

CFA INSTITUTE RESEARCH FOUNDATION / LITERATURE REVIEW

THE ECONOMICS OF PRIVATE EQUITY A CRITICAL REVIEW

ALEXANDER LJUNGQVIST



**CFA Institute
Research
Foundation**

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Stockholm School of Economics, Swedish House of Finance, and CEPR



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INTRODUCTION

Private equity (PE) involves the acquisition of stock market listed or private companies, typically through funds managed by specialized firms, with the aim of increasing the companies' value over a number of years before eventually selling them to realize returns for investors.¹

PE rose to prominence in the 1980s, when high-profile leveraged buyouts, financed by the high-yield junk bonds pioneered by Michael Milken at investment bank Drexel Burnham Lambert, targeted multi-billion-dollar companies, such as RJR Nabisco, Federated Department Stores, and Beatrice Companies. Today, PE has grown into a sizable asset class, with \$3.3 trillion in worldwide assets under management as of 2022.² Most foundations and university endowments (88%, according to a 2017 survey of 41 firms³) are invested in private equity, as are many other institutional investors. Yale University, long a pioneer of alternative asset class investment, currently allocates 17.5% of its endowment to private equity,⁴ and the Virginia Retirement System allocates even more (33%).⁵

Private equity is an intermediated asset class: Asset owners, such as endowments or pension plans, invest capital in private equity funds that in turn buy companies, own them for a number of years, then sell them and distribute the proceeds to their investors. How well asset owners fare when they entrust their capital to private equity fund managers depends on the managers' ability to select suitable companies for investment; their ability to help their portfolio companies grow, become more efficient, and innovate; and their ability to exit the companies at attractive valuations. How well asset owners fare also depends on how well aligned fund managers' interests are with those of their investors.

In this review, I will critically synthesize the main insights of more than 80 academic studies of private equity, with a special focus on the performance of private equity as an asset class and its track record of value creation. I will also focus on the key aspects of investing in private equity that are relevant to investors in private equity funds.

¹My focus in this review is on PE funds that acquire mature companies rather than on private debt funds that lend to companies or on venture capital funds that invest in entrepreneurial start-ups. For a review of the academic literature on private debt funds, see Block, Jang, Kaplan, and Schulze (2023). For a review of the academic literature on venture capital, see Da Rin, Hellmann, and Puri (2013).

²See Exhibit 4 in www.mckinsey.com/~media/mckinsey/industries/private%20equity%20and%20principal%20investors/our%20insights/mckinseys%20private%20markets%20annual%20review/2023/mckinsey-global-private-markets-review-2023.pdf.

³See www.institutionalinvestor.com/article/2bsvxkejmpofwrmf84jk/portfolio/survey-endowments-and-foundations-unfazed-by-private-equity-valuations.

⁴See <https://news.yale.edu/2020/09/24/investment-return-68-brings-yale-endowment-value-312-billion>.

⁵See *Financial Times*, "US Pension Funds Worth \$1.5tn Add Risk through Leverage" (20 January 2024). www.ft.com/content/623b67f9-090c-457f-a327-dc9f767e327a.

A BRIEF HISTORY OF PRIVATE EQUITY

Private equity, in the sense of investments in assets not traded on a stock market, has been around for centuries. The PE industry as we know it today traces its roots to the mid-20th century. Some say that the first leveraged buyout took place in 1955, when McLean Industries, Inc. acquired two steamship companies. In the 1960s, Warren Buffett's Berkshire Hathaway and Victor Posner's DWG Corporation popularized the practice of acquiring portfolios of companies much in the same way as PE firms do today.

The growth of the junk bond market in the 1970s and 1980s made possible highly leveraged buyouts of even very large targets such as RJR Nabisco, acquired by KKR in 1989 for a record-breaking \$31.1 billion. Many of the 1980s buyouts were hostile in the sense that the acquisition proceeded against target management's will.

As interest rates increased in the late 1980s and the economy headed into a recession, many of the highest-profile leveraged buyouts ran into trouble. By 1990, an era came to an end when Drexel Burnham Lambert agreed not to contest six federal felony charges, paid a record fine of \$650 million, and filed for Chapter 11 bankruptcy protection.

During the 1990s, private equity recovered and institutionalized. Deal sizes increased while value-creation strategies became less hostile and more focused on bringing about operational efficiencies. Fund sizes increased commensurately, and mega-funds became more common.

The bursting of the technology, media, and telecommunications (TMT) bubble in the early 2000s left in its wake many high-profile casualties—notably two leading private equity firms, Hicks, Muse, Tate & Furst and Forstmann, Little & Company. Between 2000 and 2003, deal sizes and leverage ratios fell again, and some early investors in private equity (such as Chase Capital Partners) sold off their investments in PE funds.

Between 2003 and 2007, the PE market first recovered (as interest rates fell) and then boomed. Deal sizes grew to the point where "club deals," the practice of syndicating the acquisition of a large target among a group of PE funds, became common. Marking the peak, a consortium led by KKR and TPG acquired Texan utility TXU in October 2007 for \$44.37 billion, much of it funded by debt. (TXU filed for Chapter 11 bankruptcy protection in 2014.)

The 2007–2008 Global Financial Crisis, and the accompanying Great Recession of 2008–2009, led to a credit crunch—especially in the high-yield debt markets that PE firms depend on to finance their deals. It took seven years for PE fundraising to again surpass the level reached in 2007.

Record-low interest rates have marked the near-decade since then, contributing to a boom in fundraising and dealmaking. Then, as central banks around the world began raising interest rates in early 2022 in an attempt to bring down inflation, dealmaking, portfolio company exits, and fundraising all slowed sharply.

KEY INSTITUTIONAL FEATURES

In the United States and many other countries, PE funds are set up as limited partnerships, consisting of a legal entity that serves as the fund's manager and general partner (GP) and a range of limited partners (LPs) that commit to provide the bulk of the capital.⁶ The GP makes investment decisions, oversees portfolio companies, and executes the fund's value-creation strategy. LPs are typically institutional investors—such as pension funds, college endowments, foundations, insurance companies, family offices, and sovereign wealth funds—or high-net-worth individuals. The relationship between the GP and the fund's LPs is governed by the fund's limited partnership agreement (LPA). Among other conditions, the LPA sets out the:

- fund's purpose and strategy;
- types of investments the fund intends to undertake, along with any restrictions or exclusions imposed on its investment strategy;
- fund's term, which is usually limited to 10 years but often can be extended for a year or two before the fund must be liquidated;
- LPs' obligations, including, importantly, how much capital they have committed to contribute to the fund;
- length of the commitment period—that is, the period during which the GP can require LPs to contribute capital by issuing "capital calls" that "draw down" capital against LPs' committed capital;
- level of the annual management fee the GP is to be paid (often, 1%–2% of committed capital) as well as the share of the fund's profits to which the GP is entitled (called the carried interest or carry, often 20%), along with any performance hurdles imposed on the GP (say, an 8% hurdle before the GP is eligible to receive carried interest);
- distribution waterfall—that is, the order in which the fund's profits are distributed to LPs and the GP;⁷
- conditions governing the sale and transfer of LP interests in the fund; and
- protective covenants that restrict the GP's discretion when managing the fund on behalf of the LPs.

A typical commitment period lasts three to five years, during which the fund scouts for suitable deals and begins to implement a variety of value-creation strategies for the portfolio companies it acquires. Once the commitment period ends, the fund's active acquisition phase also ends: It will not add further companies to its portfolio, although it may continue to make add-on acquisitions out of any remaining committed capital reserved for this purpose. A consequence of this arrangement is that PE firms need to raise new funds every three to five years if they wish to stay in business. At any given point in time, then, an established PE firm may manage

⁶Although some PE funds are stock market listed, most are not.

⁷In the typical waterfall, LPs receive all proceeds from exits until their contributed capital has been returned in full, plus a preferred return at the agreed hurdle rate. Then, the GP receives all exit proceeds during a "catch-up" period until the GP has received 20% of the preferred return. Finally, LPs and the GP split any further exit proceeds according to the carried interest.

three funds: one fund that is actively investing, another that is mostly actively looking for buyers for its portfolio companies, and one that is winding down.⁸

Compared with public corporations, limited partnerships are light on governance mechanisms. Besides enforcing their rights under the LPA by legal means, if necessary, what limited governance LPs can engage in involves the Limited Partner Advisory Committee (LPAC), a body typically tasked with resolving conflicts of interest or waiving restrictive covenants in accordance with the LPA's provisions. LPs will not actively intervene in a fund's management.

Lerner and Schoar (2004), studying the US setting, argue that the reason for this approach is likely legal. Although the GP has unlimited liability for any debts, LPs are liable only up to the amount they have contributed to the fund. Under the Uniform Limited Partnership Act, however, LPs risk losing their limited-liability status if they exercise so much control over the fund's day-to-day running that they ought to be deemed as general partners. Largely for this reason, LPs in practice act as passive sources of capital. They are not actively engaged in prospecting for deals, adding value to portfolio companies, or making exit decisions.

An important feature of PE funds is that LPs do not pay in their committed capital up front. Instead, LPs receive a capital call whenever the GP wishes to draw down capital in order to make an investment during the commitment period.⁹ In other words, when becoming an investor in a fund, each LP commits to making capital available at unknown times during the next three to five years. LPs are thus effectively short a sequence of long-dated options with unknown maturities and individually uncertain strike prices, which the GP can exercise at its discretion at a time of its choosing. From the GP's perspective, a desirable consequence of this "capital-on-demand" arrangement is that the fund's "IRR clock" ticks only when LPs' capital is invested in deals rather than sitting in a transaction account that earns little interest. Moreover, all else equal, the shorter the time LPs' capital is invested for, the higher the internal rate of return (IRR).¹⁰

It is LPs who bear the cost of ensuring they have sufficient liquidity available to meet capital calls.¹¹ Managing such a liquidity exposure over multiple years can be challenging, and the less predictable a fund's capital calls, the greater the challenge. Ensuring liquidity is available when required has an obvious opportunity cost: The LP earns less on liquid investments than it could by investing in other assets. LPs ought to take into account this opportunity cost when computing, and reporting, the returns they earn on their allocation to PE. In practice, however, they rarely do so, suggesting that publicly available performance metrics overstate the true economic returns LPs earn when investing in PE funds.¹²

⁸In reality, PE firms often manage a plethora of side vehicles. See Lerner, Mao, Schoar, and Zhang (2022) for an analysis.

⁹The LPA sets out how soon an LP has to transfer the capital contribution (say, with a month's notice).

¹⁰For a comprehensive treatment of IRR's shortcomings in the PE context, see <https://blogs.cfainstitute.org/investor/2020/10/12/times-up-for-the-irr-resetting-the-clock-on-private-equity/>.

¹¹Defaulting on a capital call typically has severe adverse consequences under the LPA. A typical penalty is forfeiture of the LP's fund interest, including capital already invested—although for reputational reasons and to maintain long-term relationships, a GP may work with an LP at risk of default on its contractual obligations to find a workaround, perhaps by finding a buyer who can take over the LP's fund interest and its outstanding commitments.

¹²Two further consequences of LPs committing to provide liquidity on demand are that LPs cannot time the market (Brown, Harris, Hu, Jenkinson, Kaplan, and Robinson 2021) and that the timing of achieving a desired PE allocation is uncertain.

A hallmark of PE deals that sets them apart from venture capital and many growth equity investments is that they are typically financed through a combination of equity and plenty of debt.¹³ In 2022, for example, leverage ratios (i.e., debt divided by EBITDA) averaged 5.9 in US private equity deals according to PitchBook.¹⁴ Typically, the debt financing is initially provided by one or more banks and then syndicated and often sold.

Even part of the eventual equity investment in a deal is often initially funded by debt, using what are called “equity bridge facilities” or “subscription line facilities.” These short-term loans are secured on a fund’s LP commitments that are repaid once the GP initiates a capital call. By allowing the GP to delay a capital call, subscription lines boost the fund’s reported IRR by shortening the time during which fund capital is invested in a deal. The effect on reported IRRs can be large: Albertus and Denes (2024) estimate that using subscription lines increases reported IRRs by 1.9 percentage points on average.

As a PE fund’s portfolio companies mature, they are readied for exit and then sold on the stock market or to a strategic buyer or a financial buyer (another PE firm’s fund). Most LPAs require exit proceeds to be distributed to the fund’s partners (in accordance with the waterfall) instead of being reinvested into the fund. Plotting the net of a fund’s cumulative drawdowns and its cumulative distributions results in the famous J-curve. **Figure 1**, reproduced from Ljungqvist, Richardson, and Wolfenzon (2020), plots the average J-curve for a sample of PE funds raised between 1981 and 2000. Over that period, it took more than seven years for the average fund to “return capital,” with capital gains accruing in the final few years of the fund’s life. Investing in private equity thus requires an LP to have both patience and a long investment horizon.

In steady state, an LP’s portfolio of PE funds of different vintage years would generate sufficient distributions from older funds to meet capital calls from younger funds in expectation. In a steady-state portfolio, the LP is thus mainly exposed to the liquidity risk associated with the curves in Figure 1 shifting as drawdowns happen unexpectedly early and/or distributions are delayed or come in lower than expected, say as a result of a recession. Moreover, sudden changes in industry practices—such as the current waning popularity of subscription lines because interest rates have increased from record lows—can shift the J-curve in unexpected ways and thereby put strain on LPs’ liquidity management.

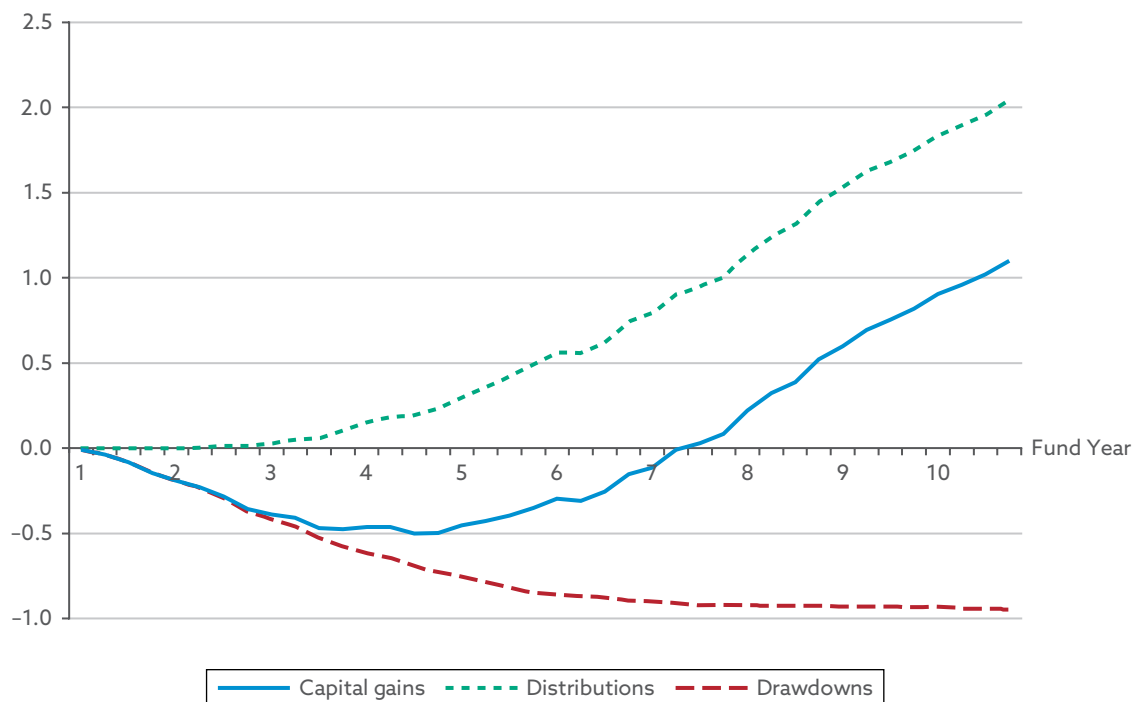
LPs cannot easily sell their fund interests. The LPA almost always gives the GP the right to veto the transfer of an LP’s fund interest. This is not to say that no such transfers take place—indeed, funds specializing in acquiring “secondary” stakes in PE funds raised a cumulative \$227 billion during 2018–2022, according to *Secondaries Investor*¹⁵—but there is no liquid marketplace in fund interests. Instead, specialized investment banking teams broker secondary sales by approaching potential buyers and inviting them to submit indicative bids, with the seller then negotiating with shortlisted bidders. According to Lerner and Schoar (2004), who study the United States, one reason why PE firms have resisted the emergence of a marketplace for fund interests may be tax law: US limited partnerships would lose their flow-through (untaxed) status under IRC Section 7704 if they were considered “publicly traded.”

¹³Axelsson, Jenkinson, Weisbach, and Strömberg (2013) provide a comprehensive discussion of the use of leverage in private equity deals.

¹⁴Source: <https://pitchbook.com/news/articles/pe-quantitative-data-deal-count-exit-liquidity-2023-forecast>.

¹⁵Source: www.secondariesinvestor.com/pe-secondary-funds-reach-best-q1-q3-period-ever.

Figure 1. J-Curve of PE Funds Raised in 1981–2000



Notes: “The figure shows average quarterly cumulative drawdowns for each year of a fund’s life (counted from 1 to 10), divided by committed capital; average quarterly cumulative distributions divided by committed capital; and quarterly net capital gains (the difference between distributions and drawdowns). The number of funds available for calculating these averages decreases over the fund years, as not every fund has completed a ten-year run of operation. The average fund draws down 14.7%, 22.6%, and 20.5% of committed capital in its first three years of operation. At the end of its fourth year, it is 72.9% invested, and at the end of its expected life (year 10) it is 94.7% invested. There are no further drawdowns beyond year 10. The average fund has returned its committed capital in the second quarter of its seventh year of operation. Funds sometimes have further distributions beyond year 10, which are not shown.”

Source: Ljungqvist, Richardson, and Wolfenzon (2020). Reprinted with permission.

THE PERFORMANCE OF PRIVATE EQUITY

How does private equity perform as an asset class? This seemingly straightforward question proves difficult to answer, for four principal reasons.

- Private equity is an opaque asset class: Although a PE fund has a duty to report its performance to its LPs (and, in the United States since 2012, to the SEC), it has no obligation to disclose its performance to the public. LPAs often explicitly bar LPs from sharing performance data they receive from a PE fund (and the SEC does not make individual fund disclosures public). Data availability thus constrains performance measurement.
- Private equity largely invests in private assets: Not being traded in financial markets, private assets cannot be marked to market easily, and estimating their value before exit is difficult.
- Private equity invests in illiquid assets: Illiquidity exposes a PE fund to the risk that there may be insufficient demand at an acceptable valuation when a portfolio company is ready to be exited.
- Private equity has long investment horizons: As the J-curve illustrates, PE funds are usually cash flow negative for many years before they begin returning capital, and they typically generate capital gains only toward the end of their lives.

Industry Practices

The PE industry usually reports three key performance indicators (KPIs) to LPs: IRR, TVPI, and DPI.¹⁶

IRR stands for internal rate of return and is well known from standard MBA textbooks. It measures the fund's annualized rate of return, considering the timing and magnitude of the fund's cash flows (i.e., its drawdowns and net-of-fees distributions). As such, an IRR can be computed only once a fund has been wound down at the end of its life, yet it is standard industry practice to report IRRs throughout a fund's life. To this end, a fund treats the estimated value of its unrealized portfolio holdings as a future terminal cash flow.

Because portfolio holdings are private and illiquid, estimating their value accurately can be challenging. Interim IRRs are thus, at minimum, noisy estimates of future performance. As I will discuss later, practitioners often worry that interim IRRs are manipulated, especially ahead of a PE firm's next fundraise. Even "final" IRRs may be misleading: LPs often worry that a GP may manipulate the fund's lifetime IRR—for example, by using subscription lines or by choosing the timing and size of the fund's investments in self-serving ways.

TVPI stands for total value to paid-in capital. It equals the total value of the net-of-fees distributions received by a fund's LPs to date plus the estimated value of unrealized portfolio holdings, divided by LPs' capital contributions. A TVPI greater than 1 indicates that the fund has

¹⁶Various data vendors attempt to obtain these privately reported KPIs for resale. A large proportion of academic research relies on data from such vendors. Selection and reporting biases are a natural concern when using such data.

generated positive returns. Like IRR, TVPI is subject to the challenge that unrealized portfolio holdings are private and illiquid and thus difficult to value accurately. Unlike IRR, TVPI ignores the time value of money. The same TVPI can thus yield very different returns. For example, doubling the fund's value over one year implies a 100% annualized return, whereas doubling its value over two years implies only a 41% annualized return. As every PE fund manager knows, time is the enemy of returns.

DPI stands for distributed to paid-in capital. It equals the total value of the net-of-fees distributions received by a fund's LPs to date divided by LPs' capital contributions. Unlike TVPI, DPI ignores unrealized portfolio holdings. Like TVPI, DPI ignores the time value of money. The J-curve shows the evolution of DPI along the positive part of its y-axis and to the right of the breakeven point.

IRR, TVPI, and DPI are all absolute KPIs—they do not adjust for the market return or for risk. According to survey evidence reported in Gompers, Kaplan, and Mukharlyamov (2016), LPs focus more on absolute KPIs than on risk-adjusted returns. To the extent that practitioners talk about relative performance, they have in mind benchmarking a PE fund's IRR, TVPI, and DPI against other PE funds. A fund placing in the top or second quartile might then be deemed to be performing well relative to other funds.

This benchmarking practice is quite different from how financial economists think about benchmarking performance. A financial economist's natural inclination would be to compute annualized risk-adjusted returns, to ensure an apples-to-apples comparison, and then to compare them not only within the PE asset class but also across all relevant asset classes. After all, investing in a PE fund involves the opportunity cost of not investing in another asset class (e.g., infrastructure or timber) that might be yielding a higher return for the same levels of risk and liquidity.

Academic Views of PE Performance

Standard academic practice is to benchmark a PE fund's performance against the performance of a strategy that invests the same amount of capital in a stock market index using the same drawdown and distribution schedules as the PE fund. The earliest implementation of this approach appears in Long and Nickels (1996), but the implementation that has become the standard measure in much of academic research is Kaplan and Schoar's (2005) public market equivalent (PME).

PME equals the ratio of the fund's net-of-fees distributions, discounted at the contemporaneous realized return on a suitable stock market index, and the fund's drawdowns, discounted at the contemporaneous realized return on the same stock market index.¹⁷ A PME greater than 1 indicates that the fund has generated a return in excess of the stock market index return.

PME is more than just intuitively appealing. Sørensen and Jagannathan (2015) show that PME is equivalent to measuring a PE fund's risk-adjusted performance using the formal capital asset

¹⁷Ljungqvist and Richardson (2003), who independently developed a PME measure, note that drawdowns associated with management fees (rather than with investments in portfolio companies) are a risk-free claim and so should be discounted at the risk-free rate rather than at the index return as in Kaplan and Schoar's (2005) PME.

pricing model of Rubinstein (1976).¹⁸ PME has a number of desirable properties: It does not require data on the riskiness of the individual portfolio companies or any estimation of any betas or the market risk premium. It is invariant to changes over time in the riskiness of a fund’s investments (e.g., as financial leverage changes). And, it cannot be manipulated by increasing the fund’s leverage or choosing the timing or size of the fund’s investments.

Broadly speaking, academic studies find that investors have historically done well when investing in PE funds, earning returns after fees that exceed those available contemporaneously in the PE markets. **Table 1** summarizes the results of seven highly cited studies that use PME to measure average historical performance in PE funds.

With the exception of the two studies that used data from Venture Economics that are no longer considered reliable,¹⁹ the academic consensus is that investment in private equity funds has historically yielded returns after fees that exceed those on the S&P 500 Index.²⁰

Whether these positive abnormal returns after fees mean that private equity beats the stock market in the sense of positive alpha remains an open question. The abnormal returns could simply compensate LPs for the greater risk, leverage, or illiquidity of PE funds.



Table 1. Performance of US PE Funds

Study	Data source	Vintages	PME	Benchmark
Ljungqvist and Richardson (2003)	Large LP	1981–1993	1.25	S&P 500
Kaplan and Schoar (2005)	Venture Economics	1980–1995	0.93	S&P 500
Phalippou and Gottschalg (2009)	Venture Economics	1980–1993	0.96	S&P 500
Robinson and Sensoy (2011)	Large LP	1984–2009	1.19	S&P 500
Higson and Stucke (2013)	Cambridge Associates	1986–2008	1.23	S&P 500
Phalippou (2014)	Preqin	1993–2010	1.20	S&P 500
Harris, Jenkinson, and Kaplan (2014)	Burgiss	1984–2008	1.27	S&P 500
Brown, Ghysels, and Gredil (2023)	Burgiss	1983–2014	1.10	CRSP-VW ^a

^aCRSP value-weighted index.

¹⁸Formally, Sørensen and Jagannathan (2015) show that PME is a valid performance measure if the LP has logarithmic preferences, the stock market index is chosen such that the return on the index equals the return on the LP’s entire portfolio, and the law of one price holds. Under these conditions, PME values a PE fund’s risky cash flows using a log-utility investor’s stochastic discount factor. Korteweg and Nagel (2016) derive a generalized PME measure.

¹⁹Venture Economics data have been shown to suffer from problems stemming from the valuation of unrealized investments and from stale data; see Stucke (2011) and Harris, Jenkinson, and Kaplan (2014) for further details. Venture Economics data are now rarely used in academic research on PE funds. Brown et al. (2015) provide an in-depth review of the pros and cons of data on PE fund performance from four other commercial vendors: Burgiss, Cambridge Associates, PitchBook, and Preqin.

²⁰See Tommar, Darolles, and Jurczenko (2024) for estimates of PMEs for a sample of non-US PE funds.

Driessen, Lin, and Phalippou (2012) find no evidence of outperformance when adjusting for risk using the CAPM and assuming that all PE funds have the same alpha and the same beta. As usual in asset pricing studies, what model is used to risk-adjust matters: Ewens, Jones, and Rhodes-Kropf (2013) find positive alpha when using a Fama–French three-factor model instead of the CAPM. The three-factor model may provide a better benchmark than the CAPM, to the extent that PE portfolios load on small size and value.

Gupta and van Nieuwerburgh (2021) consider an even richer set of risk factors and depart from the literature by using expected returns rather than the realized returns on traded assets that underpin PME. Their conclusion is that PE funds generate negative abnormal returns after fees on a risk-adjusted basis. Boyer et al. (2023) take yet another approach: They infer returns from the negotiated prices at which LP interests in PE funds change hands in secondary transactions, concluding that PE funds do not outperform on a risk-adjusted basis.

These and similar studies are difficult to compare because each uses a different dataset and adjusts for risk in a different way, making many different assumptions along the way. Consensus on whether PE funds generate positive risk-adjusted alpha after fees thus remains elusive.²¹

The fact that PE deals are more highly leveraged than the companies in the S&P 500 has long troubled scholars of PE performance, notwithstanding Sørensen and Jagannathan's (2015) analytical finding that PME is invariant to leverage. L'Her, Stoyanova, Shaw, Scott, and Lai (2016) find zero alpha when using a levered size- and sector-adjusted index to adjust for risk and leverage. In a thought-provoking study, Stafford (2022) shows that PE funds underperform a leveraged strategy of investing in small value firms that are listed on the stock market. Ang, Chen, Goetzmann, and Phalippou (2018), using a Bayesian approach, reach a different conclusion: In their model, PE returns cannot be replicated using listed stocks.

Besides risk and leverage, positive abnormal returns after fees could compensate LPs for liquidity risk. Financial economists have studied three types of liquidity risk in this context. The first results from the exposure of the returns on a PE fund's portfolio companies to unexpected fluctuations in marketwide liquidity, a factor that Pástor and Stambaugh (2003) show is a priced risk factor in public equity markets. Franzoni, Nowak, and Phalippou (2012) estimate a four-factor model that includes a Pástor–Stambaugh liquidity factor alongside the three Fama–French factors. Finding an insignificant alpha, they conclude that PE funds generate returns after fees that compensate LPs for this type of liquidity—but no more than that. Ang et al. (2018) also find that PE returns load on a proxy for market illiquidity, but only partly: Some positive alpha remains after accounting for exposure to marketwide liquidity risk.

The second type of liquidity risk arises because absent a liquid secondary market, LPs cannot easily exit a fund over its 10-year life should their portfolio needs change. Sørensen, Wang, and Yang (2014) incorporate this type of liquidity risk into a dynamic portfolio choice model. Their conclusion is that PE funds' observed abnormal returns after fees are just about large enough to compensate LPs for being locked into a 10-year commitment that is difficult to hedge.

The third type of liquidity risk relates to the J-curve. Having committed capital to a fund, LPs run the risk of receiving capital calls when liquidity is expensive. Robinson and Sensoy (2016) argue that this type of liquidity risk is unlikely to be material on average because drawdowns

²¹For an in-depth technical review of empirical methods to risk-adjust PE returns, see Korteweg (2019).

(and distributions) are procyclical. As they put it, capital calls made in good times carry a relatively low opportunity cost. Moreover, they find that much of this type of liquidity risk is fund-specific and can thus be diversified away by holding a portfolio that is diversified across funds within vintage and across vintages. Still, some funds will be prone to making capital calls when economic conditions are weak, and most LPs thus value liquidity more highly. Robinson and Sensoy (2016) show that LPs in such funds earn a return premium for such countercyclical behavior.

Return Persistence and Performance Drivers

Beyond the question regarding whether PE funds deliver positive alpha after fees, academic studies have investigated two properties of PE performance: return persistence across a PE firm's funds over time, and the drivers of return differences across funds of different vintages. Kaplan and Schoar (2005) were the first to study persistence, finding that in the 1980s and 1990s, PE firms that outperformed their peers in one fund were likely to continue outperforming their peers in subsequent funds.²² Persistence is seen as indicative of GP skill. Using different data and empirical approaches, Robinson and Sensoy (2016), Korteweg and Sørensen (2017), and Gupta and van Nieuwerburgh (2021) likewise find evidence of persistence, although Harris, Jenkinson, Kaplan, and Stucke (2023) and Braun, Jenkinson, and Stoff (2017) show that persistence has weakened over time at the fund and the deal level, respectively. The return spread can be large: Korteweg and Sørensen (2017) estimate that top-quartile funds persistently outperform bottom-quartile funds by 7–8 percentage points a year. Return persistence in private equity contrasts sharply with that of mutual funds, for which past performance is viewed as a poor predictor of future performance.

Whether LPs can exploit persistence in practice is open to question: Many studies estimate persistence from the realized returns funds will earn over their approximately 10-year lifetimes, yet PE firms raise new funds every 3–5 years, well before the final returns on their current funds are realized and publicly known. When deciding to invest in a new fund, LPs therefore have to make do with publicly available data on the current fund's interim KPIs (such as net-of-fee IRRs to date, TVPI, and DPI). Interim performance is a much noisier predictor of the next fund's performance than the current fund's lifetime return once realized in the future. Based on this insight, Hochberg, Ljungqvist, and Vissing-Jørgensen (2014) propose a model in which LPs that invest in a PE firm's current fund have an information advantage over other potential investors in the next fund, in the form of access to "soft" information about the GP's ability to persistently generate high returns. This information advantage gives current LPs bargaining power vis-à-vis the GP. The model can explain the empirical regularity that PE firms tend not to raise their fees in line with their performance and instead "price" their funds to have excess demand from LPs. Investors in earlier funds then earn abnormal returns in later funds as they can "hold up" the GP by threatening not to invest in the next fund, which other market participants with access only to public information would interpret as a negative signal in the familiar adverse-selection sense.

²²Part of the observed return persistence is mechanical because consecutive funds are raised only a few years apart and so are subject to similar macroeconomic conditions. (Depending on the investment restrictions in their LPAs, consecutive funds may even have investments in common.)

Besides past performance, two robust predictors of future performance are (1) how much capital flows into the PE industry at the time of the fund's inception and (2) the pricing and availability of high-yield debt. Consistent with Gompers and Lerner's (2000) idea that too much money spent chasing deals simply drives up entry multiples, Ljungqvist and Richardson (2003) find that the more money raised in a fund's vintage year, the worse the fund's subsequent performance. Axelson et al. (2013), Harris, Jenkinson, and Kaplan (2014), and Tommar, Darolles, and Jurczenko (2024) report similar findings.²³ Unsurprisingly given the PE industry's reliance on leverage, dealmaking is highly sensitive to the price and availability of high-yield debt. Ljungqvist and Richardson (2003) report that PE funds deploy their committed capital more slowly when corporate bond yields are higher. Axelson et al. (2013) find that leverage in PE deals is procyclical: PE funds use more leverage when debt is cheap.

How this unsurprising behavior affects fund returns is perhaps more surprising: Axelson et al. (2013) show that for the PE industry as a whole, realized PME's are lower in fund vintages that face cheap debt during their commitment period. Their explanation is that PE funds overpay: Cheap debt simply drives up entry multiples, similar to the effect of inflows of capital into the PE industry. In summary, times of abundant LP capital and times of abundant, cheap debt both appear to be associated with lower returns in PE.

²³Robinson and Sensoy (2016) take issue with these findings, reporting that vintage-year inflows cease to predict future performance when switching from absolute performance metrics such as IRR to relative performance metrics such as PME (notwithstanding the fact that both Axelson et al. [2013] and Harris, Jenkinson, and Kaplan [2014] find predictability using PME).

PERFORMANCE ATTRIBUTION AND VALUE CREATION

The private equity industry prides itself on improving and transforming its portfolio companies and thereby creating value for its investors and for society. In the words of the CEO of the American Investment Council, an industry association representing PE firms, “Private equity investments are a major driver of economic growth by supporting small businesses and paying high wages to the millions of workers those businesses employ.”²⁴ His counterpart at Invest Europe notes that “private equity is a positive force for Europe’s economy and society, securing employment and creating jobs both in good times and periods of crisis alike.”²⁵

Critics of private equity contend that far from creating value, PE firms enrich themselves and their investors at the expense of other stakeholders—notably employees who lose their benefits or even their jobs as private equity owners cut costs and restructure underperforming businesses.²⁶ Another common criticism is that PE firms load up their portfolio companies with debt in irresponsible ways and focus excessively on short-term gains at the expense of long-term value creation or the environment.

The question is, Do the positive abnormal returns after fees that PE funds have historically generated for their investors reflect the creation or the redistribution of value?

Industry Practices

Standard practice in the PE industry is to measure value creation as the difference between what a PE fund bought a portfolio company for and what it later sold it for (adjusted for changes in leverage). This change in valuation is then broken down using the “value bridge,” a tool rooted in accounting. The value bridge decomposes the change in a portfolio company’s value between acquisition and exit into the change in EBITDA profitability that accompanies revenue growth and cost reductions during the ownership period (“margin expansion”), the change from the entry multiple to the exit multiple (“multiples expansion”), and the reduction in debt.²⁷

The change in valuation between acquisition and exit is an absolute measure of value creation, just as IRR, TVPI, and DPI are absolute measures of performance. An obvious shortcoming of an absolute measure of value creation is that profitability and multiples might increase for reasons unrelated to PE ownership and so would have increased anyway: Maybe the portfolio company was bought at the bottom of the business cycle and its profitability increased simply because the economy recovered; maybe multiples expanded because the stock market boomed during the ownership period.

²⁴See www.investmentcouncil.org/new-ey-report-private-equity-fuels-job-growth-high-wages-and-small-businesses-2.

²⁵See www.investeurope.eu/media/5169/ie_pe_at-work_report_online_220413.pdf.

²⁶One prominent German politician, Franz Müntefering, called PE firms “irresponsible locusts” for destroying jobs in their pursuit of short-term profits.

²⁷In Gompers, Kaplan, and Mukharlyamov’s (2016) survey, GPs rank “growth in the value of the underlying business” and “operational improvements” as the most important drivers of deal-level returns, well ahead of “leverage” and “industry-level multiple arbitrage.”

Academic Views of PE Value Creation

To a financial economist, absolute measures of value creation and accounting-based approaches such as the value bridge are meaningless. Only that part of the valuation increase that would not have happened *but for* a PE fund's investment in a portfolio company can be attributed to the PE fund as its value creation. Measuring the extent to which private equity creates economic value thus requires a benchmark, or counterfactual, for what would have happened absent the PE fund's investment. In other words, measuring value creation is inherently a relative exercise.

The “but for” qualifier is key: If PE funds simply invest in portfolio companies whose operations and performance were about to improve regardless of PE ownership, they are simply stock pickers and cannot be credited with creating economic value. In academic parlance, stock picking leads to a selection effect (returns to LPs are high because PE funds pick future winners), while value creation manifests as a treatment effect (returns to LPs are high because PE funds *causally* increase the value of their portfolio companies during the ownership period).

But even if PE funds create economic value at their portfolio companies in this causal-treatment sense, it is possible that they do so at the expense of another party. In other words, creating “private value” for their investors need not imply that PE funds create “social value” for the economy as a whole. The creation of social value can be likened to increasing the size of the economic pie. Activities that do not increase the size of the economic pie may create private value for investors, but they do not create social value for the wider economy. Instead, such activities create value for one party at the expense of another.

An example of an activity that arguably does not increase the size of the pie is stock picking. Suppose a GP is simply good at spotting undervalued companies and effects no productive changes at its portfolio companies during the ownership period. Such a GP may well generate positive abnormal returns after fees for its LPs, but their gain exactly equals the loss suffered by shareholders who unwittingly sold too cheaply. A similar argument applies to market timing. Suppose a GP is simply good at exiting its portfolio companies when multiples are about to peak but has effected no productive changes during the ownership period.²⁸ Like stock picking, market timing redistributes value from one party to another without creating social value.

Finally, even if private equity were found to create value in the economic-pie-size-increase sense, there may still be winners and losers—say, in the form of satisfied investors and customers on the one hand and workers who are laid off during portfolio company restructuring on the other hand. This raises the question of to what extent private equity imposes negative externalities on parts of the economy.²⁹ For example, leveraging up portfolio companies may improve

²⁸In reality, GPs may or may not be good at timing. Jenkinson, Morkoetter, Schori, and Wetzter (2022) estimate that the average PE deal in the United States and Europe experienced a 0.32 EBITDA multiple expansion in 1998–2019, which they conclude is consistent with modest market-timing ability. On the one hand, Gredil (2022) reports that GPs are good at timing their exits to coincide with industry-level peaks in public-market valuations, perhaps because sitting on the boards of many public firms, they may learn non-public information that helps predict industry-level returns. Harford and Kolasinski (2014), on the other hand, find no evidence that stock market listed buyers suffer when acquiring a PE fund's portfolio company: Their share prices increase at the announcement of the acquisition and subsequently perform in line with the market.

²⁹Externalities arise when third parties suffer costs or enjoy benefits as a result of the decision maker's choice, which the decision maker had no reason to take into account. For instance, immunizing our children reduces the risk of infection

risk-adjusted returns to investors by reducing corporate tax bills and improving managerial incentives. The reduction in tax payments, however, may lead to adverse changes in tax policy that hurt others, while overleveraged portfolio companies that go bankrupt may disrupt life in local communities.

Evidence of Private Value Creation

To find out whether PE funds create economic value at their portfolio companies, financial economists have asked whether PE ownership results in efficiency and productivity gains that would not have materialized absent PE ownership and whether PE ownership results in more R&D, more innovation, improved product quality and variety, and ultimately higher sales than would have materialized absent PE ownership. In this section, I review studies of the changes portfolio companies undergo while under PE ownership. Although fascinating, much of this body of work struggles to disentangle selection and treatment. The extent to which PE funds create private value, rather than picking winners, thus remains an open question.

The early literature focused on two PE value-creation strategies: financial engineering and governance engineering. Lowenstein (1985) noted that leveraging portfolio companies could increase company value by increasing interest-related tax deductions. Studying the kind of leveraged buyouts of stock market listed firms that were characteristic of the 1980s, Kaplan (1989b) estimated the tax benefits to account for 21% to 143% of the premium paid to shareholders in the median leveraged buyout. In other words, tax benefits appear to be a main source of the expected gains in the leveraged buyouts Kaplan (1989b) studied.³⁰

The 1980s were also marked by a high level of hostility in leveraged buyouts. The public corporation was seen by many as rife with agency conflicts between managers and dispersed, passive shareholders. Michael Jensen's influential 1986 article, "Agency Costs of Free Cash Flow, Corporate Finance, and Takeovers," provided the intellectual foundation for the view that public companies were ineffectively governed. The solution, according to Jensen (1989), was private equity, which could eliminate "much of the loss created by conflicts between owners and managers" by better alignment of interests between managers and active owners.

Kaplan (1989a) attributed the large improvement in industry-adjusted operating performance in his sample of 1980s buyouts to better incentives. These incentives can be substantial: Gompers, Kaplan, and Mukharlyamov (2016) report that PE funds on average allocate 17% of portfolio company equity to management and employees.

Although financial and governance engineering have not gone away, recent research has focused more on operational engineering: Do PE funds make their portfolio companies more efficient? To see why this question is challenging to answer convincingly, consider the well-cited study by Bloom, Sadun, and van Reenen (2015). The authors report that according to their management-evaluation index, PE portfolio companies are better managed than companies with other types of owners. But because their data are cross-sectional, the authors cannot

for everyone, an example of a positive externality. Air pollution from a factory increases medical costs in surrounding areas, an example of a negative externality.

³⁰Financial engineering need not solely be about exploiting as yet unexploited tax shields. As Ivashina and Kovner (2011) show, companies can borrow more cheaply once acquired by a PE fund, as lenders set loan terms based on their knowledge of the PE firm's performance in past deals and as banks hope to sell other services to the PE firm.

disentangle whether PE ownership improves management practices in a treatment sense or whether instead PE funds selectively invest in companies that are already well managed to begin with.

As the example of Bloom, Sadun, and van Reenen's (2015) study shows, establishing a PE treatment effect at minimum requires observing portfolio companies before, during, and (ideally) after PE ownership (and even then, selection effects are difficult to rule out, as I will argue). Methodologically, the current state of the art in the literature is to compare the evolution of PE portfolio companies during the PE ownership period to that of "control" firms with similar characteristics that did not receive PE investment. Any remaining differences in performance between the two groups are then attributed to PE ownership. The implicit assumption is that *absent PE ownership*, portfolio companies would have performed similarly to the control companies on average. The characteristics typically controlled for in this "control firm" approach include, at minimum, size, industry, and year.

When measured this way, there is ample evidence that portfolio companies undergo significant operational changes during the PE ownership period. Using proprietary data on 395 portfolio companies of 48 European PE funds, Acharya, Gottschalg, Hahn, and Kehoe (2013) report that portfolio companies grow sales and profitability faster than the median stock market listed firm in the same industry during the ownership period. Using confidential data from corporate income tax returns, Cohn, Hotchkiss, and Towery (2022) report similar evidence for the United States, showing that portfolio companies experience rapid growth in sales and moderate growth in profitability compared with control firms matched on industry and prior profitability and leverage. Using French tax data, Boucly, Sraer, and Thesmar (2011) find that similar patterns hold in France.³¹

What might underlie these headline increases in profitability? In an early study, Lichtenberg and Siegel (1990) use data from the US Census Bureau to show that manufacturing plants owned by PE portfolio companies through the 1980s increased their total factor productivity (i.e., their output per unit of total input) by significantly more than the industry average as white-collar employment and wages fell. Using more recent US Census Bureau data, Davis, Haltiwanger, Handley, Jarmin, Lerner, and Miranda (2014) confirm that portfolio companies experience an increase in productivity compared with control firms matched on industry, size, age, and prior growth. Their establishment-level data allow them to show that productivity grows as portfolio companies exit their less productive units, expand their more productive units, and create new, more productive establishments. This reshuffling of production assets entails high gross labor turnover as employees are hired and fired, although the net job loss is found to be relatively small.

Using similar data for a longer period, Davis, Haltiwanger, Handley, Lipsius, Lerner, and Miranda (2021) show that employment declines after buyouts of listed companies and expands after buyouts of unlisted companies. Gornall, Gredil, Howell, Liu, and Sockin (Forthcoming) find that although wages are unchanged on average, job satisfaction ratings drop at portfolio companies.

³¹The only setting in which portfolio companies do not appear to experience much growth is in public-to-private transactions. In the United States, when PE funds take stock market listed firms private, operating margins do not improve significantly (Cohn, Mills, and Towery 2014; Guo, Hotchkiss, and Song 2011). These findings contrast with older evidence reported in Kaplan (1989a), which suggested that public-to-private deals were associated with performance improvements in the 1980s.

For Sweden, Olsson and Tåg (2017) report similarly small net employment changes overall, but they also find large increases in the likelihood of unemployment for workers at less productive portfolio companies and among workers who perform easily offshorable routine tasks. For Germany, Antoni, Maug, and Obernberger (2019) find reductions in employment and compensation during the ownership period, especially among managers and older workers. For France, Boucly, Sraer, and Thesmar (2011) find *faster* (net) growth in employment among portfolio companies along with an increase in capital expenditure during the ownership period. Overall, the effect of private equity on employment appears to be highly context dependent.

What about innovation? For the United States, Lichtenberg and Siegel (1990) report that in the 1980s, PE portfolio companies increased their innovation intensity (as measured by the ratio of R&D spending to sales) more during the ownership period than the average firm did. Lerner, Sørensen, and Strömberg (2011) report that portfolio companies produced higher-quality innovation (as measured by patent citations). For the United Kingdom, Amess, Stiebale, and Wright (2016) report a significant increase in innovation (as measured by patenting) during the ownership period.

Collectively, these studies show that portfolio companies undergo significant changes while owned by a PE fund. This insight raises two questions: Do company-level operational improvements affect the financial returns a PE fund generates for its LPs? And are these company-level operational improvements *caused* by the PE fund (treatment), or would they have happened anyway (selection)?

In an important study, Acharya et al. (2013) tackle the first question. They report that PE funds earn higher financial returns the more a portfolio company's sales and profitability have increased during the ownership period. This dynamic establishes a potential link between the changes portfolio companies undergo while owned by a PE fund and the returns that the fund's LPs earn.

Whether the link is real or spurious depends on whether the changes would have happened anyway. Surely it is true that PE funds select portfolio companies based at least in part on factors that outsiders (such as financial economists) do not observe and so cannot hold constant. Specifically, suppose PE funds selectively invest in companies that have reached an inflection point at which past managerial decisions and actions will result in above-average growth in sales and profitability. If so, PE funds do not *cause* the observed operational improvements, and the observed link between growth and investor returns reflects stock-picking skills rather than true economic value creation.

For the second question, disentangling selection and treatment is methodologically challenging for obvious reasons: We can never observe the counterfactual world in which a PE fund's portfolio company is not acquired by the PE fund. Biesinger, Bircan, and Ljungqvist (2023) use confidential textual data contained in pre-deal investment memos and value creation plans in a first attempt to disentangle selection and treatment. The unique feature of these textual data is that they reveal what plans were *already* underway at a prospective portfolio company and what additional actions the PE fund intended to take during the ownership period in order to create value in ways that would not have happened but for its investment.

Biesinger, Bircan, and Ljungqvist (2023) find that the typical operational improvements usually attributed to private equity reflect a mixture of treatment and selection effects. PE funds invest in companies that have already reached inflection points at which prior management plans are

likely to lead to industry-beating operational improvements and growth in sales and profitability. The PE funds know this information thanks to their extensive pre-deal due diligence; outsiders, such as financial economists studying PE performance, do not. According to Biesinger, Bircan, and Ljungqvist (2023), much of what happens to a portfolio company's income statement during the ownership period thus appears to have little to do with PE ownership. It is only on a portfolio company's balance sheet that PE ownership appears to make a difference—both in terms of leverage and in terms of higher asset growth driven by increased capital expenditure and acquisitions and divestitures of operating units. Tying company-level changes to deal-level returns, Biesinger, Bircan, and Ljungqvist (2023) conclude that PE funds create financial value for their LPs through a combination of stock-picking skills and value-add activities focused on the asset side of the balance sheet, while financial engineering activities on the liability side of the balance sheet do not increase deal-level returns.

Evidence of Social Value Creation

Does private equity contribute to the common good? No single study can answer this important question comprehensively. Instead, financial economists have studied specific settings to help determine whether the creation of private value for investors entails externalities (negative or otherwise).

One line of enquiry emphasizes that operational improvements at PE portfolio companies may generate positive externalities for other companies in the same industry. By helping their portfolio companies become more formidable competitors, the argument goes, PE firms raise operational and managerial standards industrywide. Consistent with this argument, Bernstein, Lerner, Sørensen, and Strömberg (2017) and Aldatmaz and Brown (2020) report that industries with greater PE activity increase sales and employment significantly faster.

There has been a recent boom in studies that exploit detailed non-accounting data to shed light on winners and losers in the wake of PE investments. Fracassi, Previtiero, and Sheen (2022) study PE investments in consumer goods companies. Using supermarket scanner data, they show that PE portfolio companies raise prices to end-consumers only marginally, suggesting that the overall growth in sales documented in studies such as Acharya et al. (2013) may reflect a quantity effect rather than a price effect. If so, value for investors might not be created at the expense of consumers. Moreover, portfolio companies are more likely to introduce new products and to increase product variety than similar non-PE companies, which may increase economic welfare if consumers derive utility from new products and greater variety.

Cohn, Nestoriak, and Wardlaw (2021) study workplace safety, reporting that PE portfolio companies experience a reduction in Occupational Safety and Health Administration (OSHA) safety violations and worker injury rates during the ownership period, compared with control firms matched on industry and size. In a similar spirit, Bernstein and Sheen (2016) report that health inspection records improve at restaurant chains acquired by PE funds. These findings suggest that PE funds do not seek to create value for investors at the expense of safety standards for workers or diners.

Kirti and Sarin (2024) study PE investment in life insurance companies, finding that the main sources of value creation are financial engineering and a post-Global Financial Crisis regulatory loophole allowing insurers to shift their investment portfolios into lower-grade bonds without triggering higher capital requirements. The effects on policyholders are nuanced: PE-owned life

insurers offer consumers lower-priced insurance products, but because they take greater risk, consumers are exposed to greater losses when things go wrong.

PE investment in the health care industry has long been contentious. For example, the 2006 acquisition of HCA (formerly known as Hospital Corporation of America) by Bain Capital, KKR, and Merrill Lynch was controversial, with critics worrying that cost-cutting would adversely affect patient care and service quality.³² A quartet of recent papers study PE investment in health care, without reaching a consensus.

Using a traditional control-firm approach, Gao, Sevilir, and Kim (2021) report that hospitals acquired by PE funds improve their operational efficiency without compromising health care quality at patients' expense. Using instead a structural approach in combination with proprietary health insurance claims data, Liu (2021) finds that PE investment leads to higher health care costs—first because PE-owned hospitals negotiate price increases with private insurers that average 69%, and second because other local hospitals piggyback on these increases in reimbursement rates by negotiating higher reimbursement rates of their own, averaging 8%. Operational efficiency improves as well, but it does so only marginally and not enough to offset the price increases.

Using an instrumental variables approach to tease out causality, Gupta, Howell, Yannelis, and Gupta (2024) report higher mortality rates among Medicare patients in nursing homes owned by PE funds than at other nursing homes. The authors do not consider whether nursing home acquisitions create value for investors, however. It is thus unclear whether PE funds created value at the expenses of patients or whether these were deals that destroyed value for investors and so were mistakes that will not be repeated. Finally, Gandhi, Song, and Upadrashta (2023) provide nuance to Gupta et al.'s (2024) findings, showing that patients are harmed only when local competitive pressures are low: In competitive local markets, care homes owned by PE firms instead offer greater quality of care.

Bearing in mind that much of the work on PE investment in health care has yet to be peer reviewed, the verdict on the desirability of PE investment in the health care industry remains uncertain.

Focusing on PE investment in higher education, Eaton, Howell, and Yannelis (2020) report that at higher education institutions acquired by PE funds, tuition rates and student debt levels rise while graduation rates, loan repayment rates, and future earnings fall in comparison to other observably similar for-profit schools. In other words, in the average higher-education deal in Eaton, Howell, and Yannelis's (2020) sample, PE funds created value for their LPs at the expense of students and the local labor market. Ewens, Gupta, and Howell (2022) paint a similarly negative picture of negative externalities when local newspapers are acquired by PE funds: Voter turnout falls in subsequent local elections.

Finally, a trio of recent papers study the environmental performance of PE portfolio companies. Shive and Forster (2020) focus on greenhouse gas emissions, reporting that PE portfolio companies pollute no more than stock market listed firms matched on industry, time, location, and other firm characteristics (although both groups pollute more than similar privately held firms). Bellon (2022) focuses on environmental pollution in the oil and gas fracking industry, reporting

³²For example, <https://observer.com/2006/08/a-healthcare-deal-thatll-make-you-sick/>.

that PE portfolio companies use fewer toxic chemicals at their wells, and emit less CO₂ by flaring off, than matched companies—but only if the expected environmental liability is high. Andonov and Rauh (2023) report that power plants owned by PE funds operate more efficiently, as measured by fuel consumption relative to the amount of power generated.

In conclusion, the emerging literature on the externalities of private equity suggests that PE investment creates both winners and losers. It thus becomes difficult to say whether private equity creates social value *even if the size of the economic pie increases*. Weighing one party's loss against another party's gain requires a tricky value judgment on which reasonable people can reasonably disagree. Even so, the existence of losers provides a rationale for government policy intervention to better align PE firms' incentives for private and social value creation.

THE LP PERSPECTIVE

Private equity is a challenging asset class. Although PE has historically generated positive abnormal returns after fees on average, the return spread between bottom-quartile and top-quartile funds is large. Manager selection is thus critical, as are other aspects of a PE investment program (liquidity management, mentioned earlier, being an obvious example).

Perhaps not surprisingly, then, research suggests that an LP's performance when investing in private equity depends on the LP's sophistication. Lerner, Schoar, and Wongsunwai (2007) report that in the 1990s, private university endowments realized returns on their PE portfolios that were 4.4% higher than the average LP's (although, according to Sensoy, Wang, and Weisbach [2014], this return differential has since narrowed substantially). Cavagnaro, Sensoy, Wang, and Weisbach (2019) infer LP skill from the statistical fact that the rate at which some LPs consistently invest in top-performing PE funds is greater than chance (i.e., luck) alone would predict if all LPs shared the same skill. The authors conclude that an LP's skill in selecting the best GPs is an important driver of LP returns.

In this section, I review academic research on various aspects of investing in PE that are of relevance and concern to LPs when forming and managing a portfolio of PE funds.

Manager Selection

If it is true that PE performance is persistent, shouldn't it be easy to select follow-on funds simply based on the previous fund's performance? Korteweg and Sørensen (2017) tackle this question by estimating whether persistence is investable in the sense that past performance is sufficiently informative to identify GPs with the skill needed to reliably generate high returns in the future. They find little investable persistence, partly because performance is noisy and partly because few GPs are skilled. This conclusion shifts the focus of manager selection away from past performance and toward detailed due diligence to understand a GP's access to high-quality deal flow; its value-creation strategy, team, and resources; and thus its potential for generating high returns on its next fund. In other words, it takes skill to identify a skilled GP. If so, it is not surprising that LPs differ systematically in the performance they earn on their PE portfolios.

If the necessary skills are subject to scale economies, we expect institutional investors that invest in these skills to allocate a larger fraction of their portfolio to private equity and to experience better performance. Consistent with this prediction, Dyck and Pomorski (2016) find that larger LPs earn higher returns on their PE allocations than smaller LPs.

Diseconomies in Fund Size

Successful GPs not only can raise follow-on funds but also can raise larger funds and thus earn fees on higher assets under management (AUM). Raising a larger fund implies doing larger deals or doing more deals—or both. But to what extent does GP skill scale? If it does not scale,

good performance in the previous, smaller fund should not be a predictor of good performance in the next, larger fund.³³

Lopez-de-Silanes, Phalippou, and Gottschalg (2015) note that financial engineering and governance engineering should scale easily, whereas operational engineering could be much harder to scale up because its implementation requires skilled human capital that may be in short supply, at least in the short run. How returns depend on fund size may thus be an empirical question. Using granular deal-level data, the authors show that when a PE firm is busy with many other deals, the deals done during this time subsequently underperform, suggesting both that PE firms do more than just engage in financial engineering and governance engineering and that there are diseconomies of scale from taking on more deals.

From a prospective LP's perspective, the critical due diligence question when facing a large increase in fund size becomes whether the GP is likely to be able attract sufficiently skilled investment professionals to put a larger amount of capital to work in its next fund.

Gaming

GPs are intermediaries: To a large extent, they invest "OPM" (other people's money), acting as agents on behalf of their principals (i.e., the LPs in their fund). As noted earlier, this principal-agent relationship is governed by the LPA, which is signed at the closing of the fund, stays in force for the fund's 12-or-so-year term, and gives the GP broad discretion over how the fund is managed. The twin insights (1) that an agent will not, in general, behave in the principal's best interest when the principal cannot fully observe the agent's actions and the agent is better informed and (2) that contracts (such as an LPA) designed to incentivize and constrain an agent's self-interested behavior will necessarily be incomplete are a foundation of modern corporate finance going back to the 1970s. LPs should thus be prepared for conflicts of interest when investing in PE funds.³⁴

The structure of GP compensation can easily give rise to misaligned incentives. GPs receive convex payoffs, both directly through their carried interest (which pays them a fixed percentage of capital gains—say 20%, when the fund does well—without penalizing them when the fund does poorly) and indirectly through their ability to raise a larger follow-on fund (with larger dollar management fees) when their current fund performs well (Metrick and Yasuda 2010).³⁵ When payoffs are convex in this way, agents can find it in their interest to take greater risks than principals would want them to: "Heads I win, tails you lose."

The use of leverage may aggravate this problem, especially when debt is cheap (Axelson et al. 2013). A comprehensive analysis of the effects of GP compensation practices on GP risk-taking would therefore be welcome. Within the context of first-time funds, Ljungqvist, Richardson, and Wolfenzon (2020) show theoretically and confirm empirically that first-time GPs make

³³The empirical relation between fund size and fund performance is essentially flat in the cross-section (Kaplan and Schoar 2005; Robinson and Sensoy 2013; and Harris, Jenkinson, and Kaplan 2014), although the perhaps more salient question of whether a large increase in fund size predicts lower performance in the GP's next fund remains unanswered.

³⁴Magnuson (2018) provides a detailed legal perspective on agency conflicts in private equity.

³⁵Chung et al. (2012) quantify the importance of these two sources of pay-for-performance, showing that they are equal in magnitude.

riskier bets in an effort to establish a track record that, if the bets pay off, will allow them to raise a second fund and stay in business.

Robinson and Sensoy (2013) investigate LPs' recurrent concern that GPs earn excessive management fees but find no evidence that high-fee funds underperform low-fee funds after fees. The same appears to be true for the carried interest, which also does not predict after-fee returns. The finer details of GPs' compensation formulas, however, appear to distort GP incentives. Robinson and Sensoy (2013) also find that PE funds time their portfolio exits in a self-serving manner. They tend to accelerate portfolio company sales during the "catch-up" period of their compensation waterfall (which has the effect of increasing their carried-interest payoff). In addition, PE funds tend to delay the sale (or write-off) of underperforming portfolio companies once the basis for the management fee switches from committed capital to net invested capital (which has the effect of increasing the amount of management fees that PE funds can charge).

A different type of conflict of interest can arise in connection with follow-on fundraising. To stay in business long term, a GP has to raise follow-on funds; the performance of the GP's current fund affects the GP's ability to raise the next fund (Chung, Sensoy, Stern, and Weisbach 2012; Hochberg, Ljungqvist, and Vissing-Jørgensen 2014; Barber and Yasuda 2017). The problem for potential LPs is that GPs, in order to be able to invest beyond their current fund's commitment period, need to raise their next fund before the current fund has realized all its investments. The current fund's reported performance thus consists of (objective) cash flows from realized investments and (more or less subjective) accounting valuations of unrealized portfolio companies. This situation raises the concern that GPs may game reported valuations.³⁶

The academic evidence on this type of gaming is mixed. Using fund-level data, Barber and Yasuda (2017) report that PE firms time their fundraising to coincide with a peak in their current fund's reported performance—and not just because they naturally tend to fundraise in the wake of successful exits. Even for funds with few successful exits (and those with low reputation), fundraising still coincides with peak performance, leading Barber and Yasuda (2017) to conclude that desperate GPs inflate their reported net asset values (NAVs). Also using fund-level data, Brown, Gredil, and Kaplan (2019) similarly find that although struggling GPs inflate NAVs during fundraising, LPs aren't fooled by the deception. Albertus and Denes (2024) show that GPs use subscription lines to juice up their reported IRRs ahead of fundraising.

Hüther (2023) comes to a very different conclusion using deal-level rather than fund-level data. The author shows that in club deals (i.e., when two or more GPs invest in the same portfolio company), there is no significant difference in the valuations reported by different GPs for the same deal, regardless of whether a GP is engaged in fundraising. Why then does fund-level data suggest NAV manipulation? Hüther (2023) argues that it is not NAVs that are being inflated ahead of fundraising. Instead, struggling GPs rush to do bad (i.e., overpriced) deals ahead of fundraising, because contractually, fundraising cannot begin until a pre-agreed fraction of the current fund's committed capital is invested. These deals subsequently underperform (i.e., have to be marked down), creating the appearance of the PE firm raising its next fund at the current fund's valuation peak.

³⁶In a speech in 2013, a senior SEC official expressed the concern as follows: "One type of manager misconduct that we've observed involves writing up assets during a fund raising period and then writing them down soon after the fund raising period closes." See www.sec.gov/news/speech/2013-spch012313bk.htm.

Disintermediation

One of the most prominent changes in the PE industry since the Global Financial Crisis, which brought club deals to an end, is that co-investment programs have become a staple feature. Such programs allow selected LPs to invest directly in a portfolio company alongside the PE fund, usually on a “no-fee-no-carry” basis. An LP who co-invests will thus pay a lower blended fee on the combination of its direct and indirect stakes in the portfolio company. The GP, in turn, can draw on a larger pool of capital and thus do larger deals or keep within the fund’s concentration limits.

Co-investment requires skill and resources: Once offered the opportunity to co-invest in a deal, the LP conducts its own due diligence on the deal before deciding whether or not to co-invest. Not surprisingly, therefore, co-investment programs are more common among larger, more sophisticated LPs (especially sovereign wealth funds).

Whether LPs are offered above- or below-average quality deals to co-invest in and whether LPs are good at selecting high-quality deals from among those offered are still largely open questions. The early evidence is mixed. Fang, Ivashina, and Lerner (2015) analyze 286 co-investment deals by seven LPs completed between 1991 and 2011. Consistent with these LPs being offered an adverse selection of GPs’ deals, Fang, Ivashina, and Lerner (2015) report that these co-investments underperformed the corresponding funds.³⁷ Braun, Jenkinson, and Schemmerl (2020), however, analyze a larger sample—1,016 co-investments by 458 LPs—and find no evidence of adverse selection: The co-investments in their sample performed in line with the corresponding funds.³⁸

Co-investment can be seen as partial disintermediation. Some LPs have gone further, originating deals themselves without involving a PE fund, in what are called direct investments. Fang, Ivashina, and Lerner (2015) report that the direct investments in their sample outperformed PE fund benchmarks.

Secondary Sales

As noted earlier, most private equity funds are illiquid in the sense that LPs cannot easily sell their fund interests and thereby transfer their obligations under the LPA to another investor. Lerner and Schoar (2004) report that transfers require GP approval in 89% of the 243 LPAs they analyze. As a result of such transfer restrictions, sales of LP interests (called secondary sales or LP-led secondaries) are essentially bespoke transactions negotiated between buyer and seller, subject to GP approval. According to McKinsey, \$56 billion of secondary sales were completed worldwide in 2022.³⁹

³⁷An alternative explanation is that the LPs were offered average-quality deals but chose poorly from among them. Fang, Ivashina, and Lerner (2015) do not observe the entire set of deals that were offered, only those that were chosen.

³⁸Their finding does not rule out that LPs were offered an adverse selection of deals on average but chose the best ones from among them. Like Fang, Ivashina, and Lerner (2015), Braun, Jenkinson, and Schemmerl (2020) do not observe the entire set of deals that were offered, only those that were chosen.

³⁹See the “McKinsey Global Private Markets Review 2023,” available at www.mckinsey.com/industries/private-equity-and-principal-investors/our-insights/mckinseys-private-markets-annual-review-2023.

A seller might wish to sell for a variety of reasons—from the idiosyncratic (portfolio rebalancing, liquidity needs, or changes in investment strategy) to the systematic (the denominator effect⁴⁰). Typical buyers include specialized secondary funds, funds of funds, investors seeking to deploy capital faster by acquiring interests in funds that have already come some way along their J-curves, investors seeking greater diversification, and investors hoping to gain access to a GP whose funds they have struggled to gain a primary allocation to in the past.

Secondary sales can involve a single fund or a portfolio of funds. Typically, transactions are priced at a discount to the fund's reported NAV. Analyzing transaction data received from an unnamed intermediary, Nadauld, Sensoy, Vorkink, and Weisbach (2019) report an average discount of 13.8%, although this average includes plenty of fire sales completed during the Global Financial Crisis—a more typical discount in their data is 9%. Nadauld et al. (2019) further report that buyers outperform sellers by 5 percentage points a year over the average fund's life, gross of transaction costs, suggesting two conclusions: First, the discounts to NAV truly are discounts; and second, selling LPs do not sell based on private information about a fund's performance having peaked, at least not on average.

Exits

Traditionally, PE funds exited their portfolio companies either by selling them to strategic buyers (i.e., operating companies) or by listing them on a stock exchange. Beginning in the mid-2000s, a third type of exit emerged: sponsor-to-sponsor deals (also called secondary buyouts), in which a PE firm's PE fund sells its portfolio company to another PE firm's PE fund. Secondary buyouts now account for more than half of PE exits.⁴¹ More recently, a fourth type of exit has become popular: GP-led secondaries, in which a PE firm's PE fund sells its portfolio company to another fund controlled by the same PE firm (essentially, the PE firm sells the portfolio company to itself). The acquiring fund is typically a newly formed "continuation vehicle" that will often own no other assets (i.e., it is a single-asset fund). The LPs in the selling fund are usually invited to invest in the continuation vehicle, although they may be required to simultaneously commit capital to the GP's next fund (a so-called "stapled" transaction). Between 2017 and 2021, GP-led secondaries grew at a compound annual growth rate of 48%.⁴²

Both secondary buyouts and GP-led secondaries raise issues of interest to LPs. The academic literature to date has focused on secondary buyouts. LPs may be concerned about secondary buyouts for three reasons. First, if there are diminishing returns to PE value creation, a secondary buyer may struggle to add much value to a portfolio company, resulting in lower returns. Second, buying funds may buy because they have capital left to burn toward the end of their life, rather than because the deal is likely to be good for their LPs. This concern arises because of the one-way-bet nature of GP compensation: It may be tempting (from the viewpoint of a GP that does not value its reputation too highly) to draw down the last few dollars of capital. If the deal pays off, the GP will earn carry; if the deal goes south, the GP will have lost "OPM" (other people's money). Third, a well-diversified LP may have a stake in both the selling fund and the

⁴⁰The denominator effect is the term used to describe the following phenomenon: When prices fall faster in the public than in the private markets, the portfolio weight of an LP's PE allocation can hit the LP's internal diversification limits.

⁴¹See www.cfo.com/news/private-equity-exits-down-57-in-2022/654767/.

⁴²See www.nb.com/en/global/insights/whitepaper-the-rise-of-gp-led-secondaries.

buying fund, with the result that the LP continues to own an indirect stake in the portfolio company but bears the transaction costs of the sale.

Wang (2012) and Bonini (2015) study changes in operating performance in the wake of the primary and the secondary buyout. Both Wang (2012) and Bonini (2015) report a slowdown in value creation: Although a portfolio company's operating performance improves significantly during its first spell in a PE fund's portfolio, this improvement does not differ from that of similar control firms during its second spell. Some support thus exists for the notion of diminishing returns to PE value creation.

Degeorge, Martin, and Phalippou (2016) and Arcot et al. (2015) study conflicts of interest in the context of secondary buyouts. Degeorge, Martin, and Phalippou (2016) report that secondary buyouts undertaken late in the buying fund's commitment period destroy value, consistent with misaligned incentives. After fees, such secondary buyouts have a PME of 0.88 and thus underperform the stock market. Secondary buyouts undertaken early in the buying fund's commitment period, however, perform in line with primary buyouts. Interestingly, it is when the selling PE fund and the buying PE fund have complementary skills that secondary buyouts generate the highest PME. This dynamic suggests that although there may be diminishing returns to PE value creation in general, additional value can be created when the buying PE fund can bring new skills to the table.

Arcot et al. (2015) also study secondary market pricing through the lens of agency concerns. They construct an index of how much pressure either the buying or the selling PE fund is under based on how close the fund is to the end of the commitment period or the end of its term, its remaining capital (or dry powder), and its reputation. Consistent with misaligned incentives, Arcot et al. (2015) report that pressured sellers sell at lower valuation multiples, while pressured buyers buy at higher valuation multiples.

GP-led secondaries provide liquidity to LPs in the original fund, which has become particularly important as exits through an IPO or a sale to a strategic or a financial buyer have slowed markedly in recent years, in the wake of central banks' concerted interest rate rises. Yet GP-led secondaries are controversial. When the PE firm acts as both buyer and seller in a transaction, in whose interest will it price the deal?⁴³ Moreover, if the transaction results in the portfolio company's reported valuation increasing, the PE firm will benefit from an increase in the base on which it earns its management fee. Finally, in a single-asset continuation fund that holds what is presumably an already successful company, the PE firm can expect a higher carried interest payout than if the future gains on the company were first used to make up for the losers in the original fund's portfolio. Although there is no existing research into GP-led secondaries in economics, Kastiel and Nini (Forthcoming) analyze these and other concerns from a legal perspective.

A final exit-related innovation worth mentioning is the rise of NAV financing. Given the current challenging exit market, GPs have trouble generating distributions for their LPs through portfolio company exits. Some GPs have turned to NAV financing, which involves borrowing against a PE fund's assets and then making distributions to their LPs (essentially, a leveraged dividend recap). Whether and how NAV financing might add value to LPs are important open questions.

⁴³A new SEC rule effective November 2023 requires PE firms to obtain a fairness opinion in GP-led secondaries. See www.sec.gov/files/rules/final/2023/ia-6383.pdf.

ESG

Over the last decade, ESG has become a core due diligence criterion in private equity. According to a 2022 survey of more than 100 LPs conducted by the Institutional Limited Partners Association (ILPA) and Bain & Co., 70% of LPs have integrated ESG considerations in their private equity investment policy to mitigate ESG risks and/or to take advantage of ESG opportunities.⁴⁴ But even as both PE firms and LPs have embraced ESG integration, ESG reporting is seen as problematic. In response to rising demand for ESG data from institutional investors, ESG frameworks and ratings providers have proliferated, leaving LPs without standardized, comparable data to assess the ESG performance of their PE portfolios. In response, a group of GPs and LPs launched the ESG Data Convergence Initiative in September 2021.⁴⁵

Academic research into ESG in the private equity context is in its infancy. Abraham, Olbert, and Vasvari (2023) document the rise in PE firms' voluntary ESG disclosures from 2000–2022. Duevski, Rastogi, and Yao (2023) report that PE firms that experience an adverse ESG incident at a portfolio company have a harder time raising their next fund. Indahl and Jacobsen (2019) use the case study of Summa Equity to argue that a focus on ESG can create value for both LPs and society. To what extent the integration of ESG considerations into LPs' investment decisions and GPs' value creation strategies affects performance in the private equity industry remains an important open question for future research.

⁴⁴See <https://go.ilpa.org/l/224412/2022-02-17/pjw2v>.

⁴⁵See www.esgdc.org/.

CONCLUDING THOUGHTS

In this review, I aimed to critically synthesize the main insights of more than 90 academic studies of private equity and to suggest open questions for research. With my apologies to any authors whose work I may have overlooked, I venture to draw the following conclusions.

- Private equity funds have, on average, historically outperformed public market indices after fees, although maybe not when adjusted for risk, leverage, and illiquidity.
- Companies acquired by private equity funds undergo significant operational changes, some of which increase investor returns and some of which would probably have happened anyway. Private equity funds generate returns for their investors through a combination of the value they add to their portfolio companies and their ability to target companies whose performance is about to take off anyway.
- Whether private equity creates social value for the economy at large is an open question. Research suggests that there can be both winners and losers when private equity invests in a company. Netting off gains and losses involves tricky value judgments.
- Private equity is a demanding asset class in which more sophisticated investors can expect to earn better returns than less sophisticated investors. There is scope for ample misalignment of interests between fund managers and investors.
- Private equity is an innovative asset class, creating new practices and solutions at a fast pace. Recent examples include subscription lines, GP-led secondaries, and NAV financing.

Private equity has received due attention from financial economists. As private equity continues to evolve and innovate, I am confident that it will continue to be studied closely.

BIBLIOGRAPHY

Abraham, J. K., M. Olbert, and F. P. Vasvari. 2023. "ESG Disclosures in the Private Equity Industry." TRR 266 Accounting for Transparency Working Paper 132. <https://ssrn.com/abstract=4265171>.

The authors explore the private equity (PE) industry's approach to environmental, social, and governance (ESG) disclosures. They examine whether PE firms' voluntary ESG disclosures are driven by investor (limited partners, LPs) demand for sustainable investments and if these disclosures align with the actual ESG performance of portfolio companies. Using a novel dataset from PE firms' websites, the research finds an increasing trend in ESG disclosures over time, suggesting that LPs' sustainability preferences impact PE firms' disclosure practices. Additionally, firms with more ESG disclosures are associated with better ESG outcomes in their investments, alleviating concerns about greenwashing.

Acharya, V. V., O. F. Gottschalg, M. Hahn, and C. Kehoe. 2013. "Corporate Governance and Value Creation: Evidence from Private Equity." *Review of Financial Studies* 26 (2):368–402. [doi:10.1093/rfs/hhs117](https://doi.org/10.1093/rfs/hhs117)

The authors investigate whether returns from large, mature PE houses are driven by financial leverage, market timing, or genuine value creation at the enterprise level, and they examine the role of human capital factors in this process. Analyzing 395 deals by 37 PE houses in Western Europe from 1991 to 2007, the study finds that a significant portion of deal IRRs stems from abnormal performance, indicating enterprise-level value creation beyond that of sector peers. This performance is associated with operational improvements in portfolio companies and the experience and background of deal partners, suggesting that top PE houses create economic value through skilled operational enhancements and strategic M&A activities.

Albertus, J., and M. Denes. 2024. "Private Equity Fund Debt: Agency Costs and Cash Flow Management." Working paper, Carnegie Mellon University.

The authors investigate the use of subscription lines of credit (SLCs) in private equity (PE), a growing trend in which PE funds use debt financing at the fund level. Through novel data, the study explores how SLCs affect capital deployment from limited partners (LPs), fund performance, and whether their use aligns with cash flow management or stems from agency conflicts. The findings suggest that SLCs enable funds to call capital less frequently, potentially distorting performance measures such as internal rate of return (IRR). The use of SLCs is not solely motivated by cash flow management objectives, however, with indications of agency conflicts playing a role.

Aldatmaz, S., and G. W. Brown. 2020. "Private Equity in the Global Economy: Evidence on Industry Spillovers." *Journal of Corporate Finance* 60 (February):101524. [doi:10.1016/j.jcorpfin.2019.101524](https://doi.org/10.1016/j.jcorpfin.2019.101524)

The authors examine internationally the impact of private equity (PE) investments on the performance of competing firms within the same industry. The study finds significant positive effects of PE investments on employment, profitability, and productivity growth in public firms in the same industry, suggesting "knowledge spillovers" from PE transactions.

Amess, K., J. Stiebale, and M. Wright. 2016. "The Impact of Private Equity on Firms' Patenting Activity." *European Economic Review* 86 (July):147–60. doi:10.1016/j.euroecorev.2015.08.013

The authors investigate the impact of private equity (PE) backed leveraged buyouts (LBOs) on the innovation output of portfolio firms, specifically examining patent activity. The analysis finds that PE-backed LBOs lead to an increase in both patenting activity and the quality of patents, as indicated by forward citations. This effect is particularly pronounced in private-to-private transactions and in industries where firms are more likely to be financially constrained.

Andonov, A., and J. Rauh. 2023. "The Shifting Finance of Electricity Generation." Stanford University Graduate School of Business Research Paper 4287123. <https://ssrn.com/abstract=4287123>.

The authors investigate the influence of competition and financing on innovation in the US electricity generation sector, emphasizing the transition from regulated markets to deregulation and its effect on asset creation and ownership changes. The analysis reveals a shift from domestic listed corporations holding 70% of electricity generation to 54%, with private equity (PE), institutional investors, and foreign corporations increasing their shares, particularly in renewable and fossil fuel power plants. The study identifies three main mechanisms driving these changes: creation of new power plants, transactions of existing plants, and decommissioning of outdated facilities. New entrants, particularly PE and foreign corporations, have played a crucial role in adopting new technologies and improving the efficiency of electricity generation, suggesting that competitive pressures and capital availability, rather than the traditional incumbency advantages, are driving the industry's evolution towards sustainability and innovation.

Ang, A., B. Chen, W. N. Goetzmann, and L. Phalippou. 2018. "Estimating Private Equity Returns from Limited Partner Cash Flows." *Journal of Finance* 73 (4):1751–83. doi:10.1111/jofi.12688

The authors introduce a methodology based on Bayesian Markov Chain Monte Carlo to estimate a time series of private equity (PE) returns, overcoming the challenge of the lack of transaction-based performance measures in PE. The analysis shows PE returns to be more volatile than standard industry indices and demonstrates that PE returns contain a significant, unique premium not replicable by passive strategies.

Antoni, M., E. Maug, and S. Obernberger. 2019. "Private Equity and Human Capital Risk." *Journal of Financial Economics* 133 (3):634–57. doi:10.1016/j.jfineco.2019.04.010

The authors assess the human capital risk of private equity (PE) buyouts in Germany, focusing on employment impact and individual outcomes post-buyout. Buyouts are associated with an 8.96% greater reduction in employment compared with control groups, alongside increased employee turnover. Particularly, older workers, white-collar workers, and managers experience significant losses in employment and wages.

Arcot, S., Z. Fluck, J.-M. Gaspar, and U. Hege. 2015. "Fund Managers under Pressure: Rationale and Determinants of Secondary Buyouts." *Journal of Financial Economics* 115 (1):102–35. doi:10.1016/j.jfineco.2014.08.002

The authors study conflicts of interest in the context of secondary buyouts, finding that selling funds that are "under pressure" according to their measure sell at lower valuation

multiples, while pressured buyers buy at higher valuation multiples, consistent with misaligned incentives.

Axelson, U., T. Jenkinson, M. S. Weisbach, and P. Strömberg. 2013. "Borrow Cheap, Buy High? The Determinants of Leverage and Pricing in Buyouts." *Journal of Finance* 68 (6):2223–67. doi:10.1111/jofi.12082

The authors investigate the determinants of leverage and pricing in private equity (PE) backed buyout firms, contrasting them with public firms' capital structures. The study finds that buyout leverage is more influenced by time-series effects and prevailing debt market conditions than by firm-specific characteristics. Contrary to public firms' countercyclical leverage, buyout firms' leverage peaks during favorable credit conditions, leading to higher purchase price multiples. The findings suggest that excess leverage during easy credit conditions may contribute to disappointing PE fund returns.

Barber, B., and A. Yasuda. 2017. "Interim Fund Performance and Fundraising in Private Equity." *Journal of Financial Economics* 124 (1):172–194. doi:10.1016/j.jfineco.2017.01.001

The authors use fund-level data to show that private equity (PE) firms time their fundraising to coincide with a peak in their current fund's reported performance, and not just because they naturally tend to fundraise in the wake of successful exits: Even for funds with few successful exits (and those with low reputation), fundraising still coincides with peak performance, leading the authors to conclude that desperate GPs inflate their reported net asset values.

Bellon, A. 2022. "Does Private Equity Ownership Make Firms Cleaner? The Role of Environmental Liability Risks." ECGI Finance Working Paper 799/2022. www.ecgi.global/sites/default/files/working_papers/documents/peenvironmentfinal.pdf.

The paper investigates the impact of private equity (PE) ownership on pollution levels of portfolio companies, particularly in the onshore oil and gas exploration sector. Using detailed administrative and satellite data on US wells, the study finds that PE ownership significantly reduces pollution, including the use of toxic chemicals and flaring practices. The reduction is attributed to PE firms' unique incentives to maximize portfolio companies' exit value.

Bernstein, S., J. Lerner, M. Sørensen, and P. Strömberg. 2017. "Private Equity and Industry Performance." *Management Science* 63 (4):1198–213. doi:10.1287/mnsc.2015.2404

The authors examine the impact of private equity (PE) investments on the growth rates of total production, employment, and capital formation across industries and countries. Industries with active PE investments exhibit faster growth without increased cyclical-ity. Additionally, PE investments are associated with reduced downside risk in industry growth rates.

Bernstein, S., and A. Sheen. 2016. "The Operational Consequences of Private Equity Buyouts: Evidence from the Restaurant Industry." *Review of Financial Studies* 29 (9):2387–418. doi:10.1093/rfs/hhw037

The authors examine how private equity (PE) ownership influences operational practices within the restaurant industry. Analyzing health inspection records from restaurants, the

study finds significant improvements in health-related practices post-PE acquisition, especially in directly owned stores.

Bharath, S., A. Dittmar, and J. Sivadasan. 2014. "Do Going-Private Transactions Affect Plant Efficiency and Investment?" *Review of Financial Studies* 27 (7):1929–76. doi:10.1093/rfs/hhu027

This study examines the impact of going-private transactions on plant-level productivity, investment, and exits. Contrary to expectations, the analysis finds no significant productivity improvements in plants post-transition to private ownership compared with their peers. Instead, going-private transactions result in reduced capital stock and employment, while operational efficiency remains unchanged. The results challenge the notion that private ownership inherently leads to operational improvements, indicating that gains from going-private transactions may stem from better identification of productive plants and strategic exits rather than from enhanced operational efficiency within plants.

Biesinger, M., C. Bircan, and A. Ljungqvist. 2023. "Value Creation in Private Equity." EBRD Working Paper 242. <https://ssrn.com/abstract=3607996>.

The authors analyze confidential textual data from value-creation plans combined with detailed financial data to disentangle the effects of treatment, selection, and financial engineering on investor returns in private equity deals. They show that PE firms create value for investors by selecting companies that are about to outperform and by helping portfolio companies improve production. They find no evidence that financial engineering affects investor returns.

Block, J., Y. S. Jang, S. N. Kaplan, and A. Schulze. 2023. "A Survey of Private Debt Funds." NBER Working Paper 30868. doi:10.3386/w30868

The authors investigate how private debt (PD) funds and collateralized loan obligation funds are filling the corporate lending gap post-Great Financial Crisis. Through a survey of 191 US and European PD investors, the study inspects PD funds' operational strategies, particularly direct lending, and compares them with banks, PE funds, and CLOs. The findings highlight PD funds' preference for stable cash flows, their perceived role in providing financing where banks may not, and their use of both negative and financial covenants for monitoring, akin to a hybrid of bank loans and covenant-lite leveraged loans.

Bloom, N., R. Sadun, and J. van Reenen. 2015. "Do Private Equity Owned Firms Have Better Management Practices?" *American Economic Review* 105 (5):442–46. doi:10.1257/aer.p20151000

This study investigates whether private equity (PE) owned firms have better management practices compared with other types of ownership. Using a survey of more than 15,000 firms across 34 countries, the authors find that PE-owned firms have superior management practices, particularly compared with family-owned and managed firms. The PE advantage is especially strong in monitoring and operational practices associated with modern management technologies. Additionally, PE-owned firms show greater delegation of authority to plant managers in areas such as sales, marketing, and new product introductions. The authors cannot definitively determine, however, whether the superior management of PE-owned firms results from PE firms selecting already well-managed targets or improving the management of acquired firms over time.

Bonini, S. 2015. "Secondary Buyouts: Operating Performance and Investment Determinants." *Financial Management* 44 (2):431–70. doi:10.1111/fima.12086

The author investigates the economic rationale and effects of secondary buyouts (SBOs) in the private equity (PE) industry, where both buyer and seller are PE firms. The article analyzes the operating performance of 163 companies across two buyout rounds. Although first-round buyouts lead to significant efficiency gains, SBOs do not show incremental operating performance improvements. Despite this result, SBOs still generate positive returns for PE investors, albeit lower in the second round. The study also examines deal characteristics influencing SBO likelihood, including deal value, investment duration, market debt levels, and the reputation of secondary syndicates.

Boucly, Q., D. Sraer, and D. Thesmar. 2011. "Growth LBOs." *Journal of Financial Economics* 102 (2):432–53. doi:10.1016/j.jfineco.2011.05.014

The study contrasts the traditional view that leveraged buyouts (LBOs) primarily create value through cost-cutting by providing evidence that LBOs can foster firm growth by alleviating credit constraints. It finds that LBO targets in France, particularly in private-to-private transactions, exhibit significant post-buyout growth in employment, sales, and capital employed compared with control firms. This growth is accompanied by an increase in capital expenditures and debt issuance, suggesting that private equity funds help previously credit-constrained firms capitalize on unexploited growth opportunities. The growth effects are more pronounced in financially dependent industries.

Boyer, B. H., T. Nadauld, K. Vorkink, and M. S. Weisbach. 2023. "Discount-Rate Risk in Private Equity: Evidence from Secondary Market Transactions." *Journal of Finance* 78 (2):835–85. doi:10.1111/jofi.13202

The authors study the risk and return of private equity (PE) investments, particularly examining the disparity between cash flow–based performance measures and risk-adjusted measures such as CAPM alpha. Using data from a large intermediary and constructing market-based indices for buyout funds, the analysis suggests that contrary to previous findings using cash flow data, buyout funds do not outperform public markets on a risk-adjusted basis. The paper highlights significant discount-rate variation in PE, challenging the valuation accuracy of net asset value used by investors. It concludes that generalized public market equivalent and alpha provide different insights into PE performance.

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. doi:10.1016/j.jfineco.2019.01.009

This research investigates private equity (PE) co-investments, where investors bypass traditional fund structures to potentially achieve higher net returns. Larger deals relative to fund size are more likely to be offered for co-investment, with no evidence of adverse selection. Co-investments can outperform traditional fund investments, especially when part of a diversified portfolio. The study underscores the importance of portfolio diversification in co-investments.

Braun, R., T. Jenkinson, and I. Stoff. 2017. "How Persistent Is Private Equity Performance? Evidence from Deal-Level Data." *Journal of Financial Economics* 123 (2):273–91. doi:10.1016/j.jfineco.2016.01.033

This study investigates the persistence of private equity (PE) returns using an extensive dataset of investments by buyout funds. Contrary to earlier findings, persistence has diminished in recent years as the PE market matured and became more competitive. The study contrasts short-run and long-run return persistence across deals rather than funds, finding that top-quartile performance persistence exists in less competitive states but diminishes when competition is high. Bottom-quartile performance, indicating underperformance, persists regardless of market conditions.

Brown, G. W., E. Ghysels, and O. R. Gredil. 2023. "Nowcasting Net Asset Values: The Case of Private Equity." *Review of Financial Studies* 36 (3):945–86. doi:10.1093/rfs/hhac045

This study introduces a novel approach for nowcasting "true" net asset values (NAVs) of private equity (PE) funds by integrating reported NAVs with cash flows and comparable asset returns. The methodology corrects for NAV smoothing and accurately estimates fund values on a weekly basis. Key findings reveal variations in systematic and idiosyncratic risks across vintage years and suggest that traditional assumptions of high systematic risk may not align with actual fund cash flow realizations.

Brown, G. W., O. R. Gredil, and S. N. Kaplan. 2019. "Do Private Equity Funds Manipulate Reported Returns?" *Journal of Financial Economics* 132:267–97. doi:10.1016/j.jfineco.2018.10.011

The authors use fund-level data to show that struggling private equity firms inflate their net asset values during fundraising but that investors are not fooled by the deception.

Brown, G. W., R. S. Harris, T. Jenkinson, S. N. Kaplan, and D. Robinson. 2015. "What Do Different Commercial Data Sets Tell Us about Private Equity Performance?" Working paper, University of North Carolina at Chapel Hill. doi:10.2139/ssrn.2701317

The authors offer a comprehensive analysis of private equity (PE) fund performance globally up to June 2014. It explores differences in data collection and potential biases across databases, revealing consistent performance patterns despite these variations. North American buyout funds historically outperformed public markets until 2006, with performance aligning with public markets thereafter. Venture funds displayed more variability. Outside North America, buyout funds' performance was similar to their North American counterparts while venture funds' performance varied significantly. The findings highlight the importance of standardized data classification and performance measurement for enhancing PE research and practice globally.

Brown, G. W., R. S. Harris, W. Hu, T. Jenkinson, S. N. Kaplan, and D. Robinson. 2021. "Can Investors Time Their Exposure to Private Equity?" *Journal of Financial Economics* 139 (2):561–77. doi:10.1016/j.jfineco.2020.08.014

The authors report modest benefits from timing market allocations in private equity (PE). The study highlights significant challenges, including organizational frictions and the nature of commitment risk in PE, where limited partners (LPs) cannot control investment timing. Strategies focusing on fund selection, such as prioritizing larger funds or those managed

by experienced general partners, yield more substantial performance gains than timing strategies.

Cavagnaro, D. R., B. A. Sensoy, Y. Wang, and M. S. Weisbach. 2019. "Measuring Institutional Investors' Skill at Making Private Equity Investments." *Journal of Finance* 74 (6):3089-134. [doi:10.1111/jofi.12783](https://doi.org/10.1111/jofi.12783)

The study examines institutional investors' skill in selecting private equity (PE) funds, analyzing investments by limited partners (LPs) from 1991 to 2011. Skill significantly impacts returns, with a one-standard-deviation increase in skill boosting internal rates of return (IRRs) by 1 to 2 percentage points. The research highlights that skilled LPs consistently outperform others, emphasizing that the ability to select high-quality general partners (GPs) is a critical determinant of success in PE investing.

Chung, J. W., B. A. Sensoy, L. Stern, and M. S. Weisbach. 2012. "Pay for Performance from Future Fund Flows: The Case of Private Equity." *Review of Financial Studies* 25 (11):3259-304. [doi:10.1093/rfs/hhr141](https://doi.org/10.1093/rfs/hhr141)

The authors examine compensation arrangements in private equity (PE) partnerships, focusing on the balance between fixed management fees, typically 1.5% to 2.5% of committed capital, and carried interest, usually 20% of profits, as drivers of general partner (GP) success. The article highlights the significance of indirect, market-based pay for performance stemming from the relationship between a fund's current performance and its ability to raise future capital. This market-based pay for performance, when added to direct compensation from carried interest, implies GPs' income is more closely tied to their funds' success than previously believed, highlighting the complexity of incentive structures in PE and the critical role of skill and performance in securing future capital.

Cohn, J. B., E. S. Hotchkiss, and E. Towery. 2022. "Sources of Value Creation in Private Equity Buyouts of Private Firms." *Review of Finance* 26 (2):257-85. [doi:10.1093/rof/rfac005](https://doi.org/10.1093/rof/rfac005)

The authors examine value creation in private firm buyouts by private equity (PE) sponsors. Using US corporate tax return data, the authors explore profitability improvements, financial engineering, and easing financial constraints as potential value sources. PE targets include firms at both high and low profitability extremes, suggesting varied strategies for value creation. Post-buyout, there is moderate profitability improvement and significant sales growth, indicating that unlocking growth potential is crucial. Despite an increase in debt-to-assets ratio, financial engineering appears secondary to facilitating growth.

Cohn, J., L. Mills, and E. Towery. 2014. "The Evolution of Capital Structure and Operating Performance after Leveraged Buyouts: Evidence from US Corporate Tax Returns." *Journal of Financial Economics* 111 (2):469-94. [doi:10.1016/j.jfineco.2013.11.007](https://doi.org/10.1016/j.jfineco.2013.11.007)

The authors examine the impact of leveraged buyouts (LBOs) on US firms from 1995 to 2007, using confidential tax return data. They find no significant improvements in operating performance post-LBO. There is evidence of sustained high leverage levels post-LBO without significant debt reduction, indicating that LBOs might not aim to discipline management through debt repayment as traditionally thought. Additionally, the authors observe minimal dividend payouts post-LBO, countering claims of substantial extractions by private equity firms.

Cohn, J., N. Nestoriak, and M. Wardlaw. 2021. "Private Equity Buyouts and Workplace Safety." *Review of Financial Studies* 34 (10):4832–75. doi:10.1093/rfs/hhab001

Using data from the Bureau of Labor Statistics, the authors reveal a decline in workplace injury rates following PE buyouts of publicly traded companies. This decline suggests a new dimension in which buyouts may positively affect workers. The study also explores how improvements in workplace safety post-buyout benefit firms and PE owners, indicating a potential source of value creation. Overall, the findings challenge the conventional narrative of buyouts negatively impacting workers.

Da Rin, M., T. Hellmann, and M. Puri. 2013. "A Survey of Venture Capital Research." In *Handbook of the Economics of Finance*, vol. 2, Part A, edited by G. M. Constantinides, M. Harris, and R. M. Stulz, 573–648. doi:10.1016/B978-0-44-453594-8.00008-2

The paper provides an extensive review of academic research on venture capital (VC), focusing on its professional asset management activity and excluding other forms of investments. It outlines the growth of the VC industry over the past 30 years and explains the typical structure of VC markets, highlighting the roles of limited partners (LPs) and general partners (GPs). The survey identifies three main research strands in the VC literature: the interaction between entrepreneurial companies and VC, the interaction between VC funds and their investors, and the organization of VC firms.

Davis, S. J., J. Haltiwanger, K. Handley, R. Jarmin, J. Lerner, and J. Miranda. 2014. "Private Equity, Jobs, and Productivity." *American Economic Review* 104 (12):3956–90. doi:10.1257/aer.104.12.3956

The study examines the impact of leveraged buyouts by private equity firms on employment, productivity, and earnings. Addressing conflicting views, it critiques industry-sponsored studies for their limitations and lack of establishment-level data. The study overcomes these constraints by using the Longitudinal Business Database to analyze employment changes before and after buyouts at both firm and establishment levels. Findings suggest that while employment shrinks more rapidly at target establishments post-buyout, target firms engage in more greenfield job creation and exhibit a higher pace of job reallocation. Moreover, buyouts improve productivity mainly through the directed reallocation of resources across units within target firms, leading to material improvements in operating margins.

Davis, S. J., J. Haltiwanger, K. Handley, B. Lipsius, J. Lerner, and J. Miranda. 2021. "The (Heterogeneous) Economic Effects of Private Equity Buyouts." NBER Working Paper 26371. www.nber.org/papers/w26371.

This paper investigates the diverse economic impacts of private equity (PE) buyouts on employment, job reallocation, and productivity. Analyzing approximately 9,800 PE buyouts in the United States from 1980 to 2013, the study reveals significant heterogeneity in outcomes based on factors such as credit conditions, type of buyout, and sponsoring PE groups. Findings indicate substantial productivity gains, differing employment trends between privately held and publicly listed firms, and the influence of credit spreads and GDP growth on employment dynamics. The research also highlights variations in buyout effects among PE groups, with implications for post-buyout employment performance. Overall, the study underscores the nuanced and circumstance-specific nature of buyout impacts, contributing to financial theory and empirical evidence.

DeGeorge, F., J. Martin, and L. Phalippou (2016). "On Secondary Buyouts." *Journal of Financial Economics* 120 (1):124–45. doi:10.1016/j.jfineco.2015.08.007

The authors study conflicts of interest in the context of secondary buyouts, finding that secondary buyouts undertaken late in the buying fund's commitment period destroy value, consistent with misaligned incentives. The authors further report that it is when the selling private equity (PE) fund and the buying PE fund have complementary skills that secondary buyouts generate the highest performance.

Driessen, J., T.-C. Lin, and L. Phalippou. 2012. "A New Method to Estimate Risk and Return of Nontraded Assets from Cash Flows: The Case of Private Equity Funds." *Journal of Financial and Quantitative Analysis* 47 (3):511–35. doi:10.1017/S0022109012000221

The paper introduces a novel methodology to estimate risk exposure and abnormal performance in the context of non-traded assets, focusing particularly on private equity funds. By extending the internal rate of return calculation with a dynamic discount rate, the method addresses the challenge of limited data availability and the absence of traded asset prices. Simulations validate the approach's accuracy in estimating key parameters, while empirical application to private equity funds provides information on market betas, costs of capital, and abnormal returns.

Duevski, T., C. Rastogi, and T. Yao. 2023. "ESG Incidents and Fundraising in Private Equity." Working paper, HEC Paris. doi:10.2139/ssrn.4641071

The paper highlights the absence of systematic academic evidence on the impact of environmental, social, and governance (ESG) factors on PE, emphasizing the differences between public and private markets regarding liquidity, regulatory scrutiny, and investor influence. The paper fills this gap by examining how ESG considerations affect PE firms' capital raising ability. Using data on ESG-related incidents and PE investment data, the study investigates the outcomes of such incidents on PE firms' fundraising success and fund size.

Dyck, A., and L. Pomorski. 2016. "Investor Scale and Performance in Private Equity Investments." *Review of Finance* 20 (3):1081–106. doi:10.1093/rof/rfv030

The study explores the impact of investor scale in private equity (PE) on performance, moving beyond traditional analyses focusing solely on limited partner (LP) investments. Using data from DB pension plans, it investigates how varying levels of PE investments affect returns. The study reveals that larger investors tend to outperform smaller ones, with a one-standard-deviation increase in PE holdings associated with 4% greater returns. Larger investors achieve cost savings by limiting intermediation services.

Eaton, C., S. T. Howell, and C. Yannelis. 2020. "When Investor Incentives and Consumer Interests Diverge: Private Equity in Higher Education." *Review of Financial Studies* 33 (9):4024–60. doi:10.1093/rfs/hhz129

The study investigates the impact of private equity buyouts in postsecondary education, focusing on value creation and its consequences for stakeholders. Using data from 88 deals involving private equity firms acquiring independent schools, it examines how these transactions affect various metrics of firm value and student outcomes. Findings indicate that private equity ownership leads not only to higher profits and increased capture of government

aid but also to deteriorating student outcomes, such as lower graduation rates and higher loan repayment rates.

Ewens, M., A. Gupta, and S. Howell. 2022. "Local Journalism under Private Equity Ownership." NBER Working Paper 29743. [doi:10.3386/w29743](https://doi.org/10.3386/w29743)

The paper explores the increasing presence of private equity in the local newspaper industry, highlighting concerns about its impact on democratic accountability and civic engagement. Although previous literature focuses on consumer preferences, this study examines the supply-side changes resulting from private equity ownership. Using comprehensive data spanning 17 years, the paper investigates the effects of private equity buyouts on newspaper content, employment, and political participation. Findings suggest a shift away from local news coverage toward national topics, accompanied by a decline in reporter and editor numbers. Despite investments in digital platforms and improved survival rates, there are concerns about decreased voter turnout and public knowledge of local government issues.

Ewens, M., C. M. Jones, and M. Rhodes-Kropf. 2013. "The Price of Diversifiable Risk in Venture Capital and Private Equity." *Review of Financial Studies* 26 (8):1854–89. [doi:10.1093/rfs/hht035](https://doi.org/10.1093/rfs/hht035)

The study investigates the use of high discount rates by venture capitalists (VCs) and their concern with total risk in assessing investments. It proposes a novel theory linking the principal-agent problem to asset prices, focusing on interactions between investors, VCs, and entrepreneurs. By analyzing private equity fund data from 1980–2011, the study shows that diversifiable risk can be priced in VC deals, affecting investor returns. The theory explains how VCs negotiate with entrepreneurs based on project risk, impacting asset prices despite zero alphas expected in equilibrium. Empirical tests confirm a correlation between realized risk and investor returns, supporting the theory's predictions.

Fang, L., V. Ivashina, and J. Lerner. 2015. "The Disintermediation of Financial Markets: Direct Investing in Private Equity." *Journal of Financial Economics* 116 (1):160–78. [doi:10.1016/j.jfineco.2014.12.002](https://doi.org/10.1016/j.jfineco.2014.12.002)

The article examines the performance of direct private equity investments made by institutional investors, comparing co-investments alongside private equity funds and solo direct investments over a 20-year period. Direct investments outperform public market benchmarks, but performance relative to private equity fund benchmarks is mixed. Co-investments tend to underperform, which appears to be driven by selection as co-investments are concentrated in larger deals during market peaks. Solo direct investments outperform fund benchmarks, with the outperformance greater for local deals and in later-stage transactions where information problems are less severe. The results suggest it is difficult for institutional investors to capture the rents earned by private equity fund managers through direct investing, especially in settings with higher information asymmetries.

Fracassi, C., A. Previtro, and A. Sheen. 2022. "Barbarians at the Store? Private Equity, Products, and Consumers." *Journal of Finance* 77 (3):1439–88. [doi:10.1111/jofi.13134](https://doi.org/10.1111/jofi.13134)

The study investigates the impact of private equity (PE) ownership on consumer product manufacturers using microlevel retail scanner data. It examines changes in product prices, sales, product mix, and geographic availability following PE acquisitions. Findings reveal that PE targets experience a 50% increase in retail sales post-deal, driven by new product

launches and geographic expansion rather than price increases. PE firms achieve growth by easing financial constraints and providing managerial expertise to target firms.

Franzoni, F., E. Nowak, and L. Phalippou. 2012. "Private Equity Performance and Liquidity Risk." *Journal of Finance* 67 (6):2341–73. doi:10.1111/j.1540-6261.2012.01788.x

Using a unique dataset of cash flows from liquidated private equity investments, the study examines the impact of liquidity risk on private equity performance. It finds significant exposure to liquidity risk, comparable to other asset classes, suggesting fewer diversification benefits than previously thought. The research also investigates the economic channel linking private equity returns to market liquidity, proposing a funding liquidity channel. Empirical evidence supports the theory, highlighting the negative relationship between funding liquidity and market liquidity innovations.

Gandhi, A., Y. Song, and P. Upadrashta. 2023. "Private Equity, Consumers, and Competition." Working paper, University of California, Los Angeles. doi:10.2139/ssrn.3626558

Although public perception often portrays private equity (PE) firms as prioritizing short-term profits at the expense of other stakeholders, academic literature has shown mixed evidence. This paper focuses on the impact of PE ownership on consumers in the nursing home industry, examining how competition influences this relationship. Findings suggest that PE-owned facilities exhibit greater responsiveness to competitive incentives, with benefits observed in competitive markets and harm in concentrated ones.

Gao, J., M. Sevilir, and Y. Kim. 2021. "Private Equity in the Hospital Industry." Finance Working Paper 787/2021, European Corporate Governance Institute. doi:10.2139/ssrn.3924517

The paper examines the impact of private equity (PE) acquisitions on hospitals, addressing debates on their effects. Although proponents argue PE firms bring managerial expertise, opponents fear excessive debt and job cuts. Analyzing 281 deals from 2001–2018, the study compares PE-acquired hospitals with non-acquired ones. Results show profitability improvement without excessive closures. Employment declines initially, particularly in administrative roles, rebounding for core medical workers. PE-owned hospitals maintain the quality of patient outcomes. Notably, non-PE acquisitions exhibit worse outcomes.

Gompers, P., S. N. Kaplan, and V. Mukharlyamov. 2016. "What Do Private Equity Firms Say They Do?" *Journal of Financial Economics* 121:449–76. doi:10.1016/j.jfineco.2016.06.003

The study delves into the practices of private equity (PE) fund managers. Conducting a survey of 79 PE firms managing more than \$750 billion, it provides detailed insights into how these managers determine capital structure, value transactions, source deals, govern, and engineer operations. The study categorizes these actions into distinct firm strategies and examines their relationship with founder characteristics. Findings suggest that PE investors prioritize value-increasing actions, such as financial, governance, and operational engineering. The survey reveals a reliance on internal rates of return and multiples of invested capital over discounted cash flow methods for investment evaluation.

Gompers, P., and J. Lerner. 2000. "Money Chasing Deals? The Impact of Fund Inflows on Private Equity Valuations." *Journal of Financial Economics* 55 (2):281–325. doi:10.1016/S0304-405X(99)00052-5

The study investigates the impact of capital inflows on venture capital investments in the US private equity market from 1987 to 1995. Analyzing more than 4,000 venture investments, it explores whether commitments to venture capital funds influence the valuation of new investments and if this relation is driven by demand pressures or improvements in investment prospects. Results show a strong positive relation between venture capital inflows and investment valuations.

Gornall, W., O. Gredil, S. T. Howell, X. Liu, and J. Sockin. Forthcoming. "Do Employees Cheer for Private Equity? The Heterogeneous Effects of Buyouts on Job Quality." *Management Science*.

The paper investigates the impact of private equity (PE) ownership on job quality. Through employee reviews, the study examines how PE buyouts affect compensation satisfaction, work-life balance, and firm culture. Findings suggest that PE ownership is associated with declines in satisfaction with compensation. However, high-performing PE deals correlate with happier employees.

Gredil, O. 2022. "Do Private Equity Managers Have Superior Information on Public Markets?" *Journal of Financial and Quantitative Analysis* 57 (1):321-58. doi:[10.1017/S0022109021000107](https://doi.org/10.1017/S0022109021000107)

The study investigates the market-timing abilities of private equity (PE) general partners (GPs) and the implications for fund investors. It highlights the influence of public capital markets on PE fund outcomes and explores how GPs leverage their informational advantage to time entry and exit decisions. The paper demonstrates that GPs' market-timing decisions create economic value for fund investors.

Gredil, O., M. Sørensen, and W. Waller. 2019. "Evaluating Private Equity Performance Using Stochastic Discount Factors." Working paper, Tulane University. doi:[10.2139/ssrn.3506847](https://doi.org/10.2139/ssrn.3506847)

The paper examines the performance evaluation of private equity (PE) funds in the context of institutional investors' specific investment objectives. It contrasts traditional performance metrics with consumption-based asset pricing models (CBAPMs) to assess PE fund performance relative to non-tradable discount factors. The study investigates the correlation between model-implied stochastic discount factors (SDFs) and real growth in gifts to university endowments and contributions to public pension plans. The findings suggest that CBAPMs provide valuable insights into the performance of PE funds, particularly in capturing long-run risks and minimizing variation in net present values (NPVs) across vintage years. Methodologically, the paper addresses biases in NPV-based performance measures and proposes corrections to enhance the accuracy of PE fund evaluations.

Guo, S., E. S. Hotchkiss, and W. Song. 2011. "Do Buyouts (Still) Create Value?" *Journal of Finance* 66 (2):479-517. doi:[10.1111/j.1540-6261.2010.01640.x](https://doi.org/10.1111/j.1540-6261.2010.01640.x)

The study investigates the value creation in leveraged buyouts (LBOs) completed between 1990 and 2006. It finds that LBO firms generally experience significant increases in total value post-buyout, resulting in substantial returns to invested capital. Although gains in operating performance are smaller compared with those documented in the 1980s, improvements in cash flows, changes in industry valuations, and realized tax benefits from increased leverage contribute significantly to returns.

Gupta, A., and S. van Nieuwerburgh. 2021. "Valuing Private Equity Investments Strip by Strip." *Journal of Finance* 76 (6):3255–307. doi:10.1111/jofi.13073

The study explores the valuation of private equity (PE) investments, considering their growing importance in global finance. The authors propose a novel two-step methodology that accounts for the cash flow risk inherent in PE investments by estimating exposure to a broader set of risk factors and incorporating strip prices. This approach allows for a deeper understanding of the risks involved and provides more accurate valuations, revealing that traditional methods may overstate performance.

Gupta, Atul, Sabrina T. Howell, Constantine Yannelis, and Abhinav Gupta. 2024. "Owner Incentives and Performance in Healthcare: Private Equity Investment in Nursing Homes." *Review of Financial Studies* 37 (4):1029–1077. <https://doi.org/10.1093/rfs/hhad082>

The study investigates the impact of private equity (PE) ownership on nursing homes and patient welfare. Using a national sample spanning nearly two decades, it uses patient-level data to analyze mortality rates and patient well-being. Although some patients may not experience significant changes, average mortality increases post-PE ownership. The study also examines financial strategies post-acquisition, revealing increased billing to Medicare and changes in expenditure patterns. Policy implications suggest potential improvements in patient outcomes through better alignment of incentives between PE firms, facility owners, and patients.

Harford, J., and A. Kolasinski. 2014. "Do Private Equity Returns Result from Wealth Transfers and Short-Termism? Evidence from a Comprehensive Sample of Large Buyouts." *Management Science* 60 (4):888–902. doi:10.1287/mnsc.2013.1790

The study investigates the contentious issue of whether private equity sponsors generate returns by creating value or by wealth transfers. Although prior literature suggests potential wealth transfer to strategic buyers and debtholders, empirical evidence indicates otherwise. The study finds that stock prices of strategic buyers increase upon acquiring portfolio companies from sponsors, and debt covenants or sponsor reputation concerns prevent excessive payouts that harm debt investors. Although some evidence of wealth transfer exists in certain scenarios, the majority of cases show no harm to financial claimants.

Harris, R. S., T. Jenkinson, and S. N. Kaplan. 2014. "Private Equity Performance: What Do We Know?" *Journal of Finance* 69 (5):1851–82. doi:10.1111/jofi.12154

The study investigates the historical performance of private equity (PE) funds. Analyzing both buyout and venture capital (VC) funds separately, the study reassesses PE fund performance in absolute terms and relative to public markets. Results indicate markedly positive performance for buyout funds, with returns exceeding those of public markets for most vintages since 1984. Using various benchmarks, buyout fund outperformance remains consistent. VC fund returns, however, show variability across decades. The paper also examines the relationship between fund performance and capital commitments, finding a negative correlation. Overall, the findings suggest that buyout funds have consistently outperformed public markets, offering investors a premium despite the illiquidity of PE investments.

Harris, R. S., T. Jenkinson, S. N. Kaplan, and R. Stucke. 2023. "Has Persistence Persisted in Private Equity? Evidence from Buyout and Venture Capital Funds." *Journal of Corporate Finance* 81 (August):102361. doi:10.1016/j.jcorpfin.2023.102361

This study delves into the concept of performance persistence among investment managers in private equity, particularly focusing on buyout and venture capital funds. The analysis distinguishes between pre- and post-2000 fund formations. The findings suggest that while persistence remains in venture capital, it has diminished for buyouts, especially in later fund generations. Moreover, the study emphasizes the challenges investors face in gauging performance based on interim data when committing to new funds. It also highlights the importance of considering fund styles and strategies in assessing performance persistence.

Higson, C., and R. Stucke. 2013. "The Performance of Private Equity." Working paper, University of Oxford.

The paper addresses the challenge of accurately measuring private equity (PE) returns because of data limitations and industry complexities. Although prior studies using limited partner data show PE outperforming public equity, conflicting findings from broader databases raise doubts. To resolve this disparity, the authors compile a comprehensive dataset covering 85% of US buyout funds since 1980. Results indicate consistent outperformance of PE over the S&P 500 Index by 500–800 basis points annually. The study also reveals cyclical returns and varying fund performance, emphasizing the importance of dataset quality in accurately assessing PE performance.

Hochberg, Y., A. Ljungqvist, and A. Vissing-Jørgensen. 2014. "Informational Holdup and Performance Persistence in Venture Capital." *Review of Financial Studies* 27 (1):102–52. doi:10.1093/rfs/hht046

The authors ask why PE firms do not eliminate excess demand for their next fund by raising fees. The article provides a model in which a PE firm's current investors learn about the PE firm's investment skills, whereas outside investors can base their investment decisions only on reported returns. This differential learning gives current investors holdup power when the PE firm raises its next fund: The PE firm cannot raise another fund unless current investors commit to re-up, because outside investors would interpret a lack of backing as a signal that current investors have doubts about the PE firm's investment skills.

Hüther, N. 2023. "Do Private Equity Managers Raise Funds on (Sur)Real Returns? Evidence from Deal-Level Data." *Journal of Financial and Quantitative Analysis* 58 (7):2959–92. doi:10.1017/S0022109022000990

The paper addresses concerns about the accuracy of net asset values (NAVs) reported by private equity funds, particularly regarding potential inflation around fundraising periods, especially for low-reputation funds. The study aims to determine the extent of manipulation that limited partners (LPs) might experience and reconcile previous literature. Findings suggest that observed performance peaks are not necessarily the result of NAV inflation but rather caused by a "cohort effect," where late investments before fundraising tend to underperform. This supports the theory that NAVs reflect genuine investment outcomes rather than manipulation. Moreover, evidence indicates that funds under pressure to deploy cash before fundraising may make suboptimal investments.

Indahl, R., and H. G. Jacobsen. 2019. "Private Equity 4.0: Using ESG to Create More Value with Less Risk." *Journal of Applied Corporate Finance* 31 (2):34–41. doi:10.1111/jacf.12344

The authors explore the evolving role of environmental, social, and governance (ESG) factors in private equity (PE) investments, proposing a framework termed "Private Equity 4.0." The authors advocate for integrating ESG considerations into the investment process to enhance value creation and mitigate risk. Through case studies and empirical analysis, the study demonstrates how addressing ESG issues can lead to improved operational efficiency, enhanced brand reputation, and reduced regulatory and litigation risks for PE-backed companies. The findings suggest that incorporating ESG factors into investment decisions can generate both financial and non-financial benefits for investors and portfolio companies.

Ivashina, V., and A. Kovner. 2011. "The Private Equity Advantage: Leveraged Buyout Firms and Relationship Banking." *Review of Financial Studies* 24 (7):2462–98. doi:10.1093/rfs/hhr024

The authors investigate the role of leveraged buyout (LBO) firms in financial intermediation, arguing that their repeated interactions with banks reduce information asymmetry and improve loan terms for their portfolio companies. Analyzing syndicated loan data, the study finds that stronger bank relationships and potential for cross-selling lead to lower loan spreads and more-favorable debt terms. These findings underscore the importance of LBO firms as financial intermediaries in facilitating LBO transactions and accessing favorable credit markets.

Jegadeesh, N., R. Kräussl, and J. Pollet. 2015. "Risk and Expected Returns of Private Equity Investments: Evidence Based on Market Prices." *Review of Financial Studies* 28 (12):3269–302. doi:10.1093/rfs/hhv046

The authors investigate the risk and return profile of private equity (PE) investments by studying market prices of publicly traded PE stocks. They develop a new approach to directly estimate *ex ante* expected returns from observed market prices. By analyzing publicly traded funds of funds (FoFs) and listed private equity funds (LPEs), the study finds that the market expects relatively low abnormal returns for both types of investments, with FoFs ranging from -0.25% to 2.0% and LPEs ranging from -0.5% to 0.25%. The research emphasizes the importance of using market prices to estimate the risk and return profile of private equity.

Jenkinson, T., S. Morkoetter, T. Schori, and T. Wetzer. 2022. "Buy Low, Sell High? Do Private Equity Fund Managers Have Market Timing Abilities?" *Journal of Banking & Finance* 138 (May):1–14. doi:10.1016/j.jbankfin.2022.106424

The authors investigate whether private equity (PE) fund managers have the ability to time the markets when buying and selling portfolio companies. Using a sample of PE deals benchmarked against M&A transaction multiples, the study finds evidence that PE fund managers create value by timing the financial markets. They sell portfolio companies when market multiples are higher than at the time of investment. The authors also find that market-timing ability is more pronounced at the time of exiting investments compared with entering investments, likely because fund managers have more flexibility in choosing exit timing.

Jensen, M. C. 1986. "Agency Costs of Free Cash Flow, Corporate Finance, and Takeovers." *American Economic Review* 76 (2):323–29. www.jstor.org/stable/1818789.

The author reviews conflicts of interest between corporate managers and shareholders, focusing on how cash payouts reduce managers' control and power, leading to increased monitoring from capital markets. Managers have incentives for organizational growth beyond optimal levels, driven by power and compensation motives. The study proposes a theory highlighting the benefits of debt in reducing agency costs related to free cash flow, emphasizing debt's role in motivating efficiency and curtailing wasteful spending by managers. Evidence from financial restructuring, leveraged buyouts, and takeovers in industries like oil supports the theory.

Jensen, M. C. 1989. "Eclipse of the Public Corporation." *Harvard Business Review* (September–October). <https://hbr.org/1989/09/eclipse-of-the-public-corporation>.

The author discusses the decline of the public corporation and the rise of alternative organizational forms. Traditional public corporations face challenges such as bureaucracy, lack of flexibility, and short-term shareholder focus. The author argues that alternative structures such as leveraged buyouts (LBOs), partnerships, and joint ventures offer advantages in terms of efficiency, innovation, and alignment of incentives. These alternatives prioritize long-term value creation and allow for more effective decision-making processes.

Kaplan, S. N. 1989a. "The Effects of Management Buyouts on Operating Performance and Value." *Journal of Financial Economics* 24 (2):217–54. doi:10.1016/0304-405X(89)90047-0

The author investigates the impact of management buyouts (MBOs) on the operating performance and value of firms. The findings suggest that MBOs often lead to improvements in operating performance, with increases in productivity and profitability observed post-transaction. Additionally, there is evidence of positive market reactions to MBO announcements, indicating enhanced firm value. The study highlights the role of managerial incentives, alignment of interests, and operational restructuring in driving these improvements.

Kaplan, S. N. 1989b. "Management Buyouts: Evidence on Taxes as a Source of Value." *Journal of Finance* 44 (3):611–32. doi:10.1111/j.1540-6261.1989.tb04381.x

The author investigates the role of taxes as a source of value creation in management buyouts (MBOs). The findings suggest that tax benefits, particularly related to depreciation deductions and interest expense deductions, contribute significantly to the value created in MBOs. Additionally, there is evidence that tax attributes of target firms, such as net operating losses and capital losses, influence MBO activity and deal structure.

Kaplan, S. N., and A. Schoar. 2005. "Private Equity Performance: Returns, Persistence and Capital Flows." *Journal of Finance* 60 (4):1791–823. doi:10.1111/j.1540-6261.2005.00780.x

The authors perform a comprehensive analysis of the private equity industry using a large dataset of fund-level performance data. Their study examines several key aspects including fund returns, persistence of manager performance across funds, and the relationship between past returns and future capital raising. On fund returns, private equity funds slightly outperform the S&P 500 Index on average over their sample period. However, there is significant performance heterogeneity across funds. There is strong persistence in performance for funds raised by the same private equity management firm, suggesting skilled versus

unskilled managers. Capital flows into private equity respond strongly to past performance but in a convex manner. Top-quartile funds experience a substantial increase in capital raised for their next fund, whereas average and underperforming funds see little incremental capital commitments.

Kaplan, S. N., and P. Strömberg. 2009. "Leveraged Buyouts and Private Equity." *Journal of Economic Perspectives* 23 (1):121–46. doi:10.1257/jep.23.1.121

The authors describe the mechanics of how leveraged buyouts (LBOs) are conducted, with private equity firms acquiring companies using a substantial amount of debt financing. They discuss the potential sources of value creation in LBOs, including operational improvements, multiple expansion, financial engineering, and tax benefits. The empirical evidence suggests that LBO firms create value primarily through operational improvements and increasing managerial incentives at the companies they acquire. The highly levered capital structures increase financial distress risks, however. The authors examine the characteristics of companies targeted for LBOs and discuss the cyclical nature of the private equity industry. They also analyze the evolution and growth of the LBO market over time.

Kastiel, K., and Y. Nini. Forthcoming. "The Rise of Private Equity Continuation Funds." *University of Pennsylvania Law Review*.

The study examines the rise of private equity continuation funds, which allow firms to hold onto successful investments beyond the typical 10-year fund life, providing liquidity and flexibility benefits. The authors argue, however, that these funds also raise potential conflicts of interest and agency costs when general partners decide which assets to continue or sell. The authors highlight concerns around valuation practices, fees charged, and transparency, and they recommend regulatory changes and improved disclosures to mitigate these potential conflicts of interest.

Kirti, D., and N. Sarin. 2024. "What Private Equity Does Differently: Evidence from Life Insurance." *Review of Financial Studies* 37 (1):201–30. doi:10.1093/rfs/hhad055

This study examines how private equity (PE) firms operate and create value by analyzing their ownership of US life insurance companies from 2004–2014. The authors find that under PE ownership, life insurers reallocate their investment portfolios toward higher-risk, higher-yield assets like structured products and alternative investments. They also increase the rate of policy lapses and surrenders, suggesting PE firms prioritize fee income over long-term policy obligations. Additionally, PE-owned insurers shift toward more capital-intensive products with higher upfront costs. Overall, the evidence suggests PE firms pursue an "institutional capital management" strategy that differs from the strategies of traditional insurers.

Korteweg, A. 2019. "Risk Adjustment in Private Equity Returns." *Annual Review of Financial Economics* 11:131–52. doi:10.1146/annurev-financial-110118-123057

The study examines methods for risk-adjusting the returns reported by private equity (PE) funds to make more appropriate comparisons to public market investments. Challenges in risk-adjusting PE returns include stale pricing of portfolio companies, the use of fund-level borrowing, and the interim recognition of fund fees and carried interest. The author evaluates different risk adjustment models like the public market equivalent and distributional methodologies. There is evidence that private equity returns are not merely compensation for

outstanding systematic risk exposures. The author cautions, however, that fund-level leverage and the optionality embedded in performance fees could justify some of the historically high returns in the asset class relative to public equities.

Korteweg, A., and S. Nagel. 2016. "Risk-Adjusting the Returns to Venture Capital." *Journal of Finance* 71 (3):1437-70. doi:10.1111/jofi.12390

The authors develop a methodology to risk-adjust the returns of venture capital investments by modeling the security-level exposure of VC funds to market and idiosyncratic risks over the life of their investments. The authors find that VC fund returns remain high even after correcting for the excessive smoothing of returns and adjusting for risk exposures. Although some of this return compensates for the risk and costs of VC investing, the results suggest a large non-marketable component likely reflecting the optionality and illiquidity of the asset class. The returns are highest for firms raising follow-on funds quickly after good performance.

Korteweg, A., and M. Sørensen. 2010. "Risk and Return Characteristics of Venture Capital-Backed Entrepreneurial Companies." *Review of Financial Studies* 23 (10):3738-72. doi:10.1093/rfs/hhq050

This study develops a new methodology to estimate the risk and return of venture capital-backed private companies, which have infrequently observed and endogenously timed valuations. The authors propose a Bayesian Markov Chain Monte Carlo estimator that explicitly models the unobserved valuation path between observed valuations and corrects for the selection bias. Applying this estimator to venture capital data, they find that accounting for selection leads to substantially lower alpha estimates and higher estimates of systematic and idiosyncratic risk compared with traditional approaches.

Korteweg, A., and M. Sørensen. 2017. "Skill and Luck in Private Equity Performance." *Journal of Financial Economics* 124 (3):535-62. doi:10.1016/j.jfineco.2017.03.006

The authors investigate the relative importance of skill versus luck in determining the performance of private equity fund managers. The authors develop a new methodology that separates fund performance into a skill component that persists across funds raised by the same manager and a luck/deal component that is uncorrelated across funds. They find that both skill and luck play highly significant roles. There is a skill premium, however, that is substantial in economic terms and has persisted over time. The results suggest that although luck is important, persistent skill differences across private equity managers are a key driver of the large dispersion in fund performance.

Lerner, J., J. Mao, A. Schoar, and N. R. Zhang. 2022. "Investing Outside the Box: Evidence from Alternative Vehicles in Private Equity." *Journal of Financial Economics* 143 (1):359-80. doi:10.1016/j.jfineco.2021.05.034

The authors investigate the performance of alternative vehicles in private equity, such as direct investments, co-investments, and separate accounts, using data from state pensions and sovereign wealth funds. They find that these alternative vehicles outperform traditional private equity funds, even after accounting for fees and other factors. The outperformance is particularly pronounced for direct investments and co-investments, and it is driven by both

better selection and lower fees. Larger, more experienced institutional investors are more likely to invest in these alternative vehicles.

Lerner, J., and A. Schoar. 2004. "The Illiquidity Puzzle: Theory and Evidence from Private Equity." *Journal of Financial Economics* 72 (1):3–40. doi:10.1016/S0304-405X(03)00203-4

The authors examine why investors accept such high fees and costs for investing in illiquid private equity funds despite the potential for higher returns in public equity markets. They develop a model showing that illiquid private equity investments can have higher returns than public markets when there are capital constraints and manager skills are complementary to investment. They find empirical evidence supporting the model's predictions. Private equity funds exposed to more illiquidity are able to compensate for higher risk and return more to investors net of fees. Their results suggest illiquidity is not discounted but creates value.

Lerner, J., A. Schoar, and W. Wongsunwai. 2007. "Smart Institutions, Foolish Choices: The Limited Partner Performance Puzzle." *Journal of Finance* 62 (2):731–64. doi:10.1111/j.1540-6261.2007.01222.x

The authors document the heterogeneity in the returns that different categories of limited partners have earned in their private equity (PE) portfolios. Endowments have fared best, perhaps because they are better able to predict the performance of a PE firm's next fund when considering whether to reinvest.

Lerner, J., M. Sørensen, and P. Strömberg. 2011. "Private Equity and Long-Run Investment: The Case of Innovation." *Journal of Finance* 66 (2):445–77. doi:10.1111/j.1540-6261.2010.01639.x

The authors ask whether private equity funds boost short-term performance at the expense of long-term growth but find no evidence that PE portfolios reduce spending on research and development.

L'Her, J. F., R. Stoyanova, K. Shaw, W. Scott, and C. Lai. 2016. "A Bottom-Up Approach to the Risk-Adjusted Performance of the Buyout Fund Market." *Financial Analysts Journal* 72 (4):36–48. doi:10.2469/faj.v72.n4.1

The authors first confirm previous findings that buyout funds outperform the S&P 500 Index on an equal-weighted basis. Using a bottom-up approach to identify the systematic risks of the underlying portfolio companies, however, they construct a more appropriate benchmark—a levered size- and sector-adjusted public index. When assessing funds against this risk-adjusted benchmark using value-weighted or pooled aggregation methods that better reflect total investor experience, the authors find no evidence of significant outperformance by buyout funds. They argue, however, that buyout funds still play a valuable role in institutional portfolios by providing small-cap exposure, opportunities for manager selection, and access to direct private investments.

Lichtenberg, F. R., and D. Siegel. 1990. "The Effects of Leveraged Buyouts on Productivity and Related Aspects of Firm Behavior." *Journal of Financial Economics* 27 (1):165–94. doi:10.1016/0304-405X(90)90025-U

The authors examine the impact of leveraged buyouts (LBOs) on various aspects of firm performance, particularly productivity, using a dataset of US manufacturing. LBOs lead to significant improvements in total factor productivity that are achieved not through workforce

reductions or lower wages but rather through better utilization of existing resources. LBOs are also associated with increased capital investment, higher R&D spending, and a reallocation of resources toward more productive plants within the firm.

Liu, T. 2021. "Bargaining with Private Equity: Implications for Hospital Prices and Patient Welfare." Working paper, Wharton School of the University of Pennsylvania. doi:10.2139/ssrn.3896410

The author investigates the impact of private equity (PE) ownership on hospital prices and patient welfare using a structural model of hospital-insurer bargaining. PE-owned hospitals charge significantly higher prices compared with non-PE-owned hospitals. These price increases are primarily driven by PE-owned hospitals' increased bargaining power and willingness to engage in tougher negotiations with insurers. The higher prices lead to a net reduction in patient welfare, because the price increases outweigh any potential quality improvements associated with PE ownership.

Ljungqvist, A., and M. Richardson. 2003. "The Cash Flow, Return, and Risk Characteristics of Private Equity." NBER Working Paper 9454. doi:10.3386/w9454

The authors analyze the cash flow, return, and risk characteristics of private equity (PE) funds. This is the first study that had access to detailed cash flow data for each fund, rather than aggregate or self-reported returns. These data allow the authors to map out the J-curve using real data. The authors show that it takes several years for capital to be invested and more than 10 years for capital to be returned to generate excess returns. They then relate the rates of drawdowns and distributions to changes in investment opportunities and competition among PE funds. The authors estimate that PE funds in their sample generated annual excess returns of 5% to 8% relative to the public equity market, earning a risk-adjusted public market equivalent (PME) of 1.24. The authors conjecture that this level of excess returns represents compensation for holding an illiquid investment.

Ljungqvist, A., M. Richardson, and D. Wolfenzon. 2020. "The Investment Behavior of Buyout Funds: Theory and Evidence." *Financial Management* 49 (1):3-32. doi:10.1111/fima.12264

The authors theoretically model and empirically test the determinants of private equity (PE) funds' investment decisions, which they link to changes in the demand for PE, conditions in the credit market, and PE fund managers' ability to influence perceptions of their talent. In their empirical tests, the authors use a dataset of 207 US PE funds that invested in 1,957 portfolio companies over a 30-year period. For established funds, but not for first-time funds, the authors find that funds accelerate their investment rate and generate higher returns for investors when investment opportunities improve, competition for deal flow eases, and credit market conditions loosen. Less established funds invest in riskier portfolio companies in an effort to create a track record. PE funds become more conservative in their investment behavior following periods of good performance.

Long, A., and C. Nickels. 1996. "A Private Investment Benchmark." University of Texas System. Paper presented at AIMR Conference on Venture Capital Investing. http://dns1.alignmentcapital.com/pdfs/research/icm_aimr_benchmark_1996.pdf.

The authors develop a benchmark for evaluating the performance of private equity investments, known as the "Private Investment Benchmark" (PIB). They argue that existing

benchmarks, such as the S&P 500 Index or the Russell 2000 Index, are not suitable for comparing private equity performance because of differences in liquidity, risk, and investment horizons. The PIB takes into account the unique characteristics of private equity investments, such as the timing and magnitude of cash flows, and provides a more accurate assessment of their performance relative to public market alternatives.

Lopez-de-Silanes, F., L. Phalippou, and O. Gottschalg. 2015. "Giants at the Gate: Investment Returns and Diseconomies of Scale in Private Equity." *Journal of Financial and Quantitative Analysis* 50 (3):377–411. doi:10.1017/S0022109015000113

The authors document substantial dispersion in deal-level performance in private equity (PE). Deal-level performance is lower at times when a PE firm has more investments to look after, suggesting that diseconomies of scale exist in private equity.

Lowenstein, L. 1985. "Management Buyouts." *Columbia Law Review* 85 (4):730–84. doi:10.2307/1122333

The author examines management buyouts (MBOs) from a legal and economic perspective. MBOs can create significant conflicts of interest between management and shareholders, as managers may prioritize their own financial gains over the long-term interests of the company. There are several potential problems with MBOs, including the lack of arm's length bargaining, the use of inside information by management, and the potential for managers to manipulate company performance to lower the buyout price. The author also discusses the legal framework surrounding MBOs, including the fiduciary duties of management and the role of the board of directors in evaluating and approving these transactions. The author concludes by proposing several reforms to mitigate the risks associated with MBOs, such as requiring greater disclosure, mandating independent fairness opinions, and strengthening the legal remedies available to shareholders.

Magnuson, W. 2018. "The Public Cost of Private Equity." *Minnesota Law Review* 102:1847–910. www.minnesotalawreview.org/wp-content/uploads/2018/06/Magnuson_MLR.pdf.

The author explores the potential negative externalities and social costs associated with private equity (PE) investments. Although PE firms may generate significant returns for their investors, their activities can also impose substantial costs on other stakeholders, such as workers, communities, and taxpayers. PE investments can create social costs through job losses and wage reductions resulting from cost-cutting measures, increased financial instability caused by high leverage, and reduced tax revenues stemming from the use of tax-efficient investment structures. The author argues the current regulatory framework surrounding PE fails to adequately address these negative externalities and protect the interests of non-investor stakeholders.

Metrick, A., and A. Yasuda. 2010. "The Economics of Private Equity Funds." *Review of Financial Studies* 23 (6):2303–41. doi:10.1093/rfs/hhq020

The authors study the compensation structure and incentives of PE fund managers. They find that the typical PE fund charges a management fee of around 2% of committed capital and a carried interest of 20% of profits, subject to a hurdle rate of 8%. There is, however, substantial cross-sectional variation in fees and carried interest, with larger and more-established funds charging higher fees. The study reveals that the compensation

structure of PE funds creates strong incentives for fund managers to maximize investment returns but may also lead to excessive risk-taking and misalignment of interests between managers and investors.

Nadauld, T. D., B. A. Sensoy, K. Vorkink, and M. S. Weisbach. 2019. "The Liquidity Cost of Private Equity Investments: Evidence from Secondary Market Transactions." *Journal of Financial Economics* 132 (3):158–81. doi:10.1016/j.jfineco.2018.11.007

The authors investigate the liquidity cost of private equity (PE) investments by analyzing secondary market transactions in PE funds. PE funds trade at a significant discount to their net asset value (NAV) in the secondary market. This discount is larger for smaller, younger, and lower-performing funds, as well as during periods of market stress. The authors argue that the discount reflects the illiquidity of PE investments and the cost of providing liquidity to PE investors who need to sell their stakes before the end of the fund's life. They estimate the total liquidity cost of PE investments to be around 5% of the fund's NAV, which is significantly higher than the liquidity cost of publicly traded securities.

Olsson, M., and J. Tåg. 2017. "Private Equity, Layoffs, and Job Polarization." *Journal of Labor Economics* 35 (3):697–754. doi:10.1086/690712

The authors examine the impact of private equity (PE) buyouts on employment and job polarization in Sweden. PE buyouts lead to significant job losses, particularly in the first two years after the buyout. These losses are primarily concentrated among low-skilled and routine jobs, however. The authors argue that PE firms accelerate the process of reallocating resources toward more productive and skill-intensive activities, consistent with the idea that PE buyouts can spark technological change and structural transformation.

Pástor, L., and R. F. Stambaugh. 2003. "Liquidity Risk and Expected Stock Returns." *Journal of Political Economy* 111 (3):642–85. doi:10.1086/374184

The authors investigate the relationship between liquidity risk and expected stock returns. They develop a measure of liquidity risk based on the sensitivity of stock returns to changes in aggregate market liquidity. Using data from the US stock market, they find that stocks with higher liquidity risk exhibit significantly higher expected returns, even after controlling for other well-known risk factors. The study also documents that the liquidity risk premium is time varying and tends to be higher during periods of market stress and low overall liquidity.

Phalippou, L. 2014. "Performance of Buyout Funds Revisited?" *Review of Finance* 18 (1):189–218. doi:10.1093/rof/rft002

The author challenges the widely held view that private equity buyout funds significantly outperform public markets. Using a dataset of 781 buyout funds raised between 1980 and 2008, the study finds that the average buyout fund underperforms the S&P 500 Index by around 3% per year after fees, with a wide dispersion of returns across funds. The author argues that previous studies have overstated the performance of buyout funds because of survivorship bias, selection bias, and the use of inappropriate benchmarks. The study also reveals that the performance of buyout funds has deteriorated over time, which the author attributes to increased competition, higher valuations, and lower value creation opportunities in the buyout market.

Phalippou, L., and O. Gottschalg. 2009. "The Performance of Private Equity Funds." *Review of Financial Studies* 22 (4):1747–76. doi:10.1093/rfs/hhn014

The authors introduce a new methodology for measuring private equity (PE) fund performance that accounts for biases in previous studies and provides a more accurate picture of the returns earned by PE investors. The authors find underperformance of PE funds relative to the S&P 500 Index. They also document significant variation in performance across PE funds, with a wide dispersion of returns and a strong persistence of performance across successive funds managed by the same firm.

Robinson, D. T., and B. A. Sensoy. 2011. "Cyclicality, Performance Measurement, and Cash Flow Liquidity in Private Equity." Working paper, Duke University.

The authors examine the cyclicality of private equity (PE) fund performance and its implications for performance measurement and cash flow liquidity. They find that PE fund performance is highly cyclical, with funds raised during boom periods underperforming those raised during bust periods, even after controlling for fund size, sequence, and vintage-year fixed effects. The authors argue that this cyclicality is driven by the pro-cyclical nature of PE investment activity and the variation in capital market conditions over the PE fund life cycle. They also show that the cyclicality of PE fund performance can lead to significant biases in performance measurement, particularly when using metrics that do not account for the timing and magnitude of cash flows, such as the internal rate of return (IRR).

Robinson, D. T., and B. A. Sensoy. 2013. "Do Private Equity Fund Managers Earn Their Fees? Compensation, Ownership, and Cash Flow Performance." *Review of Financial Studies* 26 (11):2760–97. doi:10.1093/rfs/hht055

The authors examine the relationship between private equity (PE) fund manager compensation, ownership, and cash flow performance. PE fund managers with higher ownership stakes in their funds tend to generate higher cash flow performance, both in absolute terms and relative to public market benchmarks. This dynamic suggests that the alignment of interests between fund managers and investors through ownership is an important driver of PE fund performance.

Robinson, D. T., and B. A. Sensoy. 2016. "Cyclicality, Performance Measurement, and Cash Flow Liquidity in Private Equity." *Journal of Financial Economics* 122 (3):521–43. doi:10.1016/j.jfineco.2016.09.008

The authors examine the cyclicality of private equity (PE) fund performance and its implications for performance measurement and cash flow liquidity. They find that PE fund performance is highly cyclical, with funds raised during boom periods underperforming those raised during bust periods, even after controlling for fund size, sequence, and vintage-year fixed effects. The authors argue that this cyclicality is driven by the pro-cyclical nature of PE investment activity and the variation in capital market conditions over the PE fund life cycle. They also show that the cyclicality of PE fund performance can lead to significant biases in performance measurement, particularly when using metrics that do not account for the timing and magnitude of cash flows, such as the internal rate of return (IRR).

Rubinstein, M. 1976. "The Strong Case for the Generalized Logarithmic Utility Model as the Premier Model of Financial Markets." *Journal of Finance* 31 (2):551-71. doi:10.2307/2326626

The author argues for the generalized logarithmic utility model as the most suitable model for understanding financial markets. This model is consistent with several important empirical observations, such as the positive relationship between risk and return, the existence of a risk-free rate, and the diversity of portfolio holdings among investors. The model implies that investors will hold a combination of the risk-free asset and a well-diversified portfolio of risky assets, with the proportion allocated to each determined by their level of risk aversion. The study has had a significant impact on the development of financial economics.

Sensoy, B. A., Y. Wang, and M. S. Weisbach. 2014. "Limited Partner Performance and the Maturing of the Private Equity Industry." *Journal of Financial Economics* 112 (3):320-43. doi:10.1016/j.jfineco.2014.02.006

The authors investigate the performance of limited partners (LPs) in private equity (PE) funds and how it has evolved as the PE industry has matured. Using a dataset of 1,852 PE funds raised between 1991 and 2006, the authors find that the performance of LPs has declined over time, particularly for large, established LPs. This decline is primarily driven by the increasing competition for deals and the decreasing returns to scale in the PE industry. The study also reveals that LPs' experience and access to top-performing PE firms, which were once sources of competitive advantage, have become less important as the industry has matured.

Shive, S. A., and M. M. Forster. 2020. "Corporate Governance and Pollution Externalities of Public and Private Firms." *Review of Financial Studies* 33 (3):1296-330. doi:10.1093/rfs/hhz079

The authors explore the relationship between corporate governance structures and pollution externalities, focusing on both public and private firms. The study investigates how differences in governance mechanisms impact firms' environmental behavior and their contribution to pollution externalities. Using empirical analysis, the authors shed light on how corporate governance practices influence firms' environmental performance and their role in mitigating or exacerbating pollution externalities.

Sørensen, M., and R. Jagannathan. 2015. "The Public Market Equivalent and Private Equity Performance." *Financial Analysts Journal* 71 (4):43-50. doi:10.2469/faj.v71.n4.4

The article provides a theoretical justification for using the public market equivalent (PME) measure to evaluate the performance of private equity (PE) funds. The authors show that the PME is equivalent to assessing PE performance using the dynamic version of the CAPM developed by Rubinstein (1976). Under this model, PE cash flows are valued by discounting them with realized market returns. This approach automatically adjusts for the systematic risk of the investment without requiring explicit calculation of betas. The authors argue the PME is robust to manipulation and changes in leverage. They conclude that when calculating the PME, the market index used should approximate the return on the PE investor's overall wealth portfolio.

Sørensen, M., N. Wang, and J. Yang. 2014. "Valuing Private Equity." *Review of Financial Studies* 27 (7):1977-2021. doi:10.1093/rfs/hhu013

The article develops a model to value private equity (PE) investments from the perspective of an institutional investor, such as an endowment or pension fund. The model captures key features of PE investments including illiquidity, long-term commitment, GP compensation

structure, and leverage. The authors find that costs of illiquidity and GP compensation are substantial. Leverage reduces these costs and may justify the high levels of debt used in PE transactions. The model-implied breakeven values of PE performance measures like IRR and PME are found to be close to empirically observed levels, suggesting many PE investors may just break even after accounting for risk, illiquidity, and GP compensation.

Stafford, E. 2022. "Replicating Private Equity with Value Investing, Homemade Leverage, and Hold-to-Maturity Accounting." *Review of Financial Studies* 35 (1):299–342. doi:10.1093/rfs/hhab020

The author proposes a method to replicate the performance of private equity (PE) investments using publicly traded securities. The article suggests that by using value investing strategies, homemade leverage, and hold-to-maturity accounting practices, investors can mimic the return profile of PE investments. The author provides theoretical insights and empirical evidence to support the effectiveness of this replication strategy, offering investors an alternative approach to accessing the benefits typically associated with private equity investments.

Stucke, R. 2011. "Updating History." Working paper, University of Oxford. doi:10.2139/ssrn.1967636

The author analyzes the Thomson VentureXpert (TVE) database, which has been widely used to benchmark the performance of private equity and venture capital funds. The study finds severe anomalies in the underlying data, resulting from funds that stopped being updated during their active lifetime. About 40% of funds have missing cash flows, mainly on the distribution side, and carried-forward net asset values, leading to a significant downward bias in private equity performance. Consequently, the author argues that many empirical results established using the TVE database may not be replicable with correct data. In particular, the claim that private equity has not outperformed public equity is unlikely to hold with the true fund performance data.

Tommar, S. A., S. Darolles, and E. Jurczenko. 2024. "Private Equity Performance around the World." *Financial Analysts Journal* 80 (2):99–121. https://doi.org/10.1080/0015198X.2023.2292545

The authors examine the performance and persistence of private equity funds in international markets outside of North America. Both investment strategy and geography are important for fund performance, with buyout funds performing best in Europe, growth equity funds performing best in Asia Pacific, and venture capital creating modest returns across all regions. There is also evidence of strong performance persistence and market segmentation for buyout and growth funds in Europe, as well as for globally diversified, US-sponsored buyout funds, but there is no such evidence in Asia Pacific.

Wang, Y. 2012. "Secondary Buyouts: Why Buy and at What Price?" *Journal of Corporate Finance* 18 (5):1306–25. doi:10.1016/j.jcorpfin.2012.09.002

The author investigates three potential explanations for secondary buyouts: efficiency gains, liquidity-based market timing, and collusion. The results are most consistent with liquidity-based market timing. Firms are more likely to exit through secondary buyouts when the equity market is "cold," the debt market condition is favorable, and the sellers face a high demand for liquidity. Secondary buyouts are priced higher than first-time buyouts because of favorable debt market conditions. Overall, the results suggest that secondary buyouts serve primarily to alleviate the financial needs of private equity firms rather than to create value for target companies.

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