registration filings submitted by PE fund advisers. Although the SEC adopted the Dodd-Frank Act in 2011Q2 (red dash-dotted line), a transition period set the compliance deadline for adviser registration at 2012Q1 (red dashed line). The short nine-month transition window between the announcement and effective date of the intervention implies that advisers have limited ability to change their fund characteristics and manipulate their registration status in the short run leading to a sharp increase in registrations. The clustering of registrations at the compliance deadline indicates both strong regulatory enforcement and potential costs perceived by advisers.



(a) Percent of Returning LPs



(b) Subscription Ratio of Private Equity Funds

Figure 4: Sticky LP-GP Relationships

Figure 4a shows the average percentage of returning LPs in PE funds managed by registered and unregistered advisers. Returning LPs are defined as LPs that have previous investments in funds managed by the same adviser. The red vertical dashed line indicates the base year 2012 when the Dodd-Frank Act became effective for PE fund advisers and significantly narrowed their registration exemptions. The alignment in the percent of returning LPs between funds managed by registered and unregistered GPs suggests that LP-GP relationships are sticky. Figure 4b shows the subscription ratio of funds raised by registered and unregistered advisers. The subscription ratio is defined as the ratio of the final fund size to the target fund size. Around 60% of funds managed by registered advisers are oversubscribed and 42% of funds managed by unregistered advisers remain oversubscribed. Appendix C.4 provides additional evidence on sticky LP-GP relationships.

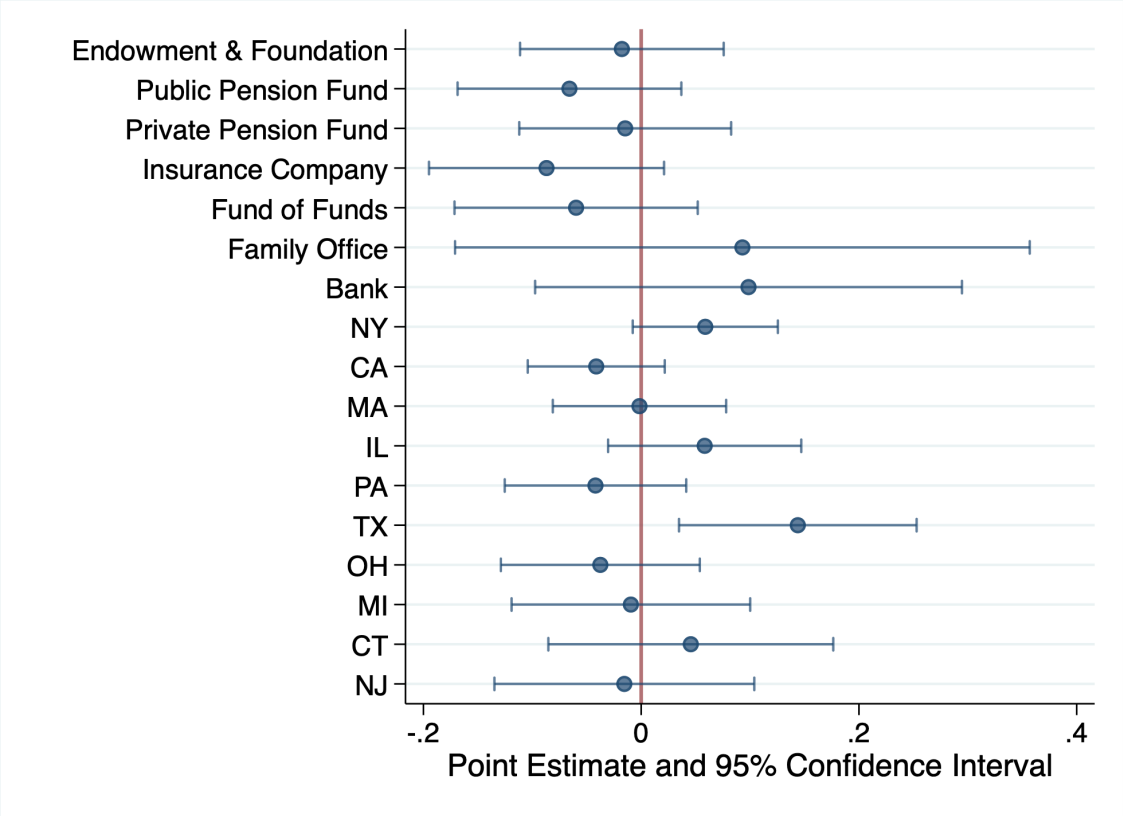
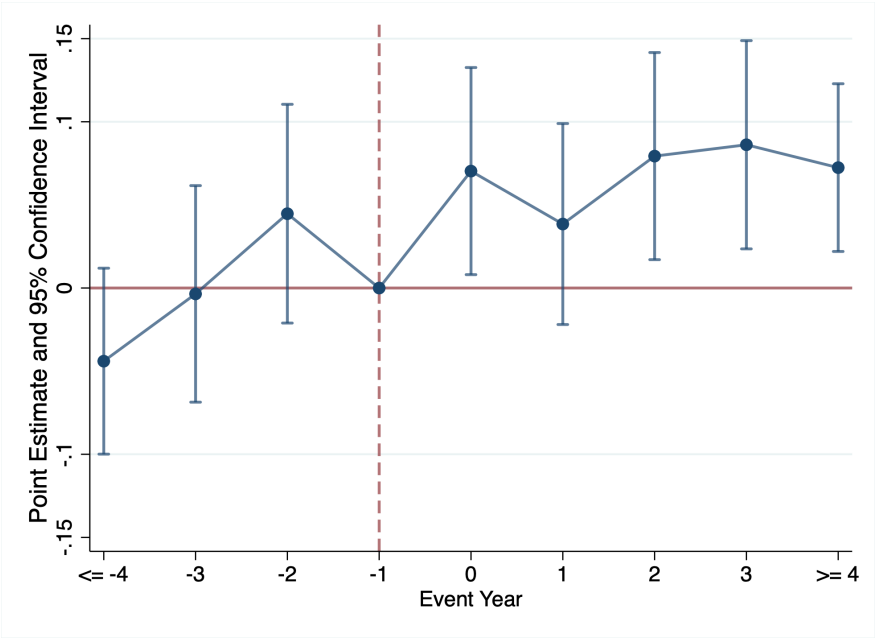
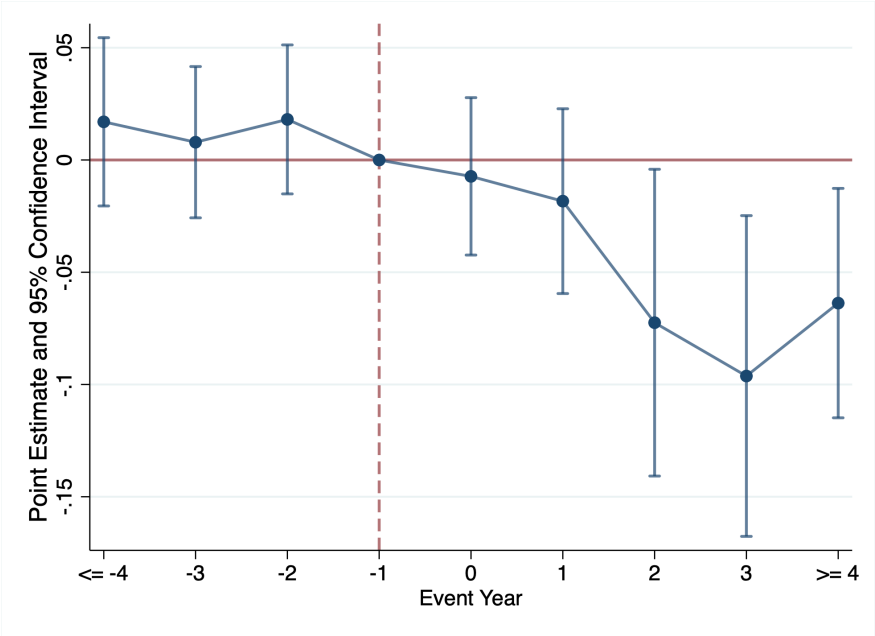


Figure 5: Linear Probability Estimates Explaining Exposure to Newly Registered GPs

This figure plots the linear probability coefficients and the associated two-tailed 95% confidence intervals from a cross-sectional regression of *Regulatory Exposure* on dummy variables based on LP institutional types and headquarter states known to influence LP-GP matching as documented by Lerner, Schoar, and Wongsunwai (2007) and Hochberg and Rauh (2013). The outcome variable, *Regulatory Exposure*, is an indicator variable equal to one if the share of newly registered GPs in the LP's pre-existing LP-GP relationships is in the top quintile group, and zero otherwise. The omitted group for LP types includes institutions such as government agencies, investment trusts, and wealth managers. The omitted group for LP states includes the rest of the US states other than the top 10 LP states (NY, CA, MA, IL, PA, TX, OH, MI, CT, NJ). Huber-White standard errors are used. The estimates suggest that these LP characteristics have little explanatory power of whether a LP has high exposure to newly registered GPs, supporting quasi-random variation of LPs' exposure to the regulatory shock. Appendix C.5 leverages the comprehensive public pension fund characteristics available in the Public Plan Database and demonstrates that none of these observable characteristics predict selection into high exposure to newly registered GPs among public pensions.



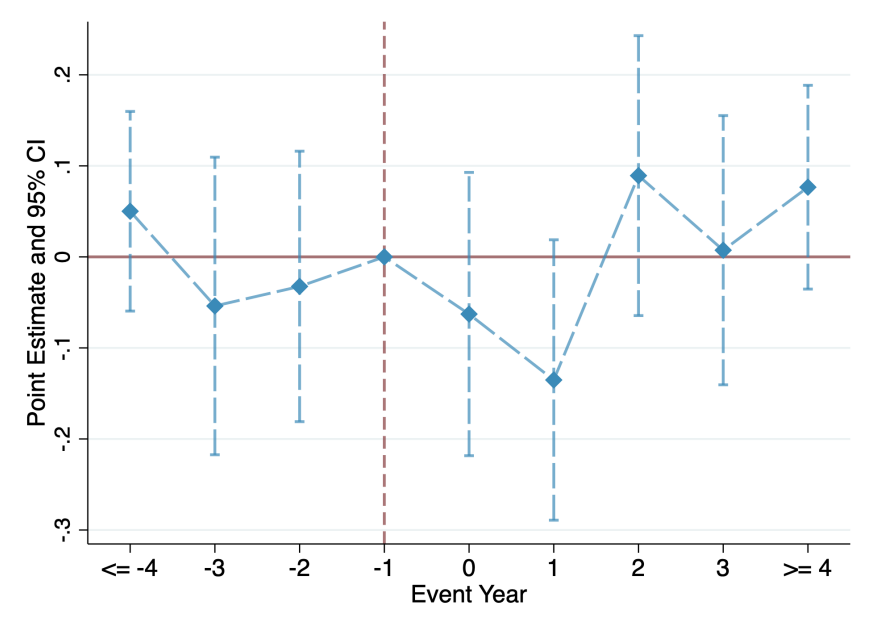
(a) Capital Commitment



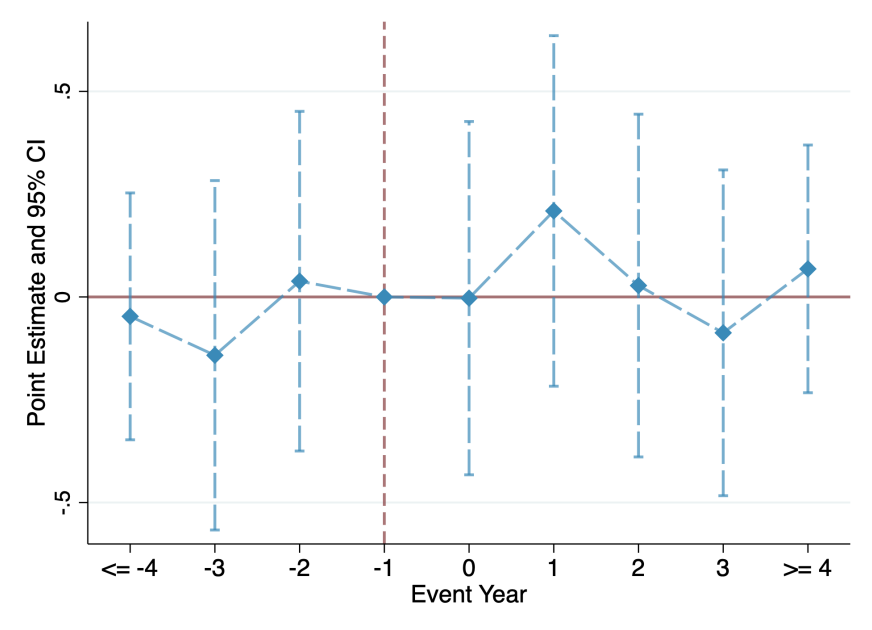
(b) Number of Direct Investments

Figure 6: Dynamic Effects of Regulatory Oversight on LPs' PE Market Participation

This figure plots the event-study coefficient estimates and associated two-tailed 95% confidence intervals of the difference between LPs with high (treatment group) and low exposure (control group) to newly registered GPs in their pre-existing LP-GP relationships. The coefficient in 2011 (t = -1) is normalized to zero. The red vertical dashed line indicates the base year of 2011, the year before the Dodd-Frank Act expanded the regulatory oversight of PE funds. The outcome variables are indicated in subcaptions. The regressions control for LP size and include year and LP fixed effects. Standard errors are clustered at the LP level.



(a) Large vs. Small Fund Managers



(b) Buyout vs. Venture Capital Fund Managers

Figure 7: Falsification Tests - Fundraising Dyanmics Across GPs

As a falsification test to rule our secular trends across different GPs as an alternative explanation (Section 5.3), this figure plots the event-study coefficient estimates and associated two-tailed 95% confidence intervals of the difference between different GPs. The outcome variable, *Ln(1 + Raised Capital)*, is the natural logarithm of one plus the total amount of PE funds raised in USD MIL in a given year. The corresponding DiD estimates (Equation 5) are reported in Columns (7) and (8) in Table 7. The coefficient in 2011 (t = -1) is normalized to zero. The red vertical dashed line indicates the base year of 2011, the year before the Dodd-Frank Act expanded the regulatory oversight of PE funds. Standard errors are clustered at the GP level.

Table 1: Summary Statistics

This table reports the summary statistics of the main variables in my analysis. For Panel A, the sample consists of 47,536 unique private equity funds reported in Schedule D during 2012-2021, excluding funds of funds, feeder funds and PE funds with initial gross asset value below 10 USD MIL. A unit of observation is a PE fund. Introduced by the Dodd-Frank Act, Schedule D are supplementary filings to Form ADV and need to be filed for each private fund managed by registered advisers and unregistered advisers since 2012. A unit of observation is a fund. For Panel B, the sample consists of 1,522 unique US limited partner (LP) investors located during the period 2001-2021. A unit of observation is an LP-year. Detailed variable definitions are provided in Appendix B.

	Mean	SD	p25	p50	p75	N
Panel A: Fund Level						
Annual Audit	0.93	0.26	1.00	1.00	1.00	23,565
GAAP	0.86	0.35	1.00	1.00	1.00	22,536
Qualified Opinion	0.06	0.23	0.00	0.00	0.00	20,209
Custodians	0.83	0.38	1.00	1.00	1.00	23,565
Registered	0.56	0.50	0.00	1.00	1.00	23,565
Gross Asset Value ($ MIL)	207.42	371.32	25.54	65.39	198.38	23,565
Fund Number	2.51	2.43	1.00	1.00	3.00	23,565
VC Fund	0.26	0.44	0.00	0.00	1.00	23,565
Panel B: LP-Year Level						
High Exposure	0.19	0.39	0.00	0.00	0.00	29,598
Post	0.51	0.50	0.00	1.00	1.00	29,598
Capital Commitment	0.33	0.47	0.00	0.00	1.00	29,598
Number of Funds	1.03	2.30	0.00	0.00	1.00	29,598
Commitment Amount ($ MIL)	37.65	108.57	0.00	0.00	14.06	29,598
Direct Investment	0.04	0.19	0.00	0.00	0.00	29,598
Number of Direct Investments	0.10	0.89	0.00	0.00	0.00	29,598
Direct Investment Amount ($ MIL)	1.54	52.73	0.00	0.00	0.00	29,598
LP Size ($ MIL)	350.21	805.81	10.00	66.61	279.87	29,598
Misconduct	0.38	0.49	0.00	0.00	1.00	29,598
Distance (Miles)	911.62	665.74	391.38	869.49	1282.20	29,598

Table 2: Registration and Improved Fund Governance

The table shows that PE funds managed by registered advisers are subject to better governance. The sample includes all PE funds reported in Schedule D during 2012-2021, excluding funds of funds, feeder funds and PE funds with initial gross asset value below 10 USD MIL. A unit of observation is a PE fund. Introduced by the Dodd-Frank Act, Schedule D are supplementary filings to Form ADV and need to be filed for each private fund managed by registered advisers and unregistered advisers since 2012. *Annual Audit* is an indicator variable equal to one if the PE fund's financial statements are subject to an annual audit, and zero otherwise. *GAAP* is an indicator variable equal to one if the PE fund's financial statements to auditors are prepared in accordance with US Generally Accepted Accounting Principles (GAAP), and zero otherwise. *GAAP* is missing for funds without annual audit. *Qualified Opinion* is an indicator variable equal to one if the PE fund ever receives a qualified opinion, and zero otherwise. A qualified opinion is issued when the auditor has identified material misstatements in the financial statements, but these misstatements are not pervasive. The variable has missing value for some funds. *Custodians* is an indicator variable equal to one if the PE fund uses custodians to hold some or all of its assets, and zero otherwise. *Registered* is an indicator variable equal to one if the GP is SEC-registered during the fund's lifespan, and zero otherwise. *Ln(Gross Asset Value)* is the natural logarithm of a PE fund's first observed gross asset value in USD MIL in all of its Schedule D filings. *VC Fund* is an indicator variable equal to one if the fund is a venture capital fund, and zero otherwise. Detailed variable definitions are provided in Appendix B. The initial filing year fixed effects control for potential differences across funds based on the calendar year their Schedule D was first filed. Standard errors are clustered at the GP level and reported in brackets. ***, ** and * indicate 1%, 5% and 10% significance levels.

	Annual Audit		GAAP		Qualified Opinion		Custodians	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Registered	0.078***	0.052***	0.261***	0.386***	-0.049***	-0.037***	0.271***	0.288***
	[0.008]	[0.009]	[0.013]	[0.019]	[0.007]	[0.007]	[0.012]	[0.016]
Ln(Gross Asset Value)		0.036***		-0.001		-0.018***		0.022***
		[0.003]		[0.003]		[0.002]		[0.003]
Fund Number		0.001		-0.004**		-0.003***		0.001
		[0.001]		[0.002]		[0.001]		[0.002]
VC Fund		-0.035***		0.275***		0.017*		0.051***
		[0.010]		[0.019]		[0.009]		[0.018]
Initial Filing Year FE	✓	✓	✓	✓	✓	✓	✓	✓
Observations	23,565	23,565	22,536	22,536	20,209	20,209	23,565	23,565
Adjusted R^2	0.039	0.079	0.137	0.219	0.020	0.034	0.134	0.142
$\bar{y}$	0.926	0.926	0.856	0.856	0.056	0.056	0.829	0.829

Table 3: Regulatory Oversight of PE Funds and Investors' Fund Investments

This table investigates how regulatory oversight of fund advisers affects LP investors' outsourced PE investments measured by their capital commitments to PE funds. The sample consists of LP investors located in the US during the period 2001-2021. A unit of observation is an LP-year. *Capital Commitment* is an indicator variable equal to one if the LP commits capital to any PE funds in the year, and zero otherwise. *Number of Funds* is the number of PE funds the LP committed capital to in one year. *Ln(1 + Committed Capital)* is the natural logarithm of one plus the amount of capital in USD MIL committed to PE funds in one year. *Regulatory Exposure* is an indicator variable equal to one if the share of newly registered GPs in the LP's pre-existing LP-GP relationships is in the top quintile group, and zero otherwise. *Post* is an indicator variable equal to one if the year is or after 2012, the effective year of the Dodd-Frank Act, and zero otherwise. *Ln(LP Size)* is the natural logarithm of the capital committed to PE funds along with the direct investments made by an LP in the past 10 years. The stand-alone *Regulatory Exposure* is absorbed by the LP fixed effects. Detailed variable definitions are provided in Appendix B. Standard errors are clustered at the LP level and reported in brackets. ***, ** and * indicate 1%, 5% and 10% significance levels.

	Capital Commitment		Number of Funds		Ln(1 + Committed Capital)	
	(1)	(2)	(3)	(4)	(5)	(6)
Regulatory Exposure × Post	0.094***	0.094***	0.308***	0.280***	0.294***	0.288***
	[0.017]	[0.017]	[0.068]	[0.067]	[0.073]	[0.072]
Ln(LP Size)		-0.001		0.074***		0.015
		[0.002]		[0.010]		[0.010]
LP FE	✓	✓	✓	✓	✓	✓
Year FE	✓	✓	✓	✓	✓	✓
Observations	29,598	29,598	29,598	29,598	29,598	29,598
Adjusted R^2	0.350	0.350	0.573	0.575	0.470	0.470

Table 4: Regulatory Oversight of PE Funds and Investors' Direct Investments

This table investigates how regulatory oversight of fund advisers affects LP investors' incentives to bypass financial intermediation through direct investing. The sample consists of LP investors located in the US during the period 2001-2021. A unit of observation is an LP-year. *Direct Investment* is an indicator variable equal to one if the LP makes direct investments in private companies in the year, and zero otherwise. *Number of Direct Investments* is the number of direct investments in private companies made by the LP in one year. *Ln(1 + Direct Investment Amount)* is the natural logarithm of one plus the amount of direct investments in USD MIL made by the LP in one year. *Regulatory Exposure* is an indicator variable equal to one if the share of newly registered GPs in the LP's pre-existing LP-GP relationships is in the top quintile group, and zero otherwise. *Post* is an indicator variable equal to one if the year is or after 2012, the effective year of the Dodd-Frank Act, and zero otherwise. *Ln(LP Size)* is the natural logarithm of the capital committed to PE funds along with the direct investments made by an LP in the past 10 years. The stand-alone *Regulatory Exposure* is absorbed by the LP fixed effects. Detailed variable definitions are provided in Appendix B. Standard errors are clustered at the LP level and reported in brackets. ***, ** and * indicate 1%, 5% and 10% significance levels.

	Direct Investment		Number of Direct Investments		Ln(1 + Direct Investment Amount)	
	(1)	(2)	(3)	(4)	(5)	(6)
Regulatory Exposure × Post	-0.013*	-0.014**	-0.066***	-0.072***	-0.033**	-0.035***
	[0.007]	[0.007]	[0.025]	[0.025]	[0.013]	[0.013]
Ln(LP Size)		0.003***		0.014***		0.006***
		[0.001]		[0.004]		[0.002]
LP FE	✓	✓	✓	✓	✓	✓
Year FE	✓	✓	✓	✓	✓	✓
Observations	29,598	29,598	29,598	29,598	29,598	29,598
Adjusted R^2	0.394	0.395	0.510	0.511	0.426	0.427

Table 5: Cross-sectional Heterogeneity

This table investigates the cross-sectional difference in the impact of regulatory oversight on investors' PE investment decisions, based on LP investors' exposure to PE fund advisers with disciplinary history and their distance to PE fund advisers. The sample consists of LP investors located in the US during the period 2001-2021. A unit of observation is an LP-year. *Capital Commitment* is an indicator variable equal to one if the LP commits capital to any PE funds in the year, and zero otherwise. *Number of Funds* is the number of PE funds the LP committed capital to in one year. *Ln(1 + Committed Capital)* is the natural logarithm of one plus the amount of capital in USD MIL committed to PE funds in one year. *Regulatory Exposure* is an indicator variable equal to one if the share of newly registered GPs in the LP's pre-existing LP-GP relationships is in the top quintile group, and zero otherwise. Regulatory misconduct frequently involves insufficient or misleading information regarding fees, asset values, and similar matters. *Post* is an indicator variable equal to one if the year is or after 2012, the effective year of the Dodd-Frank Act, and zero otherwise. *Misconduct* is an indicator variable equal to one if an LP had a pre-existing relationship with any GP reported for regulatory misconduct as of the Dodd-Frank Act's effective year, and zero otherwise. *Ln(1 + Distance)* is the natural logarithm of one plus the average distance between an LP investor and its pre-existing GPs. The stand-alone *Regulatory Exposure*, *Misconduct* and *Ln(1 + Distance)* are absorbed by the LP fixed effects. Detailed variable definitions are provided in Appendix B. Standard errors are clustered at the LP level and reported in brackets. ***, ** and * indicate 1%, 5% and 10% significance levels.

	Capital Commitment		Number of Funds		Ln(1 + Committed Capital)	
	(1)	(2)	(3)	(4)	(5)	(6)
Regulatory Exposure × Post	0.073***	0.021	0.106*	-0.126	0.157**	-0.180
	[0.019]	[0.044]	[0.060]	[0.105]	[0.076]	[0.152]
Regulatory Exposure × Post × Misconduct	0.045		0.499***		0.325*	
	[0.043]		[0.183]		[0.186]	
Misconduct × Post	-0.055***		-0.457***		-0.327***	
	[0.017]		[0.103]		[0.079]	
Regulatory Exposure × Post × Ln(1 + Distance)		0.012		0.071***		0.078***
		[0.008]		[0.024]		[0.028]
Ln(1 + Distance) × Post		-0.006		-0.036**		-0.038**
		[0.004]		[0.017]		[0.016]
LP FE	✓	✓	✓	✓	✓	✓
Year FE	✓	✓	✓	✓	✓	✓
Observations	29,598	29,598	29,598	29,598	29,598	29,598
Adjusted R^2	0.351	0.350	0.575	0.573	0.471	0.470

Table 6: Heterogeneous Time Trends

This table rules out alternative explanations based on different dynamics across GPs or LPs. The sample consists of LP investors located in the US during the period 2001-2021. A unit of observation is an LP-year. Panel A controls for heterogeneous trends across LPs based on the GP characteristics in LPs' pre-existing relationships. Detailed in Appendix C.6, Table 7 presents GP-level evidence that GPs with different sizes or investment strategies do not face different dynamics in investment opportunities after the Dodd-Frank Act. Panel B controls for heterogeneous trends based on LP characteristics. Table C.5 demonstrates that the findings remain robust when restricting to different subsamples of LPs based on institutional type. *Large GP Share* ranks LPs into quintile groups based on the share of large GPs in their pre-existing relationships. Large GPs are those that in the top quintile group based on the total amount of PE funds raised in the past ten years before 2011, the year before the Dodd-Frank Act becomes effective. *Buyout GP Share* ranks LPs into quintile groups based on the share of buyout GPs in their pre-existing relationships. Buyout GPs are those that raised buyout funds in the past ten years as of 2011. These GP characteristics are correlated with registration under the Dodd-Frank Act (see Section 2.2). *LP Type* are dummy variables based on the institutional types of LPs, such as public pension funds, private pension funds, endowments, and insurance companies. *LP State* are dummy variables based on the headquarter state of the LP. Detailed variable definitions are provided in Appendix B. Standard errors are clustered at the LP level and reported in brackets. ***, ** and * indicate 1%, 5% and 10% significance levels.

	Capital Commitment	Number of Funds	Ln(1 + Committed Capital)	Direct Investment	Number of Direct Investments	Ln(1 + Direct Investment Amount)
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: GP Characteristics						
Regulatory Exposure × Post	0.069***	0.188***	0.223***	-0.011	-0.048**	-0.027**
	[0.018]	[0.068]	[0.076]	[0.007]	[0.021]	[0.012]
LP FE	✓	✓	✓	✓	✓	✓
Year × Large GP Share FE	✓	✓	✓	✓	✓	✓
Year × Buyout GP Share FE	✓	✓	✓	✓	✓	✓
Observations	29,039	29,039	29,039	29,039	29,039	29,039
Adjusted R^2	0.355	0.587	0.479	0.397	0.510	0.429
Panel B: LP Characteristics						
Regulatory Exposure × Post	0.099***	0.344***	0.338***	-0.013*	-0.058**	-0.032**
	[0.017]	[0.068]	[0.071]	[0.007]	[0.025]	[0.013]
LP FE	✓	✓	✓	✓	✓	✓
Year × LP Type FE	✓	✓	✓	✓	✓	✓
Year × LP State FE	✓	✓	✓	✓	✓	✓
Observations	29,572	29,572	29,572	29,572	29,572	29,572
Adjusted R^2	0.373	0.595	0.495	0.395	0.515	0.428

Table 7: Falsification Tests

As a falsification test, this table shows within-GP regression estimates that rule out secular trends across GPs as an explanation for the LPs' PE market participation (first tow rows). The finding is consistent with Table 6 Panel A. The sample consists of US PE fund advisers during 2001-2021. A unit of observation is a GP-year. *Size Group* is a variable ranging from 1 to 5 that ranks a GP in quintile groups based the total amount of PE funds raised in the past ten years as of 2011, the year before the Dodd-Frank Act becomes effective. A value of 5 indicate the group of the largest size. *Buyout Manager* is an indicator variable equal to one if the GP manages any buyout funds in the past 10 years as of 2011. *Post* is an indicator variable equal to one if the year is or after 2012, the effective year of the Dodd-Frank Act which brings PE fund advisers under the SEC's scrutiny, and zero otherwise. *Registered* is an indicator variable equal to one if the GP is registered with the SEC in a given year, and zero otherwise. Change in registration status leads to within-GP variation in *Registered*. *Fundraising* is an indicator variable equal to one if the GP raises a PE fund in the year, and zero otherwise. *Number of Funds Raised* is the number of PE funds raised by the GP in a given year. *Ln(1 + Raised Capital)* is the natural logarithm of one plus the total amount of PE funds raised in USD MIL in a given year. Detailed variable definitions are provided in Appendix B. Standard errors are clustered at the GP level and reported in brackets. ***, ** and * indicate 1%, 5% and 10% significance levels.

	Fundraising			Number of Funds Raised			Ln(1 + Raised Amount)		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Size Group × Post	0.002			0.019**			0.011		
	[0.005]			[0.009]			[0.028]		
Buyout Manager × Post		0.010			-0.019			0.098	
		[0.013]			[0.023]			[0.075]	
Registered			0.030**			0.051**			0.238***
			[0.012]			[0.020]			[0.064]
GP FE	✓	✓	✓	✓	✓	✓	✓	✓	✓
Year FE	✓	✓	✓	✓	✓	✓	✓	✓	✓
Observations	14,964	14,964	14,964	14,964	14,964	14,964	14,964	14,964	14,964
Adjusted R^2	0.059	0.059	0.059	0.159	0.158	0.159	0.088	0.088	0.089
$\bar{y}$	0.220	0.220	0.220	0.262	0.262	0.262	-	-	-

Table 8: Relationships Between Company Characteristics and Direct Investments

This table reports results that investigate the link between a set of company characteristics and investors' direct investment in private equity. The sample consists of US PE deals during the period 2001-2021, including both venture capital and buyout deals. A unit of observation is a PE deal. *LP Ratio (%)* is the percentage of PE investors in a deal that are LPs acting as direct investors. *Early Stage* is an indicator variable equal to one if the deal is a venture capital deal with a round number below Series C, and zero otherwise. *Company Age* is the age of the company in years at the time of financing. *Round Number* is the number of the funding round. *Ln(Capital Raised)* is the natural logarithm of the total amount of capital in USD MIL that the company has raised. *Number of Highly Cited Patents / Deal Size* is the number of (eventually granted) highly cited patents applied for in the next three years, scaled by the deal size. Highly cited patents are defined as those with the top quintile numbers of citations among patents granted in the same year. Deal type FE is a dummy variable based on whether the PE deal is a buyout or venture capital deal. Detailed variable definitions are provided in Appendix B. Huber-White standard errors are reported in brackets. ***, ** and * indicate 1%, 5% and 10% significance levels.

	LP Ratio (%)				
	(1)	(2)	(3)	(4)	(5)
Early Stage	-1.537***				
	[0.071]				
Company Age		0.014***			
		[0.002]			
Round Number			0.396***		
			[0.021]		
Ln(Capital Raised)				0.585***	
				[0.022]	
Number of Highly Cited Patents / Deal Size					-0.210**
					[0.095]
Deal Year FE	✓	✓	✓	✓	✓
Deal Type FE	✓	✓	✓	✓	✓
Company State FE	✓	✓	✓	✓	✓
Company Industry FE	✓	✓	✓	✓	✓
Observations	125,206	108,917	125,206	81,177	73,725
Adjusted R^2	0.015	0.008	0.016	0.021	0.006

Internet Appendix for "Spreading Sunshine in Private Equity: Financial Intermediation and Regulatory Oversight"

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February 2026

Table of Contents

List of Appendix Figures

List of Appendix Tables

A Appendix: Venture Capital Exemption

In this Appendix, I provide more details on the venture capital exemption enacted as part of Title IV of the Dodd-Frank Act as an illustrative example of Congress' policy rationale in setting the new registration exemptions.[1] It highlights that the new registration exemptions are mainly set to monitor systemic risk in the wake of the 2008 financial crisis, which developed outside of the PE sector, as well as the complex trade-offs in introducing regulation into the PE market. First, I discuss the policy rationale for the venture capital exemption. Then, I present the SEC's regulatory definition of "venture capital funds" and heated debates in the VC community on the scope of such definition.

A.1 Policy Rationale

The heart of the Dodd-Frank Act is to overhaul the US financial regulatory market, after the 2008 financial crisis, to evaluate systemic risk, increase market transparency and protect consumers. While the Senate voted to exempt all PE fund advisers from registration with the SEC, the final version of the Dodd-Frank Act only exempts advisers that meet the private fund adviser or venture capital exemptions. The fundamental policy rationale to distinguish VC funds from other private funds reflects Congress' concerns regarding the potential for systemic risk based on the underlying investments and use of leverage among different private funds.

First, unlike many other private funds, VC funds invest in non-public start-ups, which are not directly connected to the public market and thus pose little systemic risk to the financial market or retail investors. Due to the nature of underlying assets, VC funds have much smaller aggregate size compared to the public equity market and other private funds such as hedge funds as pointed out by the SEC.

Second, VC funds do not rely on extensive leverage to make investments. As a result, the equity nature of fund interests implies that potential losses are only borne by LP investors and will not propagate throughout financial markets through the credit channel or other counterparty relationships.

Taking into consideration the intent of Congress, the SEC is "sensitive" to the benefits and costs of the rule imposed by venture capital exemption. With more restrictive exemption criteria, the increased regulatory oversight of private fund advisers would reduce systemic risk and increase market transparency, which in turn benefits investors through more efficient capital allocation. Potential costs include on-going compliance costs, which might be prohibitive to small advisers, potential change in the fund structure and operation for advisers that seek to meet the criteria of venture fund exemption, and reduced flexibility

[1] This part is largely based on the SEC's Proposing Release of new registration exemption rules to private funds. Release No. IA-3111; File No. S7-37-10

to accommodate unknown or uncontemplated future practices in venture capital investing.

A.2 Debates on the Definition of Venture Capital Funds

In light of Congress' intended scope of venture capital exemption, the SEC's new rule 203(1)-1 defines a venture capital fund as:

> "[a] private fund that (i) holds no more than 20 percent of the fund's capital commitments in non-qualifying investments [...]; (ii) does not borrow or otherwise incur leverage, other than limited short-term borrowing [...]; (iii) does not offer its investors redemption or other similar liquidity rights except in extraordinary circumstances; (iv) represents itself as pursuing a venture capital strategy to its investors and prospective investors; and (v) is not registered under the Investment Company Act and has not elected to be treated as a business development company."

in which a qualifying investment is defined as:

> "(i) any equity security[2] issued by a qualifying portfolio company[3] that is directly acquired by the private fund from the company ("directly acquired equity"); (ii) any equity security issued by a qualifying portfolio company in exchange for directly acquired equity issued by the same qualifying portfolio company; and (iii) any equity security issued by a company of which a qualifying portfolio company is a majority-owned subsidiary, or a predecessor, and that is acquired by the fund in exchange for directly acquired equity."

However, the SEC pointed out the difficulty in defining a VC fund in a way that balances Congress' intended scope of exemption and various views of the VC community. The SEC received over 70 comment letters in response to the proposed definition from industry groups such as VC fund advisers, their law firms, and the National Venture Capital Association (NVCA).[4] For example, much of the debate centers around the size of non-qualifying investments basket among different industry groups, the SEC and Congress. Some commenters expressed support for a larger basket size emphasizing the need for greater flexibility in taking advantage of investment opportunities such as non-convertible bridge loans of portfolio

[2] An equity security is defined by reference to the Securities Exchange Act of 1934 and includes common stock, preferred stock as well as warrants and other securities convertible into common stock in addition to limited partnership interests.

[3] Under rule 203(1)-1, a qualifying portfolio company is defined as "any company that: (i) is not a reporting or foreign traded company and does not have a control relationship with a reporting or foreign traded company; (ii) does not incur leverage in connection with the investment by the private fund and distribute the proceeds of any such borrowing to the private fund in exchange for the private fund investment; and (iii) is not itself a fund (*i.e.*, is an operating company)."

[4] The SEC's Proposing Release spends almost 70 pages to define a venture capital fund and discuss concerns raised by commenters. The details are beyond the scope of this paper.

companies,[5] interests in other pooled investment funds,[6] and publicly offered securities.[7] Although the SEC considered adopting a 40% basket for non-qualifying investments by analogy to the Investment Advisers Act definition of business development companies, the final 20% basket was established by Congress.

With respect to financial leverage, a VC fund under rule 203(1)-1 must not incur debt including guarantees of portfolio company debt in excess of 15% of the fund's capital contributions and uncalled committed capital. Many commenters sought to broaden the leverage criterion by excluding the 15% leverage limitation on capital call lines of credit[8] or borrowing by a VC fund in order to meet fee and expense obligations[9] or expanding the limit,[10] etc. However, the SEC believes that a relative lack of leverage is one of the major reasons for Congress to exempt VC fund advisers and an alternative approach to fund leverage will not address Congress' concerns about potential systemic risks created by financial leverage.

Moreover, some commenters favored the California definition of "venture capital operating company",[11] which generally requires a fund to have at least 50% of its portfolio investments in operating companies that provide it with "sufficient" management rights. But such a definition was considered too broad to be consistent with Congress' intended scope of exemption because it potentially includes many other types of PE funds.

The SEC also considered defining a qualifying VC fund as one that invests in small companies, as proposed by several commenters.[12] However, the SEC eventually gave up this alternative due to a lack of consensus on the definition of "small companies" and worries of potential negative impacts of applying a single standardized metric. For example, various definitions were proposed based on reference to the Small Business Investment Act, size of public float or EBITDA, which may be too simple to take into account the complex

[5] *See, e.g.*, Comment Letter of CounselWorks LLC (Jan. 24, 2011); ESP Letter; Comment Letter of McGuireWoods LLP (Jan. 24, 2011) ("McGuireWoods Letter"); NVCA Letter; Oak Investment Letter. See also BioVentures Letter (supported venture capital fund investments in non-convertible debt without a time limit); Cook Children's Letter; Leland Fikes Letter (each of which expressed general support). One commenter indicated that the proposed condition limiting investments in portfolio companies to equity securities was too narrow. See Pine Brook Letter.

[6] *See, e.g.*, Cook Children's Letter; Leland Fikes Letter; PEI Funds Letter; Comment Letter of SVB Financial Group (Jan. 24, 2011) ("SVB Letter").

[7] *See, e.g.*, ATV Letter; BIO Letter (noted that investments by venture capital funds in "PIPEs" (i.e., "private investments in public equity") are "common").

[8] Cook Children's Letter; Leland Fikes Letter; SVB Letter.

[9] Dechert General Letter

[10] *See* Charles River Letter (argued that a qualifying fund should be able to borrow, without limit on duration, up to 20% of capital commitments with the consent of its investors).

[11] Comment Letter of Lowenstein Sandler PC (Jan. 4, 2011) ("Lowenstein Letter"); Comment Letter of Keith Bishop (Jan. 17, 2011).

[12] *See, e.g.*, Comment Letter of National Association of Small Business Investment Companies and Small Business Investor Alliance (Jan. 24, 2011) ("NASBIC/SBIA Letter"); Quaker BioVentures Letter (Jan. 24, 2011); Comment Letter of Venrock (Jan. 23, 2011)

heterogeneity across industries and regions. As a result, the SEC believed that applying a simple metric would inadvertently restrict venture capital supply to otherwise promising young small companies.

B Variable Definitions and Construction

B.1 Variable Definitions

Variable Name	Definition
Panel A: PE Fund Level	
Annual Audit	An indicator variable equal to one if the PE fund's financial statements are subject to an annual audit, and zero otherwise.
GAAP	An indicator variable equal to one if the PE fund's financial statements to auditors are prepared in accordance with US Generally Accepted Accounting Principles (GAAP), and zero otherwise. *GAAP* is missing for funds without annual audit.
Qualified Opinion	An indicator variable equal to one if the PE fund ever receives a qualified opinion, and zero otherwise. A qualified opinion is issued when the auditor has identified material misstatements in the financial statements, but these misstatements are not pervasive. The variable has missing value for some funds.
Custodians	An indicator variable equal to one if the PE fund uses custodians to hold some or all of its assets, and zero otherwise.
Registered	An indicator variable equal to one if the GP is SEC-registered during the fund's lifespan, and zero otherwise.
Ln(Gross Asset Value)	Natural logarithm of a PE fund's first observed gross asset value in USD MIL in all of its Schedule D filings.
VC Fund	An indicator variable equal to one if the fund is a venture capital fund, and zero otherwise.
Panel B: LP-Year Level	
Capital Commitment	An indicator variable equal to one if the LP commits capital to any PE funds in the year, and zero otherwise
Number of Funds	Number of PE funds the LP committed capital to in one year
Ln(1 + Committed Capital)	Natural logarithm of one plus the amount of capital in USD MIL committed to PE funds in one year. For LP-GP relationships with missing committed capital, I impute the value with the mean value of other LPs' committed capital at the same fund level.
Direct Investment	An indicator variable equal to one if the LP makes direct investments in private companies in the year, and zero otherwise
Number of Direct Investments	Number of direct investments in private companies made by the LP in one year
Ln(1 + Direct Investment Amount)	Natural logarithm of one plus the amount of direct investments in USD MIL made by the LP in one year
Direct Investment	An indicator variable equal to one if the LP makes direct investments in private companies in the year, and zero otherwise
Regulatory Exposure	An indicator variable equal to one if the share of newly registered GPs in the LP's pre-existing LP-GP relationships is in the top quintile group, and zero otherwise
Post	An indicator variable equal to one if the year is or after 2012, the effective year of the Dodd-Frank Act which brings PE fund advisers under the SEC's scrutiny, and zero otherwise

Ln(LP Size)	Natural logarithm of the capital committed to PE funds along with the direct investments made by an LP in the past 10 years
Misconduct Exposure	An indicator variable equal to one if an LP had a pre-existing relationship with any GP reported for regulatory misconduct as of the Dodd-Frank Act's effective year, and zero otherwise.
Panel C: GP Level	
Registered	An indicator variable equal to one if the GP is registered with the SEC in a given year, and zero otherwise
Regulatory Action	An indicator variable equal to one if the GP receives regulatory disciplinary actions in the year, and zero otherwise
Censure	An indicator variable equal to one if the GP is sentenced to censure in the year, and zero otherwise
Disgorgement/Restitution	An indicator variable equal to one if the GP is sentenced to disgorgement or restitution in the year, and zero otherwise
Cease and Desist	An indicator variable equal to one if the GP receives a cease and desist order in the year, and zero otherwise
Monetary Sanction	An indicator variable equal to one if the GP receives monetary sanction in the year, and zero otherwise
Ln(1 + Fine Amount)	Natural logarithm of the fine amount in USD MIL
Ln(GP Size)	Natural logarithm of the amount of capital in USD MIL raised by PE funds managed by the adviser in the past 10 years
Number of Funds Raised	Number of PE funds raised by the GP in the past 10 years
Buyout	An indicator variable equal to one if the GP manages buyout funds, and zero otherwise
Fundraising	An indicator variable equal to one if the GP raises a PE fund in the year, and zero otherwise
Number of Funds Raised	Number of PE funds raised by the GP in a given year
Ln(1 + Raised Capital	Natural logarithm of one plus the total amount of PE funds raised in USD MIL in a given year
Co-investment Fund	An indicator variable equal to one if the GP raises a co-investment fund in the year, and zero otherwise.
Number of Co-Investment Funds	Number of co-investment funds raised by the GP in a given year.
Ln(1 + Co-investment Fund Size)	Natural logarithm of one plus the total amount of co-investment funds raised in USD MIL in a given year.
Size Group	A variable ranging from 1 to 5 that ranks a GP in quintile groups based the total amount of PE funds raised in the past ten years as of 2011, the year before the Dodd-Frank Act becomes effective. A value of 5 indicate the group of the largest size.
Buyout Manager	An indicator variable equal to one if the GP manages any buyout funds in the past 10 years as of 2011
Post	An indicator variable equal to one if the year is or after 2012, the effective year of the Dodd-Frank Act which brings PE fund advisers under the SEC's scrutiny, and zero otherwise
Panel D: Private Equity Deal Level	
LP Ratio (%)	Percentage of PE investors in a deal that are LPs

Early Stage	An indicator variable equal to one if the deal is a venture capital deal with a round number below Series C, and zero otherwise
Company Age	Age of the company in years
Round Number	Number of the funding round
Ln(Capital Raised)	Natural logarithm of one plus the total amount of capital in USD MIL that the company has raised
Ln(Capital Raised)	Natural logarithm of the total amount of capital in USD MIL that the company has raised
Number of Highly Cited Patents / Deal Size	Number of (eventually granted) highly cited patents applied for in the next three years, scaled by the deal size. Highly cited patents are defined as those with the top quintile numbers of citations among patents granted in the same year
IPO	An indicator variable equal to one if the company goes public by the end of 2021, and zero otherwise
Successful Exit	An indicator variable equal to one if the company goes public or is acquired with a valuation two times or greater than invested capital, and zero otherwise
Years to Exit	Number of years from first PE financing to exit and is missing if there is no exit
Ln(Exit Value)	Natural logarithm of the exit valuation for companies that go public or are acquired
Direct Investment	An indicator variable equal to one if the PE deal is directly invested by LP investors, and zero otherwise
Panel D: Private Equity Fund Level	
Annual Audit	An indicator variable equal to one if the PE fund's financial statements are subject to an annual audit, and zero otherwise.
GAAP	An indicator variable equal to one if the PE fund's financial statements to auditors are prepared in accordance with US GAAP, and zero otherwise.
FS Distributed	An indicator variable equal to one if the PE fund's audited financial statements for the most recently completed fiscal year is distributed to investors, and zero otherwise.
Custodians	An indicator variable equal to one if the PE fund uses custodians to hold some or all of its assets, and zero otherwise.
Registered	An indicator variable equal to one if the GP is registered with the SEC in a given year, and zero otherwise.
Ln(Gross Asset Value)	Natural logarithm of a PE fund's first observed gross asset value in USD MIL in all of its Schedule D filings.
Fund Number	The fund number of a PE fund
Buyout	An indicator variable equal to one if the fund is a buyout fund, and zero if it is a venture capital fund.
Offer Co-investments	An indicator variable equal to one if a PE fund offers co-investment opportunities to its LP investors, and zero otherwise.
Multiple LPs	An indicator variable equal to one for a fund if multiple LPs are reported in Preqin, and zero otherwise.

Missing LPs	An indicator variable equal to one if Preqin does not cover any LPs of a fund, and zero otherwise.
Missing Commitments	An indicator variable equal to one if Preqin does not cover any LP commitments for a fund, and zero otherwise.
Ln(Fund Size)	Natural logarithm of final size in USD MIL of a fund.
Panel E: Public Pension Fund Level	
Ln(Actuarial Assets)	Natural logarithm of average actuarial assets in USD MIL between 2001 and 2011
Ln(Payroll)	Natural logarithm of average covered payroll in USD MIL between 2001 and 2011
Funded Ratio	Average plan assets divided by actuarial accrual liabilities between 2001 and 2011
Benefit Cost Ratio	Average total contribution to total benefits between 2001 and 2011
Assumed Inflation	Average assumed inflation in percentage points between 2001 and 2011
Assumed Investment Return	Average assumed investment return in percentage points between 2001 and 2011
Assumed Payroll Growth	Average assumed payroll growth rate in percentage points between 2001 and 2011
TRS	An indicator variable equal to one if the pension plan type is teachers' retirement system (TRS), and zero otherwise
PFSRS	An indicator variable equal to one if the pension plan type is police/fire, firefighter, or public safety retirement system (PFSRS), and zero otherwise
1-year Investment Return	Average 1-year investment return in percentage points between 2001 and 2011
5-year Investment Return	Average 5-year investment return in percentage points between 2001 and 2011
10-year Investment Return	Average 10-year investment return in percentage points between 2001 and 2011
Actual Equity Allocation	Average actual equity allocation in percentage points between 2001 and 2011
Target Equity Allocation	Average target equity allocation in percentage points between 2001 and 2011
Equity Return	Average equity return in percentage points between 2001 and 2011
Actual Private Equity Allocation	Average actual private equity allocation in percentage points between 2001 and 2011
Target Private Equity Allocation	Average target private equity allocation in percentage points between 2001 and 2011
Private Equity Return	Average private equity return in percentage points between 2001 and 2011
Actual Fixed Income Allocation	Average actual fixed income allocation in percentage points between 2001 and 2011
Target Fixed Income Allocation	Average target fixed income allocation in percentage points between 2001 and 2011

B.2 Matching Preqin and Form ADV Filings

I manually match GP names from Preqin with investment adviser names in Form ADV filings by searching the Investment Adviser Public Disclosure (IAPD) database (`https://adviserinfo.sec.gov`). The IAPD is sponsored by the SEC and allows users to search for Form ADV filings of investment advisers regardless of their registration status with the SEC.

I search each name of my sample GPs in the IAPD, which returns potential matches with similar adviser names. Then I manually identify and validate the matches by cross-checking the addresses reported in the advisers' Form ADV filings and those shown on their official websites or PitchBook. This process allows me to create a linking table between the GPs' identifiers in Preqin and their latest SEC file numbers/Central Registration Depository (CRD) number in the Form ADV filings for data merging.

While each GP has a unique identifier in Preqin, it's important to note that a single GP may have multiple SEC file numbers due to factors like operating through multiple subsidiaries or undergoing changes in registration status. For example, Bain Capital has multiple subsidiaries such as Bain Capital Private Equity, LP (SEC file number 801-69069) and Bain Capital Ventures, LP (SEC file number 801-69071). Another example is Sequoia Capital Operations, LLC which changed its SEC file number from 802-75992 to 801-122957. This change occurred as Sequoia Capital restructured itself around an open-ended fund and began holding assets like cryptocurrencies, leading it to no longer qualify for the venture capital exemption under Title IV of the Dodd-Frank Act.[13] The SEC file number starts with "801" for registered advisers and with "802" for exempt reporting advisers.

I use the CRD number (Form ADV item 1e) combined with SEC file number (item 1d) and adviser names (item 1a) to track the same investment advisers across ADV filings. While the CRD number is unique for an investment adviser firm and does not change over time, even if the firm undergoes mergers, name changes, or other structural adjustments, sometimes advisers do not enter CRD numbers. In such cases, the SEC file number serves as a reliable alternative, as it is almost always reported and stays consistent unless the adviser switches registration status (e.g., from unregistered to SEC-registered). In the case of registration status change and missing CRD numbers after/before the registration, I use firm legal names to track the same adviser that experience registration change and stop/start reporting CRD

[13] See "The Sequoia Capital Fund: Patient Capital for Building Enduring Companies", October 26, 2021.

number after such change.[14] This multi-identifier approach allows for consistent matching of advisers despite reporting gaps or structural changes.

[14]For example, Andreessen Horowitz reported its CRD number (160489) since its first ADV filing in March 2012 and stopped reporting the CRD number after March 2017. It became a SEC-registered adviser in March 2019, changing its SEC file number from 802-75605 to 801-114985. Relying on CRD and SEC file numbers will not be sufficient to identify the same adviser's filings over time. However, using the adviser name (AH CAPITAL MANAGEMENT, L.L.C.) will ensure continuity in tracking its Form ADV filings. I avoid depending primarily on adviser names due to occasional inconsistencies in their reporting (e.g., minor variations like "ABC Capital, LLC" vs. "ABC Capital Management L.L.C." or potential typos).

C Additional Figures and Tables

C.1 Registration Status and Regulatory Oversight

To quantify the relationship between SEC registration and regulatory oversight, I use Form ADV filings to analyze the difference between registered and unregistered advisers regarding their likelihood of receiving regulatory actions. Specifically, I estimate the following regression based on the panel data of advisers constructed from Preqin and Form ADV filings:[15]

$$\textit{Disciplinary Action}_{jt} = \beta \times \textit{Registered}_{jt} + \boldsymbol{\theta'X} + \boldsymbol{\tau_t} + \boldsymbol{\delta_{state}} + \epsilon_{jt} \tag{3}$$

in which j and t denote a GP and a year. *Disciplinary Action* is a measure of disciplinary actions received by the GP in a year. The outcome variable is constructed based on the information in Item 11 in Form ADV and the additional schedule Disclosure Reporting Page. *Registered* is an indicator variable equal to one if the GP is registered with the SEC in a given year, and zero otherwise. *Registered* varies within a GP, due to change in a GP's registration over time—mainly in 2012 (Figure C.1). The regression includes a vector of control variables $\boldsymbol{X}$, which are *Ln(GP Size)*, *Number of Funds Raised*, and *Buyout* defined in the table note. These GP characteristics are related to the registration exemptions under the Investment Adviser Act and Dodd-Frank Act (see Section 2.2). $\boldsymbol{\tau_t}$ and $\boldsymbol{\phi_{state}}$ are year and GP state fixed effects. The standard errors are clustered at the GP level to address serial correlations.

Across all columns in Table C.2, the coefficient estimates of *Registered* are positive and highly significant suggesting that registered advisers are more likely to receive regulatory actions. From Column (1) to (5), the outcome variables are a set of indicator variables equal to one if the adviser received certain regulatory actions as indicated by the variable name, such as censure, disgorgement, and monetary fine, and zero otherwise in each year. In Column (6), *Ln(1 + Fine Amount)* is the natural logarithm of one plus the amount of fines in USD MIL the adviser receives in one year. For example, Column (1) indicates that registered advisers are 2.8 percentage points more likely to receive regulatory actions in a given year, while the unconditional mean is only around 1.1 percent. Overall, SEC-registered advisers face stronger regulatory oversight compared to unregistered advisers.[16] Besides periodical

[15] Although unregistered advisers were exempt from filing Form ADV prior to the Dodd-Frank Act's implementation in 2012, they must disclose any disciplinary histories from the previous ten years in their Form ADV filings after the regulatory intervention. Therefore, unregistered advisers' pre-intervention disciplinary information is observable in the post-2012 Form ADV filings.

[16] The finding is consistent with Charoenwong, Kwan, and Umar (2019), which documents that client complaints over mid-sized investment advisers increased after their regulatory jurisdiction was shifted from the SEC to state securities regulator after the Dodd-Frank Act. My results remain qualitatively similar but only marginally significant after adding GP fixed effects, due to limited within-GP variation in the outcome variables.

examinations and mandatory disclosure, registered advisers are also subject to various operational rules governing areas such as accounting and custody practices. Appendix 4.2 demonstrates that registration improves fund governance based on data from Schedule D.

C.2 Limited Aggregate Change in Fund Characteristics

The size and timing of registrations provide strong support that advisers have limited ability to manipulate their registration status in the short run. However, advisers could potentially avoid registration in the long run by gradually adjusting their fundraising characteristics to qualify for the new exemptions. This concern is largely alleviated by two pieces of evidence. First, if such strategic long-run avoidance were widespread, we would expect a gradual shift in the types of registration exemptions advisers claim. However, Figure C.3 reveals minimal long-run variation in the composition of exemptions used under the Dodd-Frank Act, which is inconsistent with this behavior.[17] Second, Figure C.2b indicates that the number of de-registrations via Form ADV-W is small relative to the number of registered advisers in a given year. The consistently low rate of voluntary de-registration therefore provides direct evidence against systematic regulatory avoidance in the long run.

Why don't advisers adjust their fund characteristics to qualify for the new registration exemptions? The primary reason is that the costs of doing so are substantial. Most importantly, adviser compensation is a function of assets under management and deliberately constraining fund size to remain below the regulatory threshold of the private fund exemption would directly reduce advisers' fee income. In fact, estimates from Metrick and Yasuda (2010) suggest that over $17.5 is allocated as compensation to PE fund advisers for every $100 raised by a PE fund. Furthermore, advisers cannot easily shift towards VC funds to exploit the venture capital fund exemption either, because their fundraising decisions are affected by various factors such as investment opportunities and human capital constraints. Collectively, the significant economic costs of manipulating fund size and the inflexibility of a firm's investment strategy collectively explain the rather limited distortion of GPs' fundraising incentives following the regulatory reform..

C.3 Limited Change in Fundraising Incentives

Due to the private adviser exemption discussed in Section 2.2, advisers can remain unregistered by keeping their assets under management (AUM) below $150 USD MIL. This exemption is the only available option if they manage any buyout funds. If buyout fund advisers were to strategically avoid registrations, they would have to manage very small funds. However, there has been a rather limited increase in the number of small buyout funds fol-

[17] Section C.3 further supports this idea by showing limited change in PE fund characteristics over time based on fundraising data.

lowing the reform.[18] This observation is evident in the cross-sectional size distributions of buyout funds raised before and after the intervention year as shown in Figure C.4a.

Advisers can also stay unregistered if they meet the venture capital exemption, by exclusively managing VC funds that meet the SEC's regulatory definition. Figure C.4b illustrates the time-series evolution of the percentage of PE funds that fall under the category of VC funds.[19] The lack of immediate and large increase in the share of VC funds suggests that advisers do not abuse venture capital exemption.

Overall, complementary to the limited long-run change in the share of advisers by registration exemption (Section C.2), the fundraising patterns suggests that advisers are constrained from systematically changing their fundraising characteristics to qualify for the new registration exemptions.

C.4 Sticky LP-GP Relationships - Evidence

To provide evidence for this stickiness, I estimate the following regression with all potential GP-LP relationships for varying length n:

$$Invest_{i,j,k+n} = \rho_n \times Invest_{i,j,k} + \boldsymbol{FEs} + \epsilon_{i,j,k+n} \tag{4}$$

in which $Invest_{i,j,k}$ is an indicator variable equal to one if LP i invests in the k-th PE fund raised by GP j, and zero otherwise. The pass-through coefficient ρ_n quantifies the persistence of LP-GP relationships at different "lengths". If existing LP-GP relationships have no predictive power on future LP-GP relationships, then ρ would be zero. If LP-GP relationships are perfectly sticky, ρ would be one.

The baseline specification controls for a GP's average market share by including GP fixed effects. Then, I allow the market share to be time-varying by including GP by year fixed effects. However, it is possible that some GPs may specialize in raising capital from particular types of LP investors, for example, due to LPs' home bias or non-pecuniary objectives. If so, the repeated fund investments could reflect GP specialization rather than true sticky relationships. I address this concern by adding fixed effects that control for a GP's market share separately by LP state and type. In the tightest specification, I further control for fund characteristics by including a fund type dummy, based on whether the fund is a VC or buyout fund, and fund size dummies, based on the fund's size quintile, as well as

[18] I use fund size as a proxy for adviser size because AUM is not observable before the Dodd-Frank Act.

[19] I use both broad and narrow definitions of VC funds because many PE funds that invest in high-growth start-ups do not necessarily meet the SEC's regulatory definition of a VC fund. I assume funds within the narrow definition are more likely to meet the regulatory definition used for the venture capital exemption. The narrow definition includes funds classified as early stage and venture (general) by Preqin. The broad definition adds funds classified as expansion / late stage, growth, and balanced by Preqin. See Appendix A for a detailed discussion of the SEC's regulatory definition.

fund number dummies.

Table C.3 reports the pass-through coefficients and provides strong support for sticky LP-GP relationships. The coefficients across all columns are large in magnitude and highly significant. For example, Panel A Column 1 indicates that LPs have approximately 40 percentage points greater likelihood of reinvesting in the next fund if they invest in the current fund raised by a GP, while the unconditional mean is less than 0.5 percent. While the pass-through coefficient decreases with additional fixed effects and time length, the estimates remain highly significant and large in magnitude.

C.5 Potential Selection into Newly Registered GPs among Public Pensions

LP investors in private equity markets include diverse institutional investors such as pension funds, endowments, and insurance companies. While commercial PE databases offer only basic information, including institutional type, location, founding year, and historical fund investments, these data sources do not provide consolidated panel data about different LPs' financial positions and other characteristic, which can be helpful in investigation potential selection in my research design. I overcome this challenge by zooming into public pensions and augmenting the Preqin data with comprehensive information from the Public Plan Database (PPD), covering over 250 major US state and local pension funds. The data supplements my analysis in Section 5.1.3 and further assess potential selection into newly registered GPs among public pensions, one of the most important and largest LPs.

Specifically, I estimate linear probability models to examine whether key pre-Dodd-Frank-Act characteristics, such as pension size, financial health, investment assumptions, type, investment returns as well as asset allocation, predict a public pension's probability of having high exposure to newly registered GPs in their pre-existing relationships. The full sample includes a cross-section of 164 unique public pension funds. As Table C.4 shows, all coefficient estimates across Columns (1)-(5) are statistically insignificant, providing further evidence against endogenous matching concerns in my difference-in-differences design, even though some of these characteristics do predict a pension's GP matching outcome, such as the probability of having a large number of pre-existing relationships in Columns (6)-(10). Table C.5 Panel D shows that my main results remain qualitatively and quantitatively similar when restricting the DiD analysis to public pension funds in my sample.

C.6 A Lack of Differential Trends across GPs

Since the new registration exemptions under the Dodd-Frank Act are tied to GP size and investment strategy, one potential concern is that the effects documented in my main tables are confounded by differential trends in investment opportunities and market dynamics between small and large GPs or between GPs that manage buyout funds or only VC funds. Table 6 Panel A addresses this concern by allowing LP outcomes to evolve on flexible time

trends across LPs with different exposure to these GPs. To further rule out this confounding factor, I directly test whether these GPs face differential fundraising outcomes by estimating the following regression:

$$Fundraising_{jt} = \beta \times GP\ Characteristics_j \times Post_t + \boldsymbol{\delta_j} + \boldsymbol{\tau_t} + \epsilon_{jt} \tag{5}$$

in which j and i denote a GP and a year, respectively. *Size Group* is a variable ranging from 1 to 5 that ranks a GP in quintile groups based the total amount of PE funds raised in the past ten years as of 2011, the year before the Dodd-Frank Act becomes effective. A value of 5 indicate the group of the largest size. *Buyout Manager* is an indicator variable equal to one if the GP manages any buyout funds in the past 10 years as of 2011. *Post* is an indicator variable equal to one if the year is or after 2012, the effective year of the Dodd-Frank Act which brings PE fund advisers under the SEC's scrutiny, and zero otherwise. $\boldsymbol{\delta_j}$ and $\boldsymbol{\tau_t}$ are GP and year fixed effects. Appendix B.1 provides detailed variable definitions. Standard errors are clustered at the GP level.

If the effects of registration documented in Table 3 is driven by the secular trends across GPs, then β in Equation (5) should be statistically positive. This explanation is unsupported by the β coefficient estimates shown in Table 7. The coefficients are not meaningfully different from zero in terms of magnitude and also mostly statistically insignificant.

To highlight the effect of registration, Table 7 also reports OLS estimates of fundraising outcomes on *Registered*, an indicator variable equal to one if the GP is registered with the SEC in a given year, and zero otherwise, which has within-GP variation due to change in a GP's registration status—mainly in 2012 (Figure C.1). In contrast to the coefficient estimates of *Size Group* × *Post* and *Buyout Manager* × *Post*, *Registered* are positive with economically large magnitude at the 1% significance level. The finding provides further evidence that the effects documented in my main tables are indeed driven by registration instead of seculary trends across GPs with different size or investment strategy.

One might wonder why exempt GPs do not choose to register if registration enhances fundraising. First, operating as an exempt reporting adviser provides greater flexibility in operations and investment strategies, whereas SEC registration imposes restrictions on areas such as fees, expenses, marketing, and custody rules. Second, SEC registration requires the disclosure of sensitive information, including detailed business practices and financial data through Form PF, which some PE fund advisers may prefer to avoid to protect proprietary information and maintain confidentiality (Abuzov, Gornall, and Strebulaev, 2025). Third, the costs of SEC registration—such as legal, compliance, and administrative expenses—can be substantial, particularly for smaller or mid-sized advisers.

C.7 Adverse Selection in Direct Investments

While LPs tend to invest in mature and large companies, such deals are presumably the most subject to adverse selection – the very best deals will be oversubscribed and syndicated to investors within the GP networks rather than invested by LP investors which tend to have weaker deal origination. As a result, those companies that LPs have a greater chance to directly invest in might have lower quality. Similar adverse selection in co-investments has been studied by Fang, Ivashina, and Lerner (2015) and Braun, Jenkinson, and Schemmerl (2020), who examine whether PE fund advisers offer worse co-investment opportunities to their LP investors and find inconclusive results.

This paper does not find evidence of adverse selection in LP investors' direct investments based on the exit outcomes of a propensity-score-matched sample of PE deals in the US. According to results reported in Table 8, deals participated by LPs are very different from those invested by GPs. To create a proper benchmark, I construct a control group by matching each LP's direct investment with another deal with similar observable deal characteristics but no LP investors. Table C.9 Panel A reports the OLS estimates of exit outcomes, in which the variable of interest *Direct Investment* is an indicator variable equal to one if the deal is directly invested by LP investors and zero otherwise. The coefficient estimates are highly insignificant across all columns - providing little support for adverse selection into companies with worse exit outcomes measured either by the probability of having a successful exit through IPO or acquisitions, time to exit, and exit valuation. Panel B shows balanced covariates after the propensity score matching - the standardized differences of observable characteristics between LP-invested companies and those without LPs' direct investments are almost reduced to zero and the variance ratios become closer to one after the matching.

One caveat is that a lack of differences in company exit outcomes does not necessarily suggest LPs can earn similar net returns in their direct investments compared to their fund investments. To properly measure LP's return in company exits, we will need to observe the ownership stake at the IPO or M&A, which is unobservable in my data. Using proprietary data of deal-level cash flow provided by some large institutions, Fang, Ivashina, and Lerner (2015) show that LPs' direct investments tend to outperform their fund benchmark, especially when LPs can more easily overcome information frictions in direct investing.

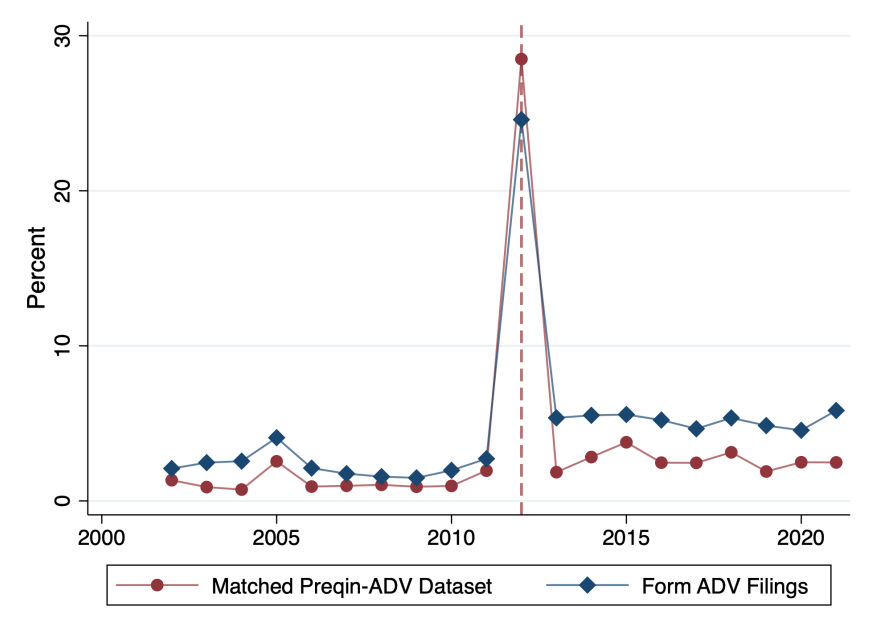
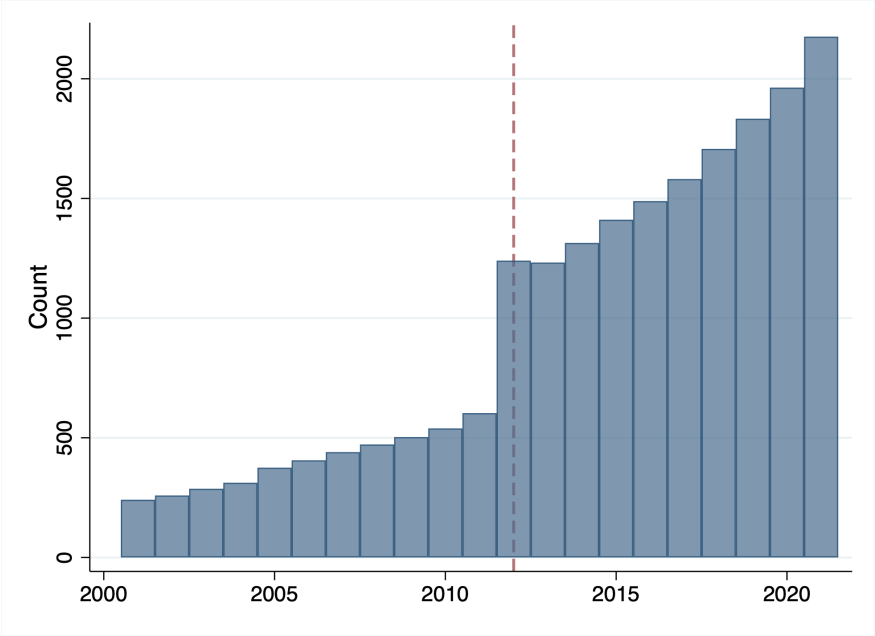
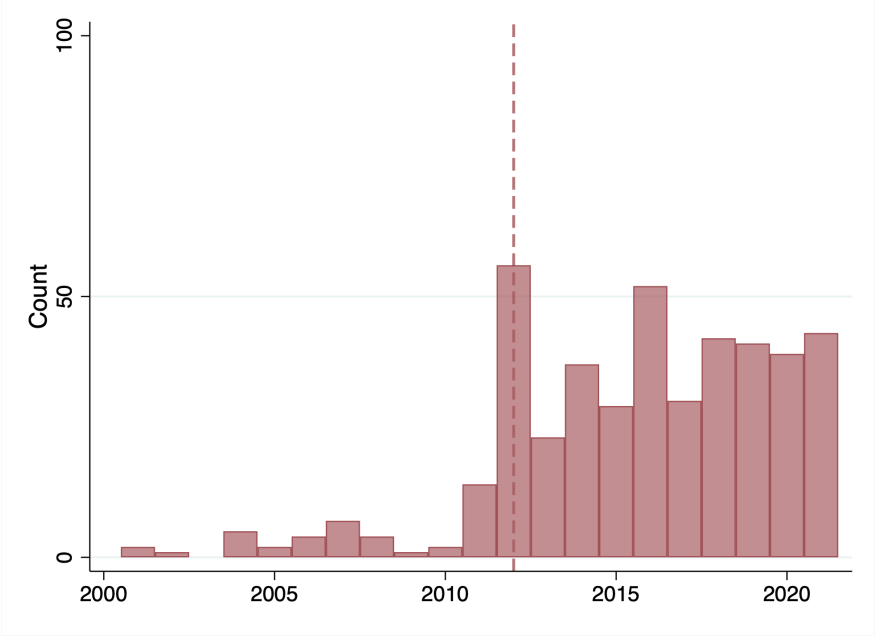


Figure C.1: Data Validation - Share of Newly Registered Advisers

This figure compares the share of newly registered PE fund advisers as a percentage of all advisers in the manually matched Preqin-ADV dataset with the share soly based on Form ADV filings. To identify these GPs in Preqin, I manually match Preqin with Form ADV filings by searching the Investment Adviser Public Disclosure database based on GP names. Appendix B.2 provides details about the matching procedure. The share in the matched Preqin-ADV database closely aligns with the share solely based on Form ADV filings (correlation = 0.98), validating the matching quality. While the sample GP in the matched Preqin-ADV database consists of GPs with observed LP relationships, this consistency mitigates concerns about potential selection biases arising from the coverage of GPs in LPs' pre-existing relationships in Preqin. The main identification strategy in this paper relies on the GPs that become newly registered in 2012, indicated by the vertical red dashed line, when the Dodd-Frank Act becomes effective to PE fund advisers.



(a) Number of Registered Advisers



(b) Number of SEC Registration Withdrawal by Active Advisers

Figure C.2: Number of Registered PE Advisers vs. Number of Active De-registrations

Figure C.2a shows the number of PE fund advisers that are registered with the SEC from 2001-2021. Figure C.2b indicates the number of SEC de-registration by advisers that meet the old (new) registration exemptions before (after) the Dodd-Frank Act. The number of active de-registrations is small compared to the number of registered advisers in a given year. The de-registration data is collected from Form ADV-W, regulatory filings that must be submitted by advisers when they withdraw their registrations from the SEC. The red vertical dashed line indicates 2012 when the Dodd-Frank Act became effective and significantly narrowed PE fund advisers' registration exemptions.

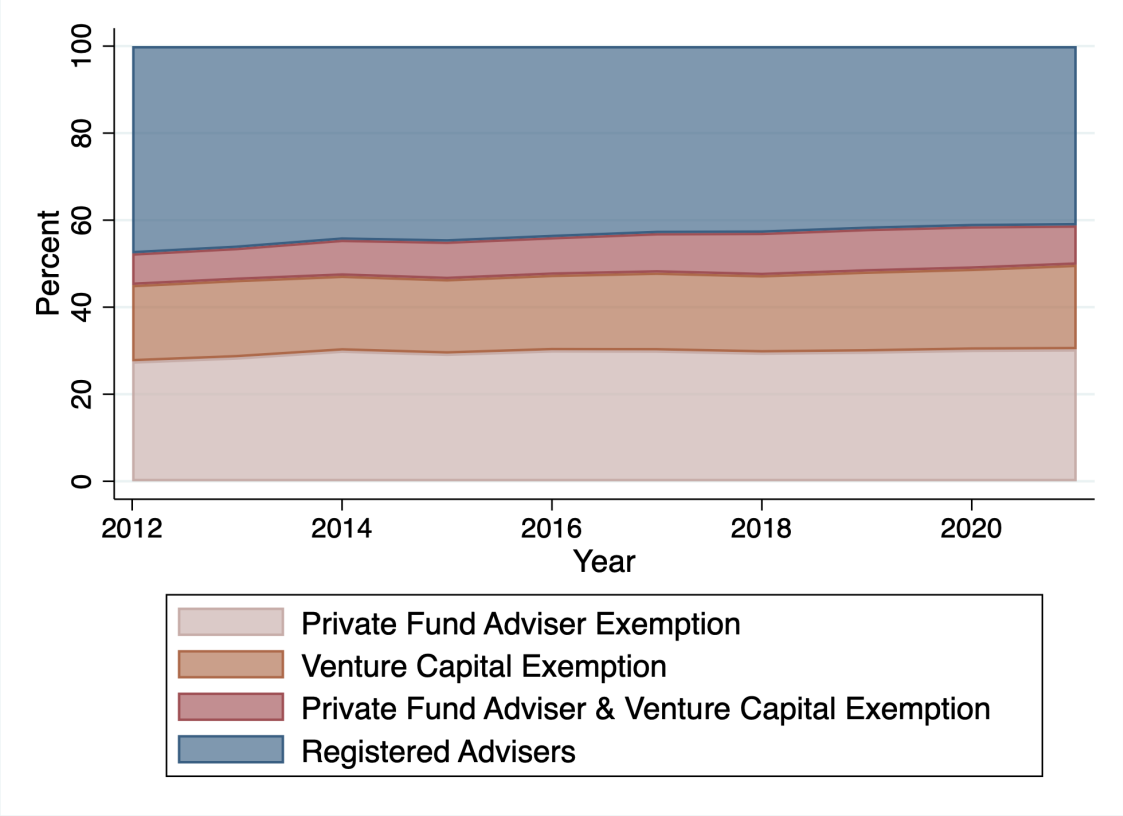
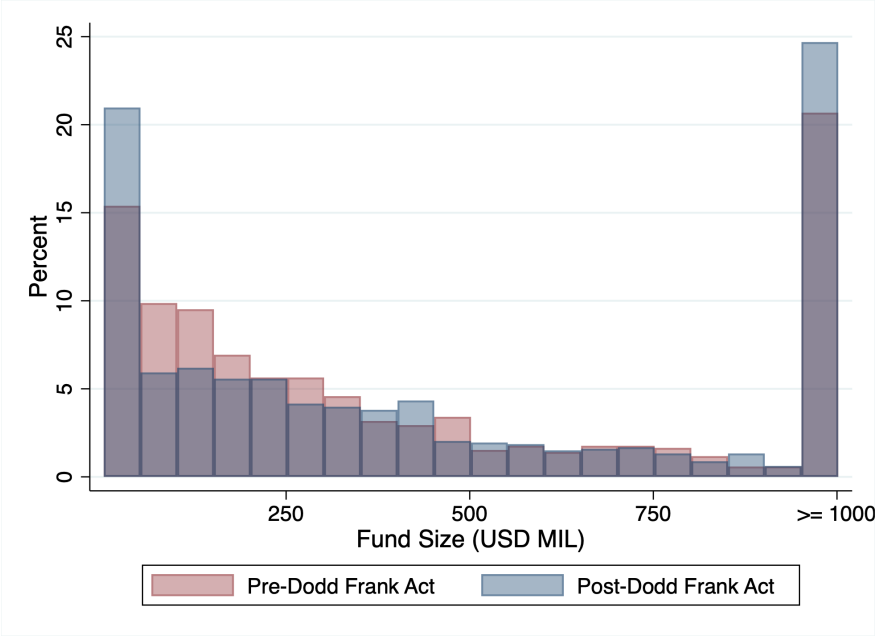
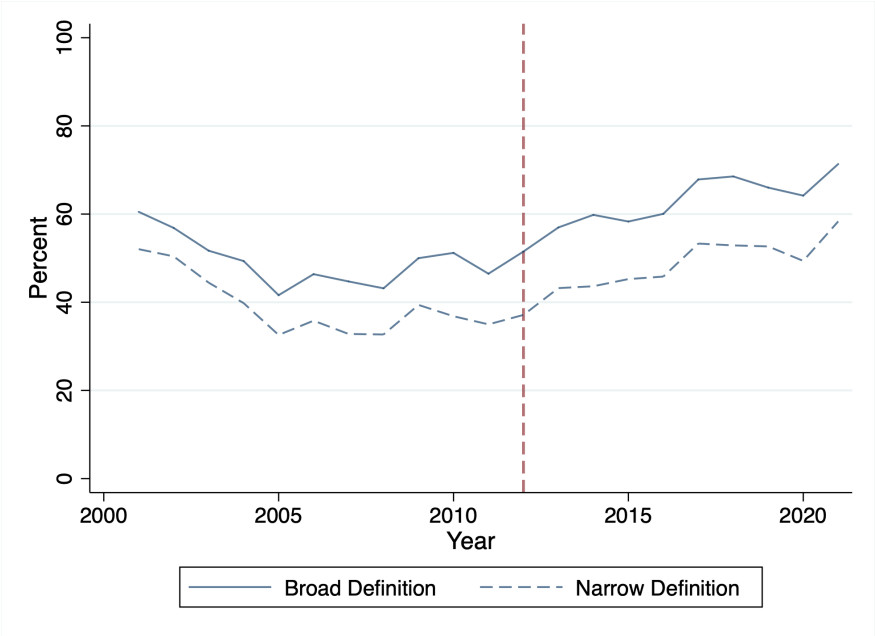


Figure C.3: Share of Exempt Reporting Advisers by Qualified Exemption

Figure C.3 shows the share of unregistered PE fund advisers, also known as exempt reporting advisers, by qualified new exemption under the Dodd Frank from 2012 to 2021. These unregistered advisers are shown in different shades of red, while registered advisers are indicated in blue. Advisers qualify for the private fund adviser exemption if solely advising private funds and have assets under management, as defined in rule 203(m)-1, in the US of less than $150 MIL. Advisers qualify for the venture capital exemption if solely advising venture capital funds, as defined in rule 203(1)-1. The detailed regulatory definition is discussed in Appendix A. The figure indicates a lack of long-run change in PE advisers' characteristics after the Dodd-Frank Act, suggesting advisers do not systematically adjust fundraising to avoid registration.



(a) Buyout Fund Size Distribution



(b) Time Series Evolution of Venture Capital Fundraising

Figure C.4: Aggregate Fundraising Characteristics Before and After the Dodd-Frank Act

Figure C.4a shows the cross-sectional size distribution of buyout funds raised before and after the effective year of the Dodd-Frank Act. Figure C.4b illustrates the time-series evolution of the percentage of PE funds classified as venture capital (VC) funds. Both figures indicate limited aggregate changes in PE fund characteristics across advisers around the reform. These characteristics are determinants of the new registration exemptions under the Dodd-Frank Act. The solid line uses a broad definition including funds classified as early stage, expansion / late stage, venture (general), growth, and balanced funds by Preqin. The dashed line uses a narrow definition including funds classified as early stage and venture (general) funds by Preqin. The red vertical dashed line indicates the base year 2011, the year before the Dodd-Frank Act significantly narrowed PE fund advisers' registration exemptions.

Table C.1: Top Private Equity Fund Advisers Initially Registered in 2012

This table provides the top PE fund advisers initially registered with the SEC in 2012 after the Dodd-Frank Act became effective for PE fund advisers. The ranking is based on the total gross asset value of PE funds reported by the advisers in their Form ADV filings in 2012.

	Adviser Name	Gross Asset Value (USD MIL)
1	Warburg Pincus LLC	33,177
2	Hellman & Friedman LLC	20,685
3	Leonard Green & Partners, LP	15,385
4	First Reserve Management, LP	14,294
5	Madison Dearborn Partners, LLC	13,878
6	Clayton, Dubilier & Rice, LLC	13,725
7	Silver Lake Technology Management, LLC	13110
8	TA Associates Management, LP	10,631
9	Centerbridge Partners, LP	8,859
10	American Securities LLC	8,857
11	WCAS Management Corporation	8,392
12	H.I.G. Capital, LLC	8,300
13	THL Managers VI, LLC	8,276
14	Stone Point Capital LLC	8,273
15	Kelso & Company, LP	8,245
16	Sun Capital Advisors, Inc.	8,172
17	Arclight Capital Partners, LLC	7,954
18	Golden Gate Private Equity Inc.	7,274
19	Tiger Global Management, LLC	7,211
20	Onex Partners Manager LP	7,209

Table C.2: SEC Registration and Regulatory Oversight of PE Fund Advisers

This table shows the relationship between PE fund advisers' SEC registration status and regulatory actions received by advisers for their misconduct, based on estimates from Equation (3). The sample consists of US PE fund advisers during 2001-2021. A unit of observation is a GP-year. *Registered* is an indicator variable equal to one if the GP is registered with the SEC in a given year, and zero otherwise. The outcome variables are a set of variables based on regulatory actions disclosed by the advisers in their Form ADV filings. For example, *Regulatory Action* is an indicator variable equal to one if the GP receives regulatory disciplinary actions in the year, and zero otherwise. *Cease and Desist* is an indicator variable equal to one if the GP receives a cease and desist order in the year, and zero otherwise. *Ln(1 + Fine Amount)* is the natural logarithm of the fine amount in USD MIL. The regressions control for GP characteristics related to the registration exemptions under the Investment Adviser Act and Dodd-Frank Act (see Section 2.2). *Ln(GP Size)* is the natural logarithm of the amount of capital in USD MIL raised by PE funds managed by the adviser in the past 10 years. *Number of Funds Raised* is the number of PE funds raised by the GP in the past 10 years. *Buyout* an indicator variable equal to one if the GP manages buyout funds, and zero otherwise. Detailed variable definitions are provided in Appendix B. Standard errors are clustered at the GP level and reported in brackets. ***, ** and * indicate 1%, 5% and 10% significance levels.

	Regulatory Action	Censure	Disgorgement/ Restitution	Cease and Desist	Monetary Sanction	Ln(1 + Fine Amount)
	(1)	(2)	(3)	(4)	(5)	(6)
Registered	0.028***	0.015**	0.014***	0.019***	0.028***	0.057***
	[0.008]	[0.006]	[0.005]	[0.006]	[0.008]	[0.021]
Ln(GP Size)	0.002	0.001	0.001	0.001	0.002	0.008
	[0.002]	[0.002]	[0.001]	[0.001]	[0.002]	[0.005]
Number of Funds Raised	0.001	0.000	0.001	0.001	0.001	0.001
	[0.001]	[0.000]	[0.000]	[0.001]	[0.001]	[0.002]
Buyout	-0.007*	-0.003	-0.003	-0.005**	-0.008**	-0.019
	[0.004]	[0.003]	[0.002]	[0.003]	[0.004]	[0.013]
GP State FE	✓	✓	✓	✓	✓	✓
Year FE	✓	✓	✓	✓	✓	✓
Observations	15,535	15,535	15,535	15,535	15,535	15,535
Adjusted R^2	0.035	0.020	0.021	0.024	0.035	0.021

Table C.3: Sticky LP-GP Relationships

This table shows the pass-through estimates from Equation (4) suggesting that LP-GP relationships are sticky in the private equity market. The sample includes all possible LP-GP relationships, both realized or unrealized, for PE funds raised during 2001-2021. $Invest_k$ is an indicator variable equal to one if an LP invests in the k-th PE fund raised by a GP, and zero otherwise. Each panel reports the pass-through estimates for different n with the outcome variable indicated in the panel caption. For example, Panel A shows the incremental probability that an LP will invest in the next PE fund raised by the GP if the LP has invested in its current fund. Column (1) controls for a GP's average market share by including GP fixed effects. Column (2) allows the market share to be time-varying by including GP by year fixed effects. Column (3) adds GP by LP state and GP by LP type fixed effects to account for potential GP specialization by LP state or LP type. Column (4) further controls for fund characteristics by including a fund type dummy, based on whether the fund is a venture capital or buyout fund, and fund size dummies, based on the fund's size quintile, as well as fund number dummies. Standard errors are two-way clustered, at the LP and GP levels, and reported in brackets. ***, ** and * indicate 1%, 5% and 10% significance levels.

	(1)	(2)	(3)	(4)
Panel A: Invest$_{k+1}$				
Invest$_k$	0.405***	0.405***	0.393***	0.392***
	[0.013]	[0.013]	[0.013]	[0.013]
Observations	6,507,889	6,507,889	6,501,467	5,985,357
Adjusted R^2	0.190	0.193	0.196	0.198
Panel B: Invest$_{k+2}$				
Invest$_k$	0.287***	0.287***	0.274***	0.272***
	[0.016]	[0.016]	[0.016]	[0.015]
Observations	4,070,636	4,070,636	4,066,895	3,792,964
Adjusted R^2	0.108	0.112	0.121	0.121
Panel C: Invest$_{k+3}$				
Invest$_k$	0.233***	0.233***	0.223***	0.220***
	[0.021]	[0.021]	[0.022]	[0.019]
Observations	2,697,002	2,697,002	2,694,597	2,527,197
Adjusted R^2	0.082	0.086	0.099	0.098
GP FE	✓			
GP × Year FE		✓	✓	✓
GP × LP State FE			✓	✓
GP × LP Type FE			✓	✓
Fund Type FE				✓
Fund Size FE				✓
Fund Number FE				✓

Table C.4: Potential Selection into Newly Registered GPs among Public Pension Funds

This table reports cross-sectional regressions examining selection into newly registered advisers based on average pre-intervention (2001-2011) public pension fund characteristics covered in the Public Plan Database. The sample includes public pensions matched to the LP sample in the main analysis. A unit of observation is a public pension. *Regulatory Exposure* is an indicator variable equal to one if the share of newly registered GPs in the LP's pre-existing LP-GP relationships is in the top quintile group, and zero otherwise. *GP Relationships* is an indicator variable equal to one if the number of pre-existing relationships is in the top quintile group, and zero otherwise. The table suggests that these pension characteristics cannot predict selection into newly registered GPs but predicts the number of pre-existing GP relationships, which supports the quasi-random variation of regulatory oversight across LPs given the political economy of the intervention described in Section 2.2. The benchmark type for TRS and PFSRS pensions is Public Employees' Retirement System (PERS)/Employees' Retirement System (ERS). Detailed variable definitions are provided in Appendix B. Huber-White standard errors are reported in brackets. ***, ** and * indicate 1%, 5% and 10% significance levels.

	Regulatory Exposure					GP Relationships				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Ln(Actuarial Assets)	-0.070				-0.021	0.046				0.102
	[0.053]				[0.119]	[0.078]				[0.086]
Ln(Payroll)	0.050				-0.017	0.008				-0.122
	[0.053]				[0.140]	[0.079]				[0.083]
Funded Ratio	-0.014				0.048	0.471**				-0.163
	[0.139]				[0.410]	[0.190]				[0.269]
Benefit Cost Ratio	-0.000				-0.012	0.001***				0.108***
	[0.000]				[0.035]	[0.000]				[0.036]
Assumed Inflation (%)		3.278			-14.247		-0.696			1.324
		[8.430]			[14.495]		[4.143]			[7.876]
Assumed Investment Return (%)		-14.719			-0.158		-3.725			-21.694
		[9.615]			[14.675]		[5.962]			[14.374]
Assumed Payroll Growth (%)		-4.745			4.657		-5.390**			-5.367
		[4.165]			[11.079]		[2.673]			[8.167]
TRS (0/1)			0.000		-0.000			0.001		-0.001
			[0.001]		[0.001]			[0.001]		[0.001]
PFSRS (0/1)			-0.001		-0.000			0.001		-0.003*
			[0.001]		[0.002]			[0.001]		[0.001]
1-year Investment Return (%)				0.026	0.015				-0.001	0.075
				[0.039]	[0.096]				[0.047]	[0.098]
5-year Investment Return (%)				0.022	-0.014				0.065	-0.008
				[0.048]	[0.084]				[0.059]	[0.071]
10-year Investment Return (%)				0.005	0.027				0.003	-0.012
				[0.022]	[0.038]				[0.027]	[0.033]
Actual Equity Allocation (%)				0.004	0.024				0.017	0.002
				[0.010]	[0.017]				[0.016]	[0.015]
Target Equity Allocation (%)				0.005	-0.011				0.005	0.014
				[0.008]	[0.013]				[0.011]	[0.010]
Equity Return (%)				0.014	0.010				-0.041*	-0.073**
				[0.018]	[0.042]				[0.024]	[0.028]
Actual Private Equity Allocation (%)				-0.016	-0.019				0.016	-0.009
				[0.011]	[0.022]				[0.011]	[0.012]
Target Private Equity Allocation (%)				0.004	0.002				0.047***	0.046**
				[0.011]	[0.028]				[0.013]	[0.021]
Private Equity Return (%)				0.008	0.010				0.008	0.012
				[0.007]	[0.012]				[0.007]	[0.009]
Actual Fixed Income Allocation (%)				0.006	0.009				0.009	-0.026*
				[0.010]	[0.016]				[0.015]	[0.014]
Target Fixed Income Allocation (%)				-0.007	-0.015				-0.003	0.018
				[0.009]	[0.019]				[0.011]	[0.013]
Fixed Income Return (%)				0.006	0.047				0.061	0.066
				[0.029]	[0.054]				[0.047]	[0.046]
Observations	164	100	164	108	70	164	100	164	108	70
Adjusted R^2	-0.007	0.001	-0.002	0.015	-0.190	0.108	-0.012	-0.003	0.294	0.134

Table C.5: Potential Confounding Regulations and Subsamples of LPs

This table provides robustness checks by re-estimating Equation (2) with different subsamples of LPs. Panel A excludes bank LPs, which are directly affected by the Volcker Rule, a contemporaneous shock with the Dodd-Frank Act preventing banks from holding private equity. Panel B excludes FOF managers, which, as private fund advisers themselves, are subject to the same registration requirements and regulatory oversight under the Dodd-Frank Act as the PE fund advisers in which they invest. Panel C restricts the sample to endowments and foundations, to mitigate concerns about confounding financial regulation around the Dodd-Frank Act. Endowments and foundations are arguably less regulated than other LPs such as pensions, insurers, and banks because they do not guarantee benefits or take on public liabilities. Panel D restricts the sample to public pensions to supplement the analysis reported in Table C.4. The full sample consists of LP investors located in the US during the period 2001-2021. A unit of observation is an LP-year. Detailed variable definitions are provided in Appendix B. Standard errors are clustered at the LP level and reported in brackets. ***, ** and * indicate 1%, 5% and 10% significance levels.

	Capital Commitment	Number of Funds	Ln(1 + Committed Capital)	Direct Investment	Number of Direct Investments	Ln(1 + Direct Investment Amount)
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Exclude Banks						
Regulatory Exposure × Post	0.098***	0.317***	0.308***	-0.013*	-0.067***	-0.033**
	[0.018]	[0.070]	[0.074]	[0.007]	[0.025]	[0.013]
Observations	29,124	29,124	29,124	29,124	29,124	29,124
Adjusted R^2	0.350	0.573	0.470	0.394	0.510	0.426
Panel B: Exclude Fund of Funds (FOF) Managers						
Regulatory Exposure × Post	0.092***	0.254***	0.280***	-0.014**	-0.031**	-0.019*
	[0.017]	[0.066]	[0.071]	[0.006]	[0.015]	[0.011]
Observations	27,286	27,286	27,286	27,286	27,286	27,286
Adjusted R^2	0.354	0.592	0.480	0.236	0.202	0.208
Panel C: Restrict to Endowments and Foundations						
Regulatory Exposure × Post	0.104***	0.209***	0.357***	-0.021***	-0.031***	-0.030***
	[0.020]	[0.052]	[0.073]	[0.006]	[0.009]	[0.007]
Observations	11,386	11,386	11,386	11,386	11,386	11,386
Adjusted R^2	0.262	0.494	0.306	0.156	0.165	0.120
Panel D: Restrict to Public Penion Funds						
Regulatory Exposure × Post	0.163***	0.652**	0.464*	0.003	-0.045	0.024
	[0.054]	[0.297]	[0.245]	[0.007]	[0.046]	[0.018]
Observations	3,849	3,849	3,849	3,849	3,849	3,849
Adjusted R^2	0.472	0.667	0.682	0.405	0.150	0.181
LP FE	✓	✓	✓	✓	✓	✓
Year FE	✓	✓	✓	✓	✓	✓

Table C.6: Rule out Supply Side Explanations - Registration and Co-investment Funds

This table investigates whether registration constrains co-investment opportunities, which could lead to more standardized PE investments manifested through fund investments. In Panel A, the sample consists of US PE fund advisers during 2001-2021. A unit of observation is a GP-year. In Panel B, the sample consists of PE funds raised by these sample GPs in the same period without missing value of the outcome variable. *Registered* is an indicator variable equal to one if the GP is registered with the SEC in a given year, and zero otherwise. Change in registration status leads to within-GP variation in *Registered*. *Co-investment Fund* is an indicator variable equal to one if the GP raises a co-investment fund in the year, and zero otherwise. *Number of Co-Investment Funds* is the number of co-investment funds raised by the GP in a given year. *Ln(1 + Co-investment Fund Size)* is the natural logarithm of one plus the total amount of co-investment funds raised in USD MIL in a given year. *Offer Co-investments* is an indicator variable equal to one if a PE fund offers co-investment opportunities to its LP investors, and zero otherwise. Detailed variable definitions are provided in Appendix B. Standard errors are clustered at the GP level and reported in brackets. ***, ** and * indicate 1%, 5% and 10% significance levels.

Panel A: GP-Year Level

	Co-investment Fund		Number of Co-investment Funds		Ln(1 + Co-investment Fund Size)	
	(1)	(2)	(3)	(4)	(5)	(6)
Registered	0.035***	0.023***	0.048***	0.031***	0.110***	0.078***
	[0.005]	[0.005]	[0.008]	[0.011]	[0.019]	[0.019]
GP State FE	✓		✓		✓	
GP FE		✓		✓		✓
Year FE	✓	✓	✓	✓	✓	✓
Observations	19,277	19,295	19,277	19,295	19,277	19,295
Adjusted R^2	0.027	0.134	0.024	0.145	0.011	0.095
$\bar{y}$	0.023	0.023	0.031	0.031	0.059	0.059

Panel B: PE Fund Level

	Offer Co-investments	
	(1)	(2)
Registered	0.017	0.026
	[0.051]	[0.059]
Ln(Fund Size)	0.037**	0.067***
	[0.017]	[0.024]
Fund Number	-0.009	0.004
	[0.008]	[0.009]
Buyout	0.031	-0.057
	[0.051]	[0.053]
GP State FE	✓	
GP FE		✓
Vintage FE	✓	✓
Observations	659	501
Adjusted R^2	0.174	0.672
$\bar{y}$	0.871	0.850

Table C.7: Rule out Supply Side Explanations - Venture Capital Market Participation

This table provides robustness checks by restricting to the venture capital market and re-estimating Equation (2). The new size-based exemption under the Dodd-Frank Act does not create incentives that distort GPs' VC fund size (see Section 2.2). The sample consists of LP investors located in the US during the period 2001-2021. A unit of observation is an LP-year. *Capital Commitment* is an indicator variable equal to one if the LP commits capital to any PE funds in the year, and zero otherwise. *Number of Funds* is the number of PE funds the LP committed capital to in one year. *Ln(1 + Committed Capital)* is the natural logarithm of one plus the amount of capital in USD MIL committed to PE funds in one year. *Direct Investment* is an indicator variable equal to one if the LP makes direct investments in private companies in the year, and zero otherwise. *Number of Direct Investments* is the number of direct investments in private companies made by the LP in one year. *Ln(1 + Direct Investment Amount)* is the natural logarithm of one plus the amount of direct investments in USD MIL made by the LP in one year. *Regulatory Exposure* is an indicator variable equal to one if the share of newly registered GPs in the LP's pre-existing LP-GP relationships is in the top quintile group, and zero otherwise. *Post* is an indicator variable equal to one if the year is or after 2012, the effective year of the Dodd-Frank Act, and zero otherwise. Detailed variable definitions are provided in Appendix B. Standard errors are clustered at the LP level and reported in brackets. ***, ** and * indicate 1%, 5% and 10% significance levels.

	Capital Commitment	Number of Funds	Ln(1 + Committed Capital)	Direct Investment	Number of Direct Investments	Ln(1 + Direct Investment Amount)
	(1)	(2)	(3)	(4)	(5)	(6)
Regulatory Exposure × Post	0.114***	0.211***	0.292***	-0.014**	-0.057**	-0.034***
	[0.012]	[0.034]	[0.042]	[0.006]	[0.023]	[0.012]
LP FE	✓	✓	✓	✓	✓	✓
Year FE	✓	✓	✓	✓	✓	✓
Observations	29,572	29,572	29,572	29,572	29,572	29,572
Adjusted R^2	0.349	0.486	0.432	0.379	0.547	0.473

Table C.8: Fund Reporting and Registration

This table shows that GPs do not become more likely to report their LPs or their commitments at the fund level after SEC registration. The sample includes PE funds raised by US fund advisers during 2001 and 2021. A unit of observation is a PE fund. *Multiple LPs* is an indicator variable equal to one for a fund if multiple LPs are reported in Preqin, and zero otherwise. *Missing LPs* is an indicator variable equal to one if Preqin does not cover any LPs of a fund, and zero otherwise. *Missing Commitments* is an indicator variable equal to one if Preqin does not cover any LP commitments for a fund, and zero otherwise. *Registered* is an indicator variable equal to one if the GP is registered with the SEC in a given year, and zero otherwise. *Ln(Fund Size)* is the natural logarithm of final size in USD MIL of a fund. *Buyout* is an indicator variable equal to one if the fund is a buyout fund, and zero if it is a venture capital fund. Detailed variable definitions are provided in Appendix B. Standard errors are clustered at the LP level and reported in brackets. ***, ** and * indicate 1%, 5% and 10% significance levels.

	(1)	(2)	(3)
	Multiple LPs	Missing LPs	Missing Commitments
Registered	0.015	-0.034	-0.036
	[0.025]	[0.024]	[0.031]
Ln(Fund Size)	0.147***	-0.151***	-0.136***
	[0.008]	[0.007]	[0.008]
Fund Number	0.016***	-0.001	-0.008**
	[0.003]	[0.003]	[0.003]
Buyout	-0.019	0.123***	-0.047
	[0.048]	[0.042]	[0.051]
GP FE	✓	✓	✓
Vintage FE	✓	✓	✓
Observations	3,907	3,907	3,907
Adjusted R^2	0.538	0.443	0.530
$\bar{y}$	0.638	0.230	0.435

Table C.9: Direct Investments and Adverse Selection

This table investigates whether investors face adverse selection of investment opportunities when making direct investments in private equity markets. The sample is constructed by finding the nearest neighbor match for each company invested directly by LPs using a propensity score matching procedure based on PE deals during the period 2001-2021. Each LP direct investment is matched with a deal invested by GPs. The propensity score is estimated using the following deal characteristics: *Early*, *Company Age*, *Round Number*, *Capital Raised*, *Deal Size*, *Number of Investors*, as well as deal year, deal type, company state, and company industry indicators. These characteristics are used as control variables in the regressions. Panel A reports the OLS estimates on the exit outcomes. Panel B shows the covariate balance summary of key variables between companies directly invested by LP investors and those without LP investors. *IPO* is an indicator variable equal to one if the company goes public by the end of 2021, and zero otherwise. *Successful Exit* is an indicator variable equal to one if the company goes public or is acquired with a valuation two times or greater than invested capital, and zero otherwise. *Years to Exit* is the number of years from first PE financing to exit and is missing if there is no exit. *Ln(Exit Value)* is the natural logarithm of the exit valuation for companies that go public or are acquired. *Direct Investment* is an indicator variable equal to one if the PE deal is directly invested by LP investors, and zero otherwise. Detailed variable definitions are provided in Appendix B. Huber-White standard errors are reported in brackets. ***, ** and * indicate 1%, 5% and 10% significance levels.

Panel A: Company Exit Outcomes

	IPO	Successful Exit	Years to Exit	Ln(Exit Value)
	(1)	(2)	(3)	(4)
Direct Investment	0.003	-0.000	0.020	-0.038
	[0.006]	[0.008]	[0.112]	[0.063]
Controls	✓	✓	✓	✓
Deal Year FE	✓	✓	✓	✓
Deal Type FE	✓	✓	✓	✓
Company State FE	✓	✓	✓	✓
Company Industry FE	✓	✓	✓	✓
Observations	9,301	9,301	2,281	2,113
Adjusted R^2	0.168	0.161	0.307	0.330

Panel B: Covariate Balance Summary

	Standardized Differences		Variance Ratios	
	Raw	Matched	Raw	Matched
Early Stage	-0.422	0.036	1.039	0.983
Company Age	0.070	0.001	0.675	0.658
Round Number	0.493	0.044	1.547	1.003
Capital Raised	0.329	0.015	2.064	0.910
Deal Size	0.225	-0.020	1.763	0.730
Number of Investors	0.857	0.064	1.777	0.848