

## Private equity portfolio companies: A first look at Burgiss holdings data<sup>+</sup>

Gregory Brown<sup>a</sup>, Robert S. Harris<sup>b</sup>, Wendy Hu<sup>c</sup>,  
Tim Jenkinson<sup>d</sup>, Steven N. Kaplan<sup>e</sup>, and David Robinson<sup>f</sup>

### Abstract

This paper provides a first look at newly available data on the holdings of private equity (PE) funds. Because research has been hampered by the lack of comprehensive, high-quality data on portfolio companies, this new source offers the potential for a wide range of research. Provided by Burgiss, a global provider of data and analytics to investors in PE funds (limited partner investors or LPs), the data are gathered from the financial reports of general partners (GPs) to LPs who are Burgiss clients. The sample covers over 45,000 investments in funds' portfolio companies (in buyout and venture capital); moreover, the coverage is expected to grow through a phased release process. The paper describes preliminary findings on sample characteristics and offers a high-level view on aspects of performance in hopes of inspiring additional research. Returns to investments in portfolio companies are highly variable and skewed. This is particularly true of venture capital where many investments turn out worthless and average performance is boosted by a few spectacular successes that create the bulk of fund value. Performance is related to a number of factors (including investment size, duration of the investment and levels of fund raising), with patterns differing for buyout and venture capital investments.

This version: January 2020

<sup>+</sup> This research has been generously supported by the UAI Foundation, the Private Equity Research Consortium, and the Institute for Private Capital. We thank Burgiss for supplying data and especially James Bachman. Disclosures: Brown has invested in private and public equities. Harris has invested in private and public equities and has held a board position for funds investing in public equities. Kaplan has invested in and consulted to buyout and venture capital funds of funds. Jenkinson has consulted to limited partners, and has held board positions in private equity-backed portfolio companies and in a fund investing in private equity. He also has invested in private and public equities.

<sup>a</sup> *University of North Carolina, Kenan-Flagler Business School, USA*

<sup>b</sup> *University of Virginia, Darden School of Business USA*

<sup>c</sup> *The Burgiss Group, USA*

<sup>d</sup> *University of Oxford, Said School of Business, UK*

<sup>e</sup> *University of Chicago Booth School of Business, USA*

<sup>f</sup> *Duke University, Fuqua School of Business, USA*

## **Private equity portfolio companies: A first look at Burgiss holdings data**

### **1. Introduction**

Each year private equity (PE) funds invest in thousands of companies. In recent years, such PE investments have increased while the number of publicly-listed companies has declined. Research on PE funds has grown due to the increased importance of the asset class and new availability of detailed fund-level data. However, as a recent review on venture capital (VC) research notes: “the basic story on portfolio company data is not a great one...the availability of data as well as the consistency of the academic findings using these data are still lacking” (Kaplan and Lerner 2016). Likewise, large, comprehensive samples on holdings of buyout funds have typically not been available.<sup>1</sup>

This paper provides a first look at new data from Burgiss on over 45,000 portfolio company investments by PE funds (both buyout and VC) made across the last three decades. After describing the data, subsequent sections of the paper provide an overview of preliminary evidence on performance at the holdings level and a few factors related to that performance. Returns to investments in portfolio companies are highly variable and positively skewed, consistent with the existence of diversified fund structures for investing in private equity. Especially in VC, many individual investments turn out worthless; average performance is boosted by some spectacular successes. A number of factors (including investment size, duration of the investment and levels of capital flowing into the sector) are linked to performance, though the patterns differ between buyout and VC. The data and the preliminary results suggest there are fruitful opportunities for

---

<sup>1</sup> See Kaplan and Lerner (2016) and Kaplan and Sensoy (2015) for reviews of data sources used in research and some of their shortcomings.

future research.

The performance of the underlying portfolio company investments drives the performance of PE funds. Portfolio company holdings data, therefore, are crucial to understand what forces drive performance and how funds are structured. For instance, past studies using fund-level data (e.g., Harris, Jenkinson and Kaplan, 2014, 2016, and Brown et al. 2019) find that PE performance, both for buyout and VC investments, has been highly cyclical: periods of high fundraising have been followed by periods of low performance at the fund level. Deal-level data provide a more powerful lens on the issue since a fund's return reflects investments made at different times during the fund's life, and potentially in different economic environments. Deal-level data can also shed light on what type of investments create value as well as agency and signaling issues that may arise over the life of a fund. For example, investments are sometimes "warehoused" even before fund raising is completed, potentially as a quality signal for the fund. In addition, as a fund's investment phase draws to a close, the fund's general partners may experience pressure to make investments in order to call capital commitments and/or to strengthen the case for launching a follow-on fund.

## **2. Data and Measurement**

This paper utilizes new holdings data that reflect the individual investments of thousands of PE funds in the Burgiss database (e.g., purchases of companies and investments in venture rounds).<sup>2</sup> This granularity contrasts with fund-level data that are typically partitioned by a vintage year (in Burgiss data, the year of the first cash flow) even though funds make purchases over an investment phase that spans a number of years.

---

<sup>2</sup> See Brown, Gredil and Kaplan (2019) and Harris, Jenkinson and Kaplan (2014) for discussion of Burgiss fund-level data.

The large cross-sectional database from Burgiss covers 46,311 holdings<sup>3</sup> as of 2019:Q1; 15,095 are buyout investments and 31,206 are VC investments. Realized investments represent slightly over half of both groupings. Burgiss gathers holdings data from the financial reports of general partners (GPs) to the limited partners (LPs) who are Burgiss clients and invest in the GPs' funds. While a smattering of buyout and VC deals were made in the 1980s, the sample has meaningful numbers of holdings for investment years from the mid-1990s through 2018. The median investment year for realized deals is 2007 for buyout and 2006 for VC. For still active deals, the median investment year is 2015 for both. Burgiss is in the process of increasing both the sample size and variables for holdings which they will provide for research. This results from a phased process that releases data only after extensive checks, with a goal of ultimately providing detailed cash-flow data for a comprehensive set of holdings. The Appendix to this paper provides detail on sourcing and a breakout of the sample by time period, realization status, industry and geography.

Burgiss currently reports an investment's multiple of invested capital (MOIC or "money multiple") as a measure of performance. The MOIC is also referred to as the multiple of Total Value to Paid-in capital (TVPI) and we use these interchangeably. As an additional metric for some of our analysis, we estimate a "market-adjusted" multiple (MAM) to control for the opportunity costs of not investing in public equity markets. To estimate the MAM with currently available data on holdings, we divide the MOIC of the holding by the MOIC of the S&P 500 index (inclusive of dividends) over the time interval of the investment. This adjusted multiple is a crude form

---

<sup>3</sup> As a comparison, Braun, Jenkinson and Stoff (2017) focus on buyout and include 13,523 investments sourced from three large fund-of-fund managers. While Braun et al. have roughly the same number of companies as in our buyout sample, the deals come from roughly a decade earlier than ours with a median investment year of 1998 for realized deals. Over two-thirds of the Burgiss sample is in venture capital.

of a public market equivalent, or PME, developed by Kaplan and Schoar (2005) and used frequently in research on fund-level data. To simplify the exposition, and conform to the literature on fund-level returns, we will use PME as the term describing market-adjusted multiples (MAM).

### **3. What does performance look like at the deal level?**

*Key Findings: Portfolio company investment performance is highly variable and positively skewed, especially in VC, and consistent with the diversified fund model for private equity investing.*

Table 1 provides summary statistics for the sample. This includes both realized and unrealized deals. As a result, the magnitudes are likely to change over time. For buyout, the mean money multiple is 1.91 and the mean PME is 1.21. Value-weighted figures are lower than the equally weighted figures suggesting larger deals do not perform as well on average. The percentile values display large dispersion with a median money multiple of 1.56 and median PME of 1.06. The figures for VC in Panel B show even more dispersion than for buyout. The median values for VC are well below the mean and even the 75th percentile values fall below the mean, illustrating the highly dispersed and positively skewed distribution of performance.

Focusing on realized buyout deals, Panel A of Figure 1 shows that the mean (median) multiple is 2.28 (2.07) but that a fifth of multiples are essentially zero and a few holdings are exceptionally profitable. The pattern for VC investments is even more dispersed and skewed: Panel B shows that about half of VC holdings end up being worthless, or with very low value. Roughly 60% of investments lose money. The result is a large gap between mean and median multiples in VC deals.

Such highly dispersed outcomes mean that *overall performance in private equity is dependent on the success of a relatively limited number of investments, especially in VC funds.*

Figure 2 shows Lorenz curves plotting the cumulative distribution of value resulting from holdings versus the cumulative distribution of the number of holdings when ranked by profitability (based on multiples). A holding's dollar value is its MOIC multiplied by its size (i.e., the denominator in the multiple calculation). Figure 2 illustrates the outsized role of successful holdings, especially in VC. The top panel echoes earlier results in buyout; almost 20% of holdings end up with zero value, the lowest returning 80% account for just over 60% of the value, leaving almost 40% of value from the top 20% of holdings. The bottom panel shows an even more dramatic pattern for VC. About 40% of investments end up worthless and the vast majority of value, about 80%, is generated by twenty percent of investments. To use a sports analogy, "hitting home runs" is vitally important to a fund's success in VC investing.

These results highlight the importance of diversified fund structures in private equity investing, especially for VC. The performance distributions also signal the need for special care in creating research designs to study holdings data where performance is highly skewed. Similar results and identical conclusions emerge for Lorenz curves using the cumulative dollar value (versus number) of investments.

#### **4. Is performance related to the size of a deal?**

*Key Findings: Large investments appear to have lower performance for buyout but not for venture capital.*

Figure 3 charts multiples and market-adjusted multiples (PME) across size quartiles based on the size of an investment (quartile 4 capturing the largest fourth of observations within a year). For buyout, money multiples and PMEs decline as size increases, falling from a noticeably higher level for the smallest size quartile.

For VC, there is no clear link between investment size and performance in Figure 3. This

is likely due to the nature of the holdings data and the sequential nature of funding for venture companies. A holding represents the sum across all of a fund's exposure to a portfolio company. As a consequence, large investments in holdings can be built up over multiple rounds of financing if the company continues to thrive. In contrast if the company falters, there may be no additional funding forthcoming. Preliminary tests actually suggest there may be higher performance for extremely large VC deals and this is a promising area for research to study exit decisions.

## **5. Is performance related to how long an investment is held before exit?**

*Key Findings: Average performance appears to drop off for exits past 4 years for buyouts, but not for VC.*

Perhaps surprisingly, the average duration (from investment to realization) of exited investments is essentially the same in buyout and venture. As Figure 4 highlights, however, the duration of investments is highly variable, more so in VC. While the median duration is five years in both buyout (Panel A) and venture (Panel B), there is a long "tail" of investments that take much longer more than the typical ten-year assumed life of a PE fund, with a small percent stretching to 15 years or more.

Figure 5 charts performance against the duration of the investment. For buyout, both the multiple and PME start to decline after about 3 years; the relatively larger drop in PME reflects the opportunity cost of leaving money in the holding. This pattern is consistent with buyout funds targeting a holding period of five years or less. Extending a buyout's exit beyond that horizon is associated with substantially lower performance. In VC, however, performance is not linked to holding duration. Average TVPIs trend up slightly with duration while average PMEs hold steady above 1.0. This pattern in VC may reflect the sequential nature of financing as well as the

heterogeneity of holdings within the venture space and the longer time it takes to build a young company.

## **6. Does the supply of capital affect performance at the holding level?**

*Key Findings: Performance is lower for investments made (holdings) in years when the supply of capital to the sector is high. This effect is particularly pronounced in VC, consistent with fund-level research. Moreover, supply conditions in the investment year appear more important than those for the vintage year of the fund making the investment. Finally, buyout exits during high supply conditions (and hence competition in pricing) are associated with higher performance but this pattern does not hold in VC.*

Figure 6 charts investment multiples based on the amount of capital available to do deals. We use funds committed, but not yet called, across all funds, or so-called “dry powder”, as our measure of available capital. We do this separately for buyout and VC funds and divide by the trailing three-year average of dry powder. Years are then segmented into quartiles (4 being high levels of dry powder) using three alternate schemes: the vintage year of a fund making an investment (first cluster of 4 bars), the year the investment is made (second cluster of bars) and the year the holding is exited. For buyout, capital supply conditions in vintage and investment years show modest effects, though the second cluster of bars (investment year quartiles) shows a slightly more pronounced downward trend in performance as the capital supply increases. The most notable pattern for buyout is the strong performance boost from exiting in high capital supply years.

For venture, the performance effects of capital supply are more pronounced and appear most strongly related to the investment year of the holding. Average performance of VC investments made in years with high capital supply are noticeably lower.

## **7. Summary and Conclusions**

This paper provides a first look at newly available data on the holdings of PE funds. Because research has been hampered by the lack of comprehensive, high-quality data on portfolio companies, we are hopeful that this new source will be a catalyst for research on a wide range of issues. Sourced from GP reporting on thousands of funds, the data are from the Burgiss Group, a global provider of data management services for the limited partner community. The sample covers over 45,000 investments in funds' portfolio companies (in buyout and VC); the coverage is expected to grow through a phased release process.

The paper describes sample characteristics and offers a high-level view of preliminary findings on a few aspects of performance. Returns to investments in portfolio companies are highly variable and skewed. Especially in VC, many investments turn out worthless and average performance is boosted by some spectacular successes that create the bulk of fund value. Performance appears linked to a number of factors (including investment size, duration of the investment and levels of fund raising), though patterns differ between buyout and VC.

## References

- [1] Braun, Riener, T. Jenkinson and C. Schemmerl, 2019, Adverse selection and the performance of private equity co-investments, forthcoming *Journal of Financial Economics*.
- [2] Brown, G., R. Harris, T. Jenkinson, S. Kaplan and D. Robinson, 2015, What Do Different Commercial Data Sets Tell Us About Private Equity Performance?, Working Paper, Private Equity Research Consortium. SSRN paper 2706556.
- [3] Brown, G., O. Gredil and S. Kaplan, 2019, Do Private Equity Funds Manipulate Reported Returns? forthcoming *Journal of Financial Economics*.
- [4] Cornelius, Peter, 2011, International Investments in Private Equity: Asset Allocation, Markets, and Industry Structure (Academic Press, London, UK).
- [5] Fang, Lily, V. Ivashina and J. Lerner, 2015, The disintermediation of financial markets: Direct investing in private equity, *Journal of Financial Economics*, Vol.116, No. 1, 160-1778.
- [6] Gredil, Oleg, 2015, Market-Timing and Agency Costs: Evidence from Private Equity. Working Paper, Tulane University.
- [7] Gredil, Oleg, Barry Griffiths and Rudiger Stucke, 2014, Benchmarking Private Equity: the Direct Alpha Method, SSRN number 2403521.
- [8] Harris, Robert, Tim Jenkinson, and Steven N. Kaplan, 2014, Private Equity Performance: What Do We Know? *Journal of Finance* 69(5), 1851-1882.
- [9] Harris, Robert, Tim Jenkinson, and Steven N. Kaplan, 2016, How Do Private Equity Investments Perform Compared to Public Equity? *Journal of Investment Management*, Volume 14, No. 3.
- [10] Harris, Robert, Tim Jenkinson, Steven N. Kaplan, and Rudiger Stucke, 2015, Has persistence persisted in private equity? Working paper, University of Chicago. SSRN paper 2304808.
- [11] Harris, Robert, Tim Jenkinson, Steven N. Kaplan, and Rudiger Stucke, 2018, Financial Intermediation in Private Equity: How Well Do Funds of Funds Perform? *Journal of Financial Economics*, Vol. 129(2), 287-305.
- [12] Kaplan, Steven N. and Josh Lerner, 2016, Venture Capital Data: Opportunities and Challenges, National Bureau of Economic Research, Working Paper 2250.
- [13] Kaplan, Steven N., and Antoinette Schoar, 2005, Private Equity Returns: Persistence and Capital Flows, *Journal of Finance* 60(4), 1791-1823.

- [14] Kaplan, Steven N., and Berk Sensoy, 2015, Private Equity Performance: A Survey, *Annual Review of Financial Economics* 21(11), 1-18.
- [15] Kaplan, Steven N., and Per Stromberg, 2009, Leveraged Buyouts and Private Equity, *Journal of Economic Perspectives* 23(1), 121-146.
- [16] Kauffman Foundation, 2012, “We Have Met the Enemy. . . And He is US: Lessons from Twenty Years of the Kauffman Foundation’s Investment in Venture Capital Funds and The Triumph of Hope over Experience.” Working Paper.
- [17] Kocis, James M., James C. Bachman, Austin M. Long, and Craig J. Nickels, 2009, Inside Private Equity (John Wiley & Sons, Hoboken, N.J., USA).
- [18] Nadauld, Taylor, B. Sensoy, K. Vorkink and M. Weisbach, 2019, The liquidity cost of private equity investments; Evidence from secondary market transactions, *Journal of Financial Economics*, Vol. 132, No. 3, 158-181.
- [19] Robinson, David T. and Berk Sensoy, 2016, Cyclicity, Performance Measurement and Cash Flow Liquidity in Private Equity, *Journal of Financial Economics*, 122(3): 512-543.
- [20] Sensoy, Berk, Yingdi Wang, and Michael Weisbach, 2014, Limited Partner Performance and the Maturing of the Private Equity Market, *Journal of Financial Economics* 112(3), 320-343.
- [21] Sorensen, Morten, and Ravi Jagannathan, 2015, The Public Market Equivalent and Private Equity Performance, *Financial Analysts Journal* 71(4), 43-50.

**Table 1: Performance Characteristics of Buyout and Venture Capital Holdings**

This table reports means (both value-weighted and equally weighted) for the multiple of invested capital (TVPI) along with the standard deviation and percentile values. The table also reports an approximation of a market adjusted public market equivalent (PME) using the S&P 500 as the public market index. The figures are calculated across all holdings-both active and exited, with size information.

Panel A: Buyout

	Mean (value-weighted)	Mean (equally weighted)	Standard Deviation	25 <sup>th</sup> Percentile	50 <sup>th</sup> Percentile	75 <sup>th</sup> Percentile
TVPI	1.91	2.14	2.83	1.00	1.56	2.66
PME	1.21	1.45	2.05	0.57	1.06	1.74

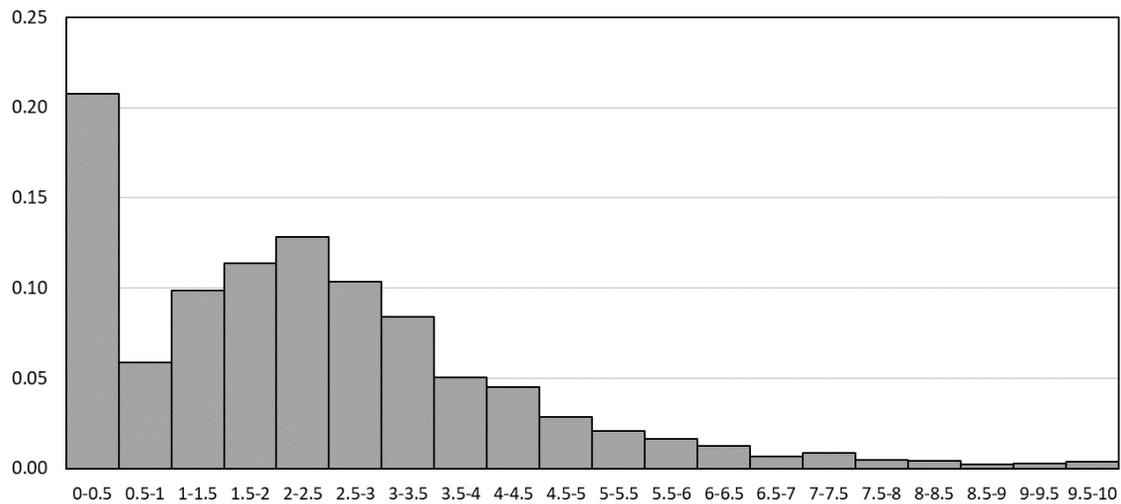
Panel B: Venture Capital

	Mean (value-weighted)	Mean (equally weighted)	Standard Deviation	25 <sup>th</sup> Percentile	50 <sup>th</sup> Percentile	75 <sup>th</sup> Percentile
TVPI	2.21	2.13	6.94	0.11	1.00	1.99
PME	1.33	1.35	4.19	0.08	0.71	1.31

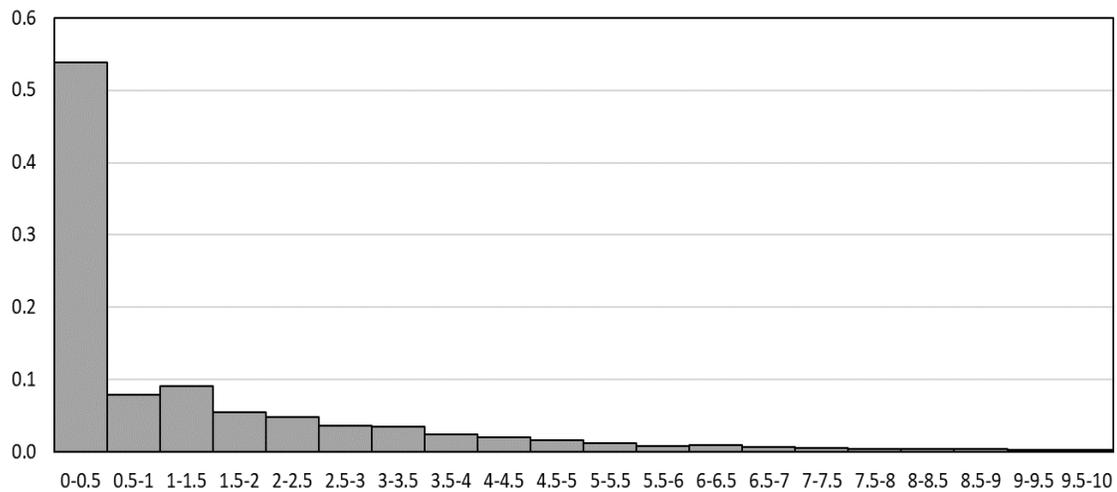
### Figure 1: Investment Multiples for Holdings in Buyout and Venture Capital Funds

This figure shows the distribution of Multiple of Invested Capital (or MOIC) also called Total Value to Paid-in Capital (TVPI) for realized (exited) holdings of buyout funds (in Panel A) and venture capital funds (in Panel B). The distributions shown are for multiples of ten or less and are for holdings with complete information including size.

Panel A: Buyout Holdings



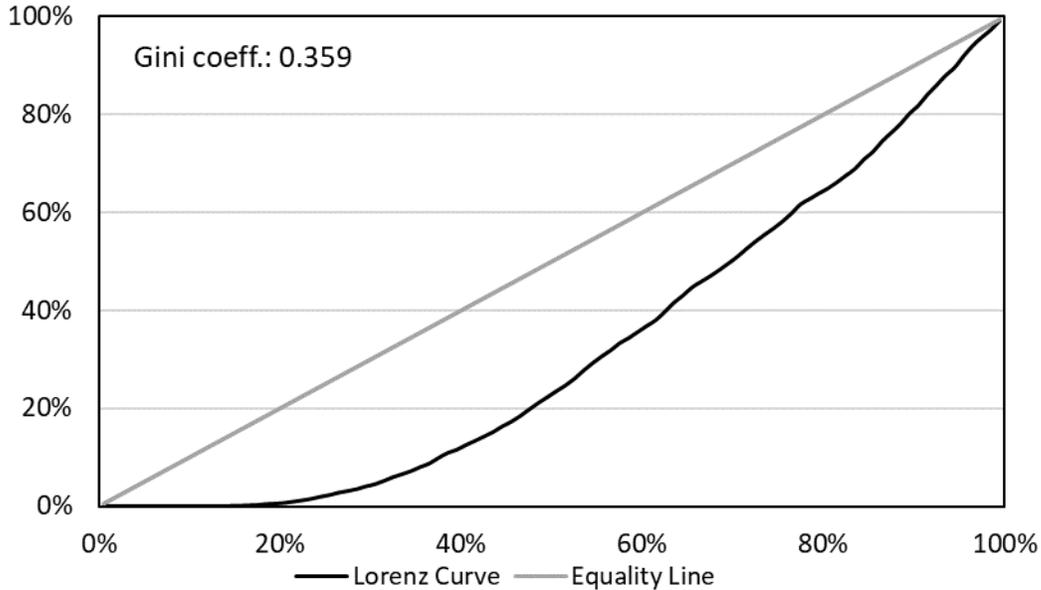
Panel B: Venture Capital Holdings



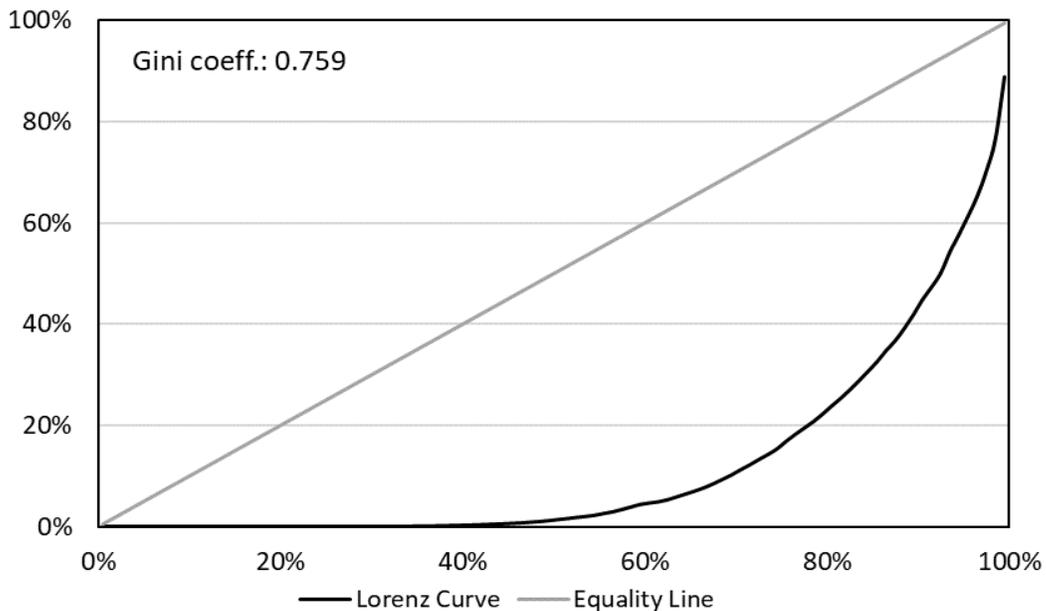
## Figure 2: Value Creation and Holdings in Buyout and Venture Capital Funds

This figure charts Lorenz curves graphing the cumulative distribution of the dollar value resulting from realized holdings versus the cumulative distribution of the number of holdings ranked on holding investment multiples. A holding's value is its investment size times its investment multiple. Gini coefficients measure the degree of equality across holdings (0 is perfect equality, 1.0 perfect inequality).

Panel A: Buyout Fund Holdings



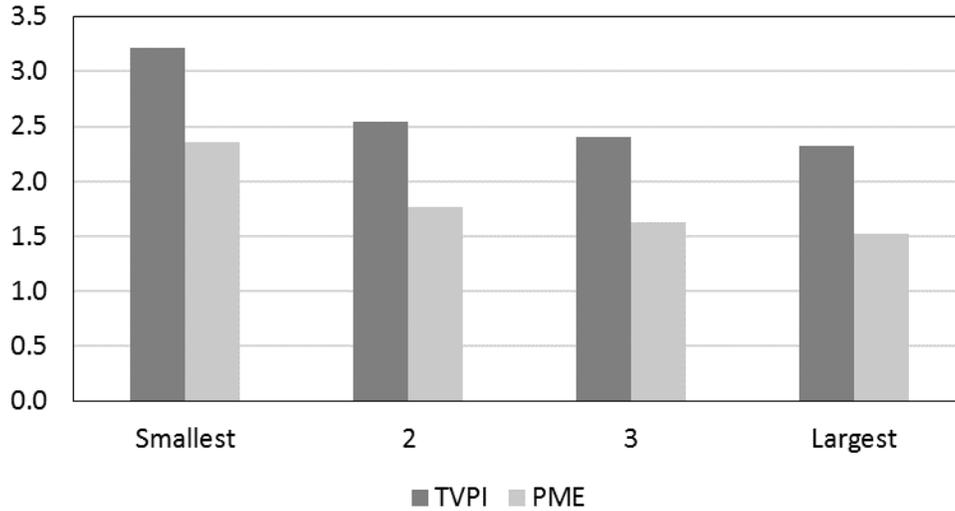
Panel B: Venture Capital Fund Holdings



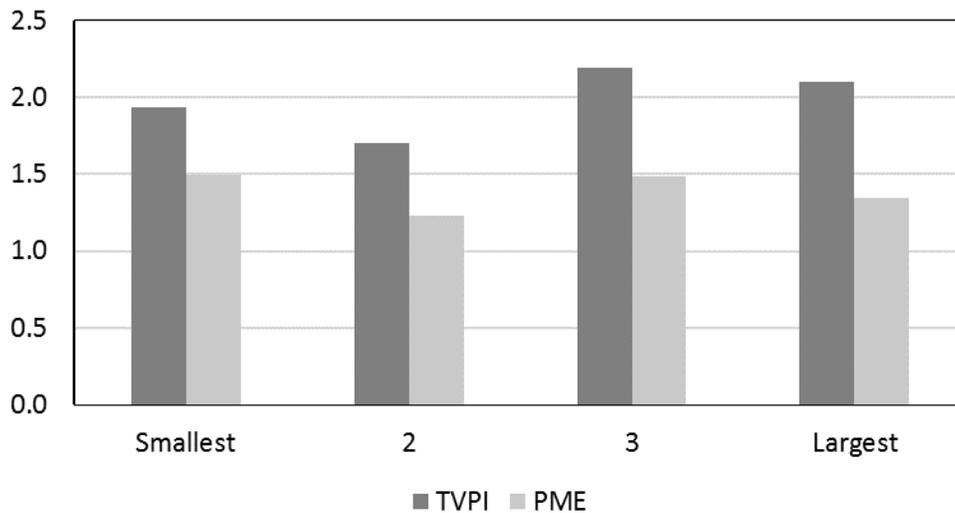
### Figure 3: Investment Size and the Performance of Realized Investments

This figure graphs the value-weighted performance for holdings versus the size of the holding for buyout (Panel A) and Venture Capital (Panel B) investments. Performance is prior to any fees and carried interest and is measured in two ways: the investment multiple (TVPI) and an approximated public market equivalent (PME). Holdings are segmented into size quartiles (quartile 4 capturing the largest holdings).

Panel A: Buyout Multiple and PME by Size Quartile



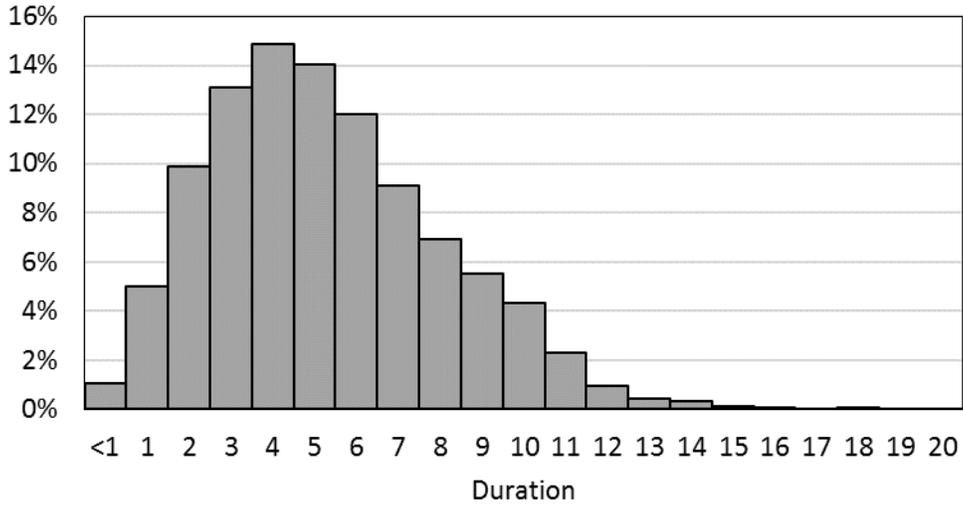
Panel B: Venture Capital Multiple and PME by Size Quartile



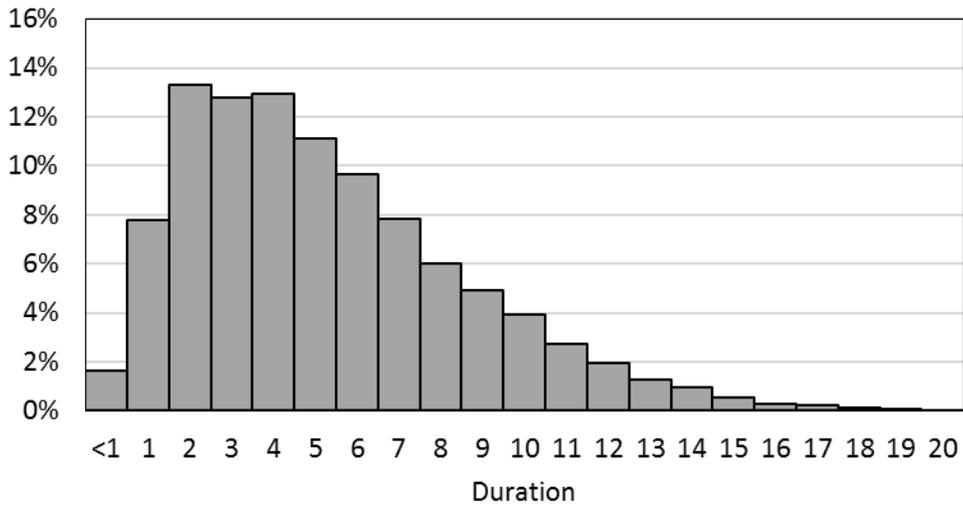
### Figure 4: Duration of Investment Period

This figure plots the histograms of portfolio company investment periods (duration) in years for buyout (Panel A) and Venture Capital (Panel B) investments. Results are for the sample with complete information including size and only for investments that have been exited.

Panel A: Buyout Fund Investments



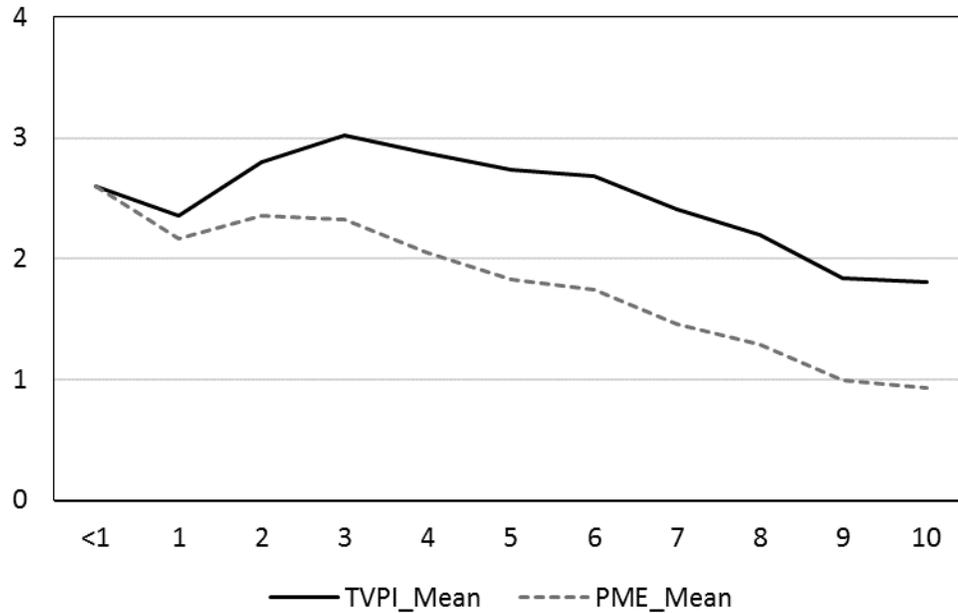
Panel B: Venture Capital Fund Investments



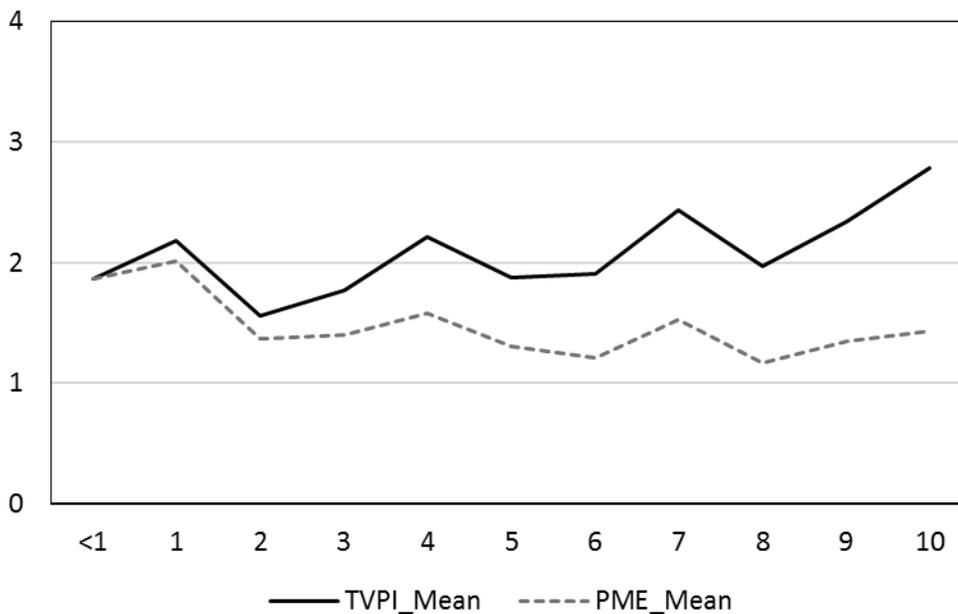
### Figure 5: Performance and Duration of Holding

This figure plots performance of portfolio companies by duration (in years) of investment period. Performance is prior to any fees and carried interest and is measured in two ways: the investment multiple (TVPI) and an approximated public market equivalent (PME). Buyout portfolio companies are shown in Panel A and venture capital companies are shown in Panel B. Results are for the sample with complete information including size and only for investments that have been exited. These figures are for the sample with complete information.

Panel A: Buyout



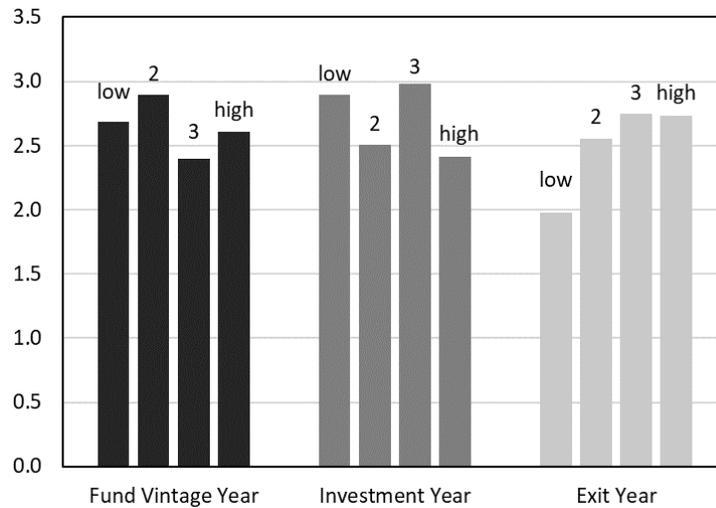
Panel B: Venture Capital



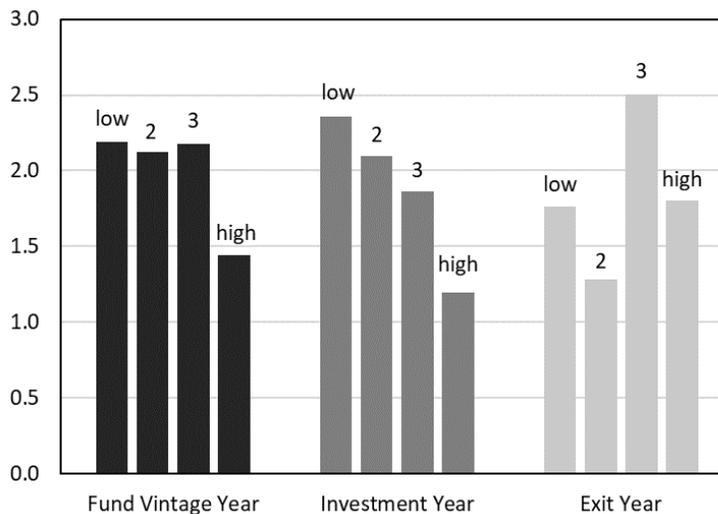
### Figure 6: Performance and the Supply of Capital

This figure charts the mean investment multiple (TVPI, prior to fees and carry) for holdings as a function of capital supplied for investing in private equity. Calendar years are segmented into quartiles based on the annual level of dry powder divided by the three-year rolling average of dry powder. Separate measures are developed for buyout and venture with 4 (high) being the highest quartile of capital supply years for that asset class. Holdings are then assigned to quartiles in three alternative ways: based on the vintage year of the fund with the holding, the investment year of the holding, and the exit year of the holding. We use 1997-2016 to assign quartiles for investment and vintage years. For exit years, we use 2001-2018 given the lag between investment and exit.

Panel A: Buyout TVPI



Panel B: Venture Capital TVPI



## **Appendix. Burgiss Holdings Data (as of 2019:Q1)**

The data for this study are provided by Burgiss, a global provider of data and analytics for the limited partner community. Fund-level data from Burgiss include detailed, verified and cross-checked cash-flow histories for a nearly exhaustive sample of private equity funds for over three decades. These cash flows are net of fees and profit shares (also called carried interest) paid to the general partner (GP), and thus represent the actual cash inflows and outflows earned by the limited partner (LP). Burgiss data have been used extensively in recent academic work (see, for instance, Brown, Gredil and Kaplan, 2019, Harris, Jenkinson and Kaplan, 2014, 2016).

Burgiss is in a staged process of building and releasing a large set of holdings level data. The holdings represent the investments made by funds in underlying portfolio companies. Burgiss gathers these data from the actual financial reports of GPs to the LPs who are Burgiss clients and invest in the GPs' funds. Holdings are included for any fund in the Burgiss Manager Universe (i.e. the fund-level cash flows are already present). As of early 2019, Burgiss has information on well over 150,000 holdings across all types of funds including buyout, venture, real estate and other forms of private equity investing. Over time, Burgiss plans to grow the available data both in the number of holdings and information per holding, with the goal of ultimately providing detailed cash-flow data for a comprehensive set of holdings.

The staged release applies verification processes which include screening out duplicative positions, checking extreme values of observations, and testing for apparent anomalies between holdings and fund level data. For instance, if fund performance (net of fees and carry) exceeds the aggregated holding performance (gross of fees and carry), this will prompt investigation to determine whether this reflects underlying data issues or is due to some other factor, for example, the fund's use of subscription lines of credit. A challenge is that GP reports do not always communicate detailed information on a holding prior to exit. GP reporting has improved in recent

years but was less complete in the early years of the industry. Moreover, Burgiss gains access to GP reports only if and when a Burgiss client has invested in the fund. Since Burgiss has hundreds of LP clients the result is quite comprehensive fund coverage from inception over the last quarter century. For early years, however, the coverage since fund inception will not be as complete. See Brown et al. (2015), (2014) and Kaplan and Sensoy (2015) for detailed discussions of fund coverage.

Burgiss has compared aggregate performance from fund-level data (net), vintage by vintage, to that implied by the holdings-level data (gross) and reports that results behave in line with what is expected given reasonable assumptions for management fees, expenses and carry. This finding suggests the data are representative of all fund holdings and thus appropriate for research. Future research on this topic will be important and will benefit from the increasing size and scope of data in future releases by Burgiss.

As part of its phased process, Burgiss has provided us access to data with performance information on over 46,000 holdings of buyout and VC funds. For each holding, the data include a Multiple of Invested Capital (MOIC, also referred to as TVPI, Total Value to Paid in Capital), the industry (GIC sector) and geography. The multiple is gross of fees and thus reflects the actual performance of the investment as of exit or the last reporting date (for active investments). This contrasts with net-of-fee performance for funds which blends both the performance of holdings and fees charged to the LP.

For each holding, Burgiss also has provided information on broad characteristics of the investing fund, such as fund size, vintage year and asset class (buyout or VC). We do not have information to match a holding to other holdings of the same fund, nor do we have how the investment was realized (e.g. sale, liquidation, IPO). For purposes of this first look at the data,

Burgiss also supplied, for a large fraction of holdings, the investment year, the exit year for realized investments, the date of the last reported multiple for unrealized investments and the size of the investment (dollars invested).

The sample is a large cross-sectional database covering 46,311 holdings<sup>4</sup> with performance information as of 2019 Q1; 15,095 are buyout investments and 31,206 are VC investments. Realized investments represent slightly over half of both groupings. While a smattering of buyout and VC deals were made in the 1980s, the sample has meaningful numbers of holdings for investment years from the mid-1990s through 2018. The median investment year for realized deals is 2007 for buyout and 2006 for VC. For deals that are still active, the median investment year is 2015 for both buyout and VC. Figure A.1 charts time profiles of holdings by investment year since the mid-1990s, when meaningful sample sizes that contain size and investment/exit date information begin. Panel A shows that buyout investments made prior to 2010 are largely exited. For VC, Panel B depicts a similar pattern.

Table A.1 shows that buyout holdings are about 10 times as large on average as those in VC; moreover, an individual buyout holding tends to represent a larger fraction of a fund. For instance, the average buyout holding is \$112.7 million versus \$10.2 million in VC. These patterns are consistent with a higher degree of diversification when investing in younger companies. For both buyout and VC, median size is well less than the mean size and 51% of the holdings have been exited. Table A.2 provides detail on the sample including time period, geography, industry and realization status.

---

<sup>4</sup> As a comparison, Braun, Jenkinson and Stoff (2017) focus on buyout and include 13,523 investments sourced from three large fund-of-fund managers. While Braun et al. have roughly the same number of companies as in our buyout sample, the deals come from roughly a decade earlier than ours with a median investment year of 1998 for realized deals. Over two-thirds of the Burgiss sample is in venture capital.

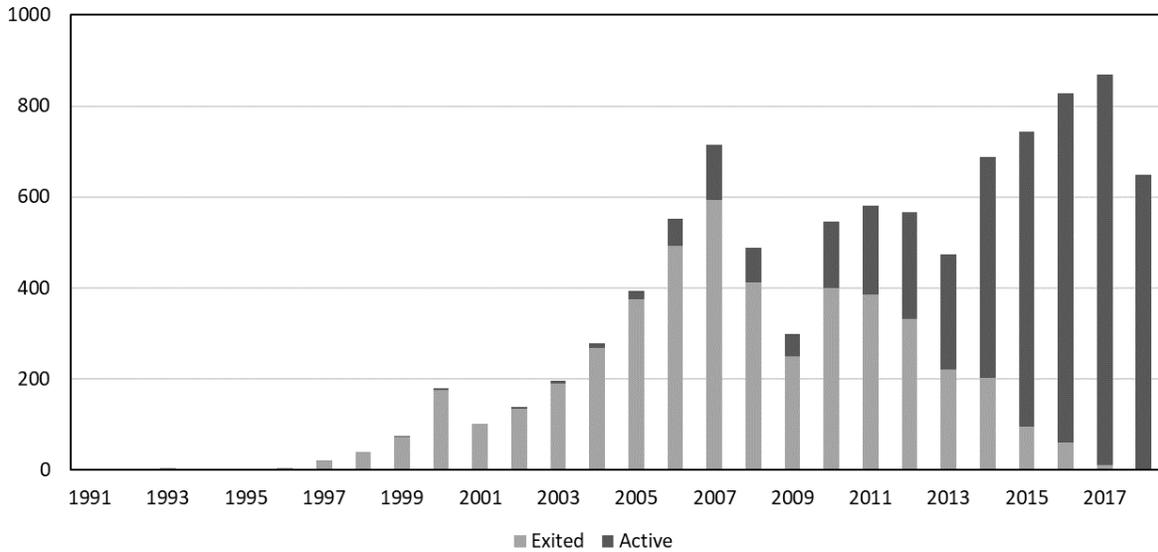
As noted earlier, as one of its data checks, Burgiss compares aggregate performance from fund-level data (net), vintage by vintage, to that implied by the holdings-level data (gross). We conduct a parallel analysis. The results are charted in Figure A.2. For buyout, Panel A shows that results across all vintage years behave in line with what is expected given patterns in management fees, expenses and carry: gross performance exceeds net and the two series move in tandem. This finding suggests the data are representative of all fund holdings and thus appropriate for research. For VC, Panel B shows similar results with the exception of the 1998 vintage which bears further investigation. Overall, the results in Figure A.2 confirm that the holdings data appear representative of the universe of investments made by private equity funds.

Table A.3 summarizes performance metrics across all holdings in the sample (both active and realized) for which we have complete data. Figures A.3 and A.4 graph time trends in investment multiples and adjusted multiples (PMEs) for realized buyout and venture holdings.

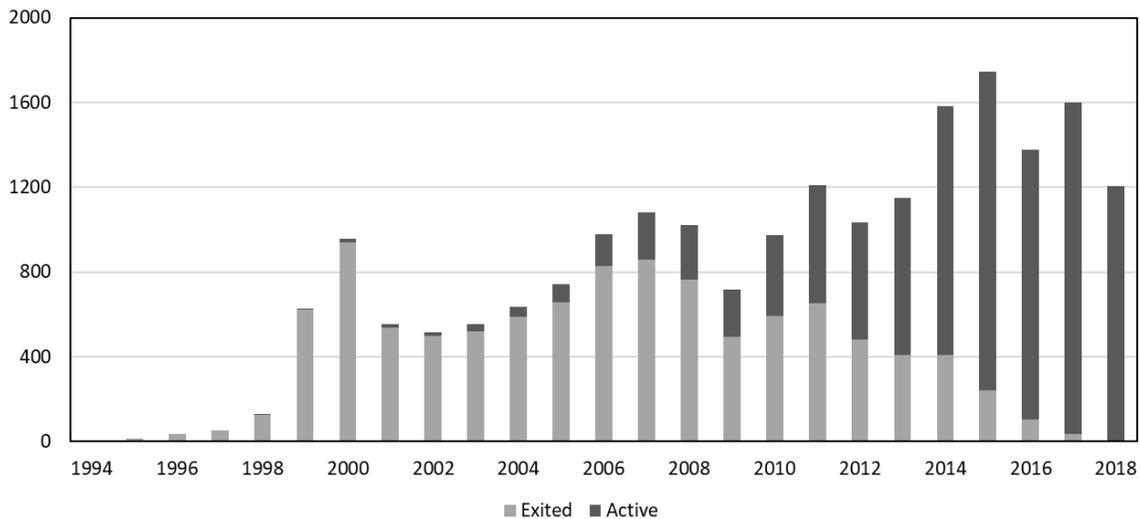
### Figure A.1: Number of Holdings by Investment Year

This figure plots the number of portfolio company holdings by year of original investment for both buyout funds and venture capital funds. Lighter-shaded bars represent exited investments and darker-shaded bars represent active investments as of 2019:Q1. The sample includes only those portfolio companies with complete information including size, investment year and exited year (if not active).

Panel A: Number of Buyout Fund Portfolio Companies, 1991-2018



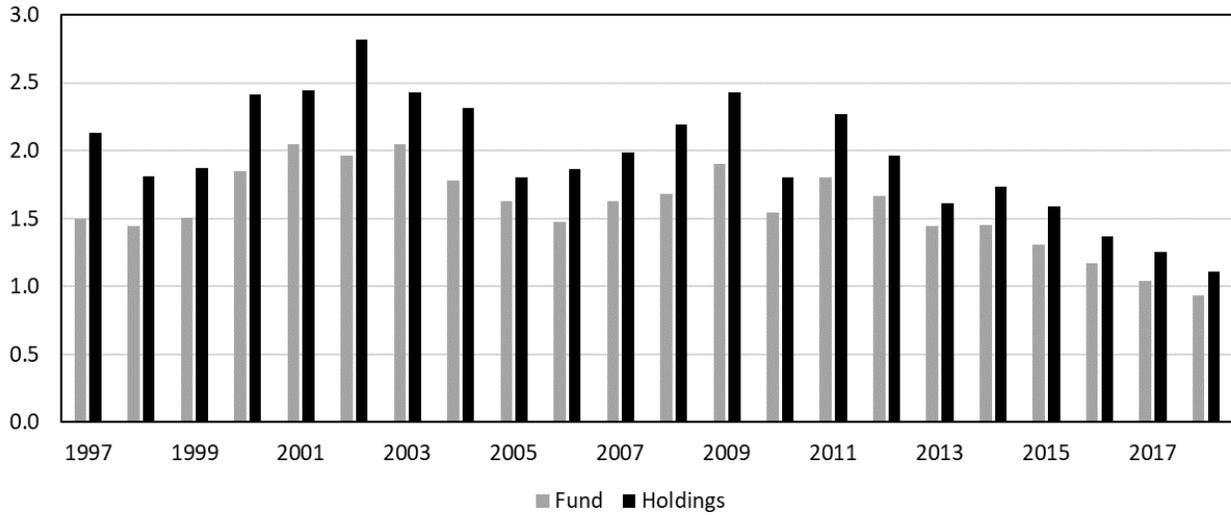
Panel B: Number of Venture Capital Fund Portfolio Companies, 1994-2018



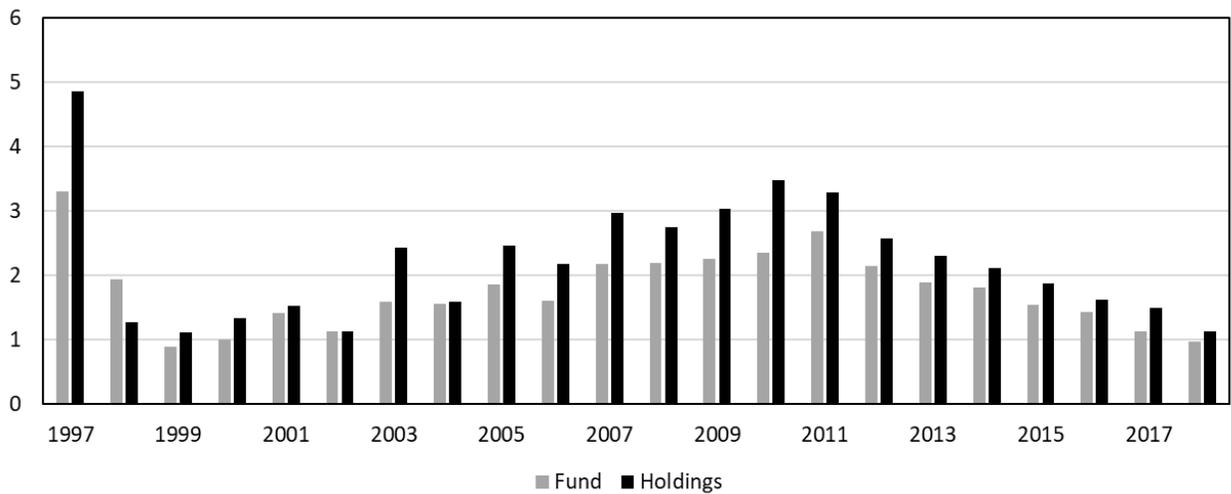
### Figure A.2: Net Performance at Fund Level versus Gross Performance of Holdings

This figure charts, by vintage year, performance at the fund level and at the holdings level. The fund level investment multiple (TVPI, net of fees and carry) is based on value-weighting all funds in Burgiss data with that vintage year. The holdings level multiple (gross, prior to fees and carry) is based on value-weighting all holdings in Burgiss by funds in that vintage year (no matter when the investment was made). Panel A shows buyout funds and Panel B shows venture capital funds.

Panel A: Buyout, 1997-2018



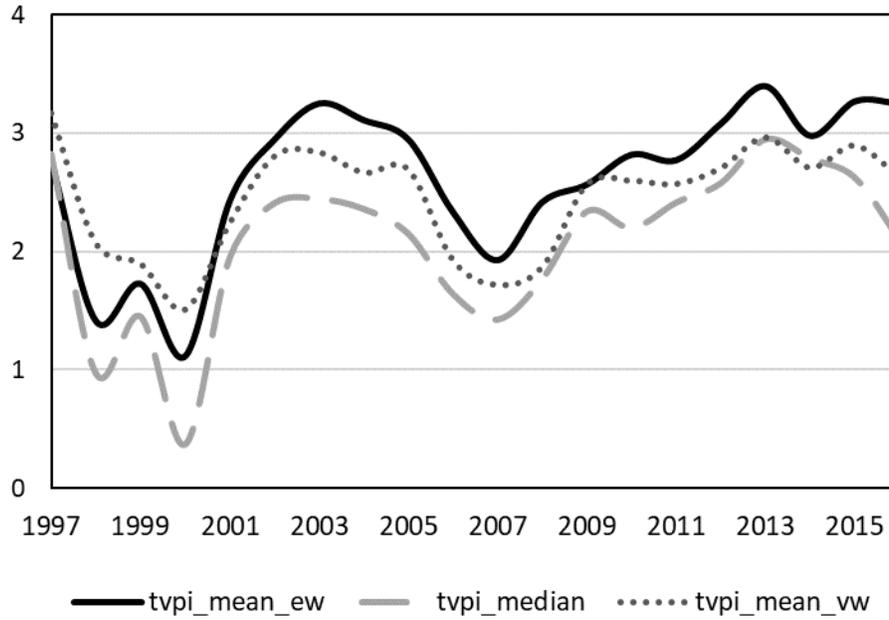
Panel B: Venture Capital, 1997-2018



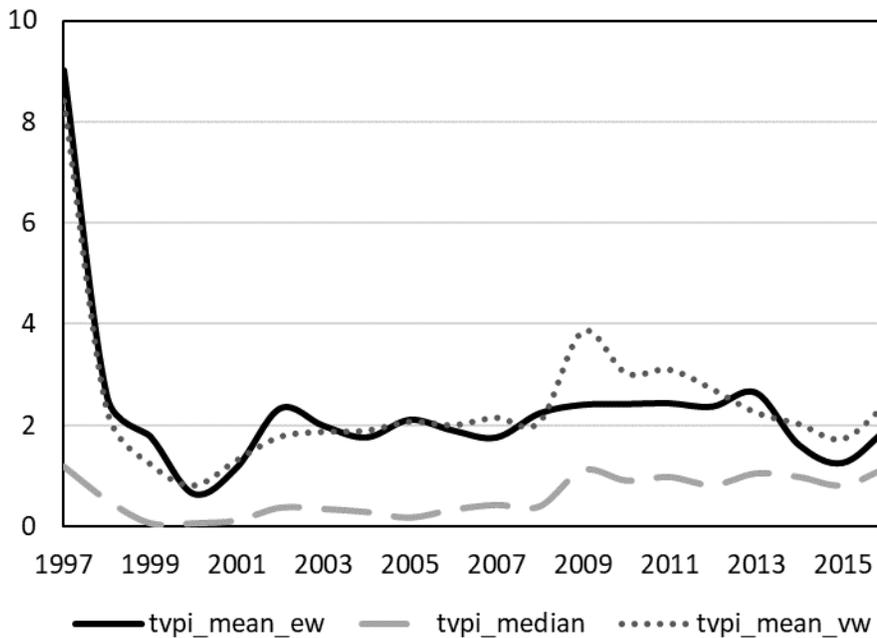
### Figure A.3: Money Multiples for Realized Holdings

This figure graphs the equal-weighted (ew) mean, value-weighted (vw) mean, and median of the investment total value to paid-in multiple (TVPI) gross of fees and carry, of realized holdings by the investment year of the holding. The top panel is for buyout and the bottom for venture capital. These figures are for the sample with complete information including size.

Panel A: Buyout TVPI, 1997-2016



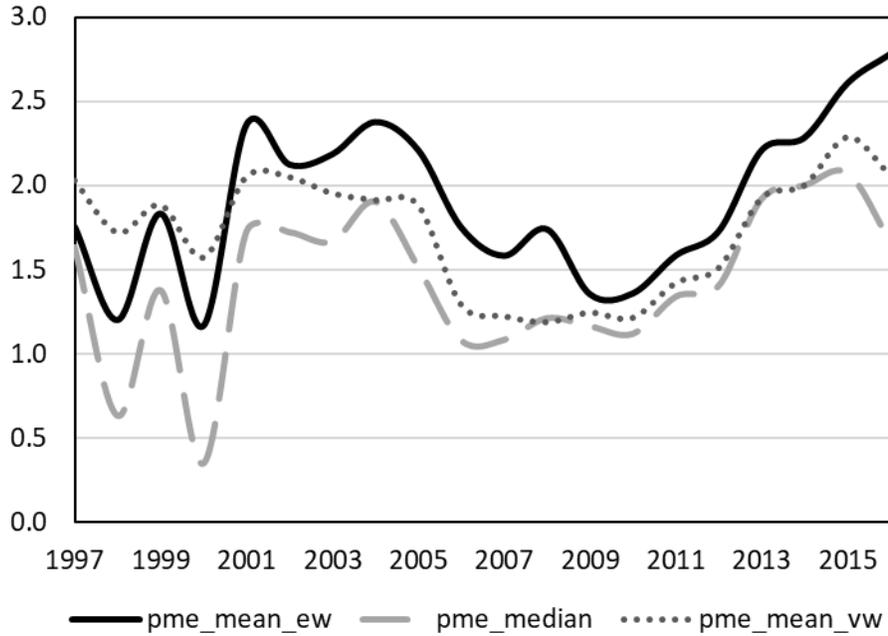
Panel B: Venture Capital TVPI, 1997-2016



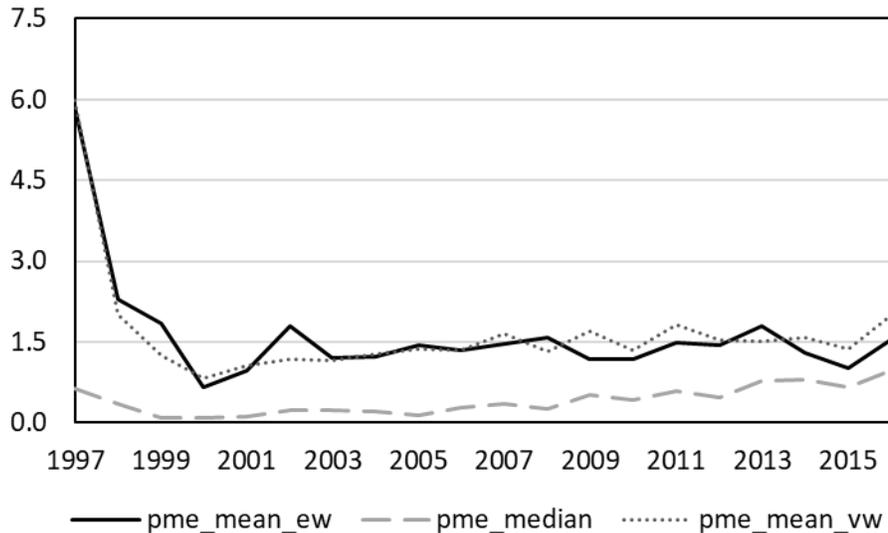
### Figure A.4: Adjusted Multiples (PMEs) for Realized Holdings

This figure graphs the mean, value weighted mean, and median market-adjusted multiple, or PME, gross of fees and carry, of realized holdings by the investment year of the holding. The top panel shows buyout deals and the bottom panel shows\ venture capital deals. These figures are for the sample with complete information including size.

Panel A: Buyout PMEs, 1997-2016



Panel B: Venture Capital PMEs, 1997-2016



**Table A.1: Characteristics of Holdings for Buyout and Venture Capital**

This table reports figures on the size and duration for holdings by private equity funds, separately for buyout and venture capital. Figures are also reported for the mean and median sizes of private equity *funds* over the same vintage years as the funds in which the investments are held. Information is for holdings with information on size, investment year and exit year.

<b>Characteristic of Holding</b>	<b>Buyout</b>	<b>Venture Capital</b>
Mean Investment size (in USD millions)	112.7	10.4
Median Investment size (in USD millions)	51.9	6.7
% Exited	51%	51%
Mean duration for exited investments in years	5.3	5.3
Median duration for exited investment in years	5	5
Mean fund size of the same vintage (in USD millions)	1,182	286
Median fund size of the same vintage (in USD millions)	489	194

**Table A.2: Descriptive Statistics for Holdings Data**

This table reports median values for holdings data. The "full" sample includes all holdings with performance data. The sample with size information requires that we have the size of the holding, the investment year and the exit year when investments have been realized. The full sample includes the year of investment for the vast majority of realized holdings (97% for buyout and 98% for venture capital). TVPI is the multiple of total value to invested capital. PME is the public market equivalent using the SP500 as the public market index. Size is in millions of US dollars. The duration is the time in years from the investment year to the exit year for realized investments. For unrealized investments the holding period is through the last reporting date for the holding. For the sake of brevity, we report industry information across the GIC classifications with the largest numbers of observations and report the rest as other. The figures for consumer goods include both discretionary and staples. Other includes energy, materials, real estate, utilities and any other not classified.

Panel A: Buyout Deals

	Median Values										
	Full Sample					Sample with Size of Holding					
	Observations	TVPI	PME	Year	Duration	Observations	TVPI	PME	Year	Duration	Size
<i>Realization Status</i>											
All Deals	15,095	1.55	1.07	2011	4	9,433	1.56	1.06	2012	4	52
Realized	8,461	2.10	1.35	2007	5	4,843	2.11	1.36	2007	5	48
Unrealized	6,634	1.21	0.94	2015	3	4,590	1.29	0.94	2015	3	56
<i>Year of Investment (only fully realized deals)</i>											
1980s	3	*	*	*	*						
1990-1994	43	2.40	0.99	1993	5	12	1.37	0.71	1993	5	35
1995-1999	392	1.50	1.21	1998	6	137	1.45	1.32	1999	6	31
2000-2004	1,495	2.11	1.61	2003	5	868	2.08	1.58	2003	5	31
2005-2009	3,406	1.80	1.17	2007	6	2,124	1.79	1.17	2007	6	57
2010-2014	2,150	2.41	1.36	2011	4	1,337	2.48	1.36	2011	4	56
2015-2018	701	2.39	1.95	2014	2	365	2.60	1.94	2014	3	35
<i>Industry categories (only fully realized deals)</i>											
Communications Services	773	1.81	1.32	2006	5	458	1.86	1.34	2006	5	70
Consumer Goods	2,236	2.03	1.29	2007	5	1,302	2.07	1.30	2007	5	44
Financials	567	1.91	1.11	2008	5	311	1.90	1.14	2008	5	60
Health Care	922	2.42	1.57	2008	5	542	2.40	1.56	2008	5	50
Industrials	1,703	2.20	1.35	2007	5	968	2.20	1.34	2008	5	44
Information Technology	1,269	2.15	1.38	2008	5	753	2.22	1.43	2008	5	44
Other	991	2.10	1.44	2008	5	509	2.02	1.40	2008	5	43
<i>Geographic categories (only fully realized deals)</i>											
Unknown	1,599	2.29	1.41	2007	6	1,018	2.29	1.41	2008	5	77
Africa	20	0.70	0.42	2007	7	14	0.72	0.37	2007	7	40
Asia	489	1.66	1.20	2008	5	258	1.78	1.21	2009	5	58
Eastern Europe	108	1.49	1.04	2008	5	69	1.44	1.04	2008	5	42
Latin America	84	1.87	1.07	2010	5	37	2.03	0.87	2010	5	83
Middle East	32	1.88	1.10	2008	4	18	1.69	1.09	2007.5	5	35
North America	4,052	2.10	1.40	2007	5	2,123	2.07	1.39	2007	5	39
Pacific	202	1.98	1.27	2008	5	133	2.09	1.28	2008	5	54
Western Europe	1,875	2.10	1.34	2007	5	1,173	2.11	1.37	2007	5	46

Panel B: Venture Capital Deals

	Median Values										
	Full Sample					Sample with Size of Holding					
	Observations	TVPI	PME	Year	Duration	Observations	TVPI	PME	Year	Duration	Size
<i><u>Realization Status</u></i>											
All Deals	31,206	1.00	0.71	2011	4	20,494	1.00	0.73	2011	4	7
Realized	16,642	0.43	0.29	2006	5	10,477	0.38	0.29	2006	5	7
Unrealized	14,564	1.00	0.87	2015	4	10,017	1.08	0.87	2015	4	6
<i><u>Year of Investment (only fully realized deals)</u></i>											
1980s	25	1.00	0.57	1989	6						
1990-1994	168	1.28	0.39	1993	6	2	*	*	*	*	*
1995-1999	2,126	0.27	0.21	1998	5	856	0.14	0.14	1999	4	8
2000-2004	4,359	0.21	0.15	2002	6	3,083	0.18	0.14	2002	6	8
2005-2009	4,984	0.44	0.30	2007	6	3,602	0.42	0.29	2007	6	8
2010-2014	3,165	0.95	0.52	2011	4	2,137	0.99	0.58	2011	4	5
2015-2018	1,506	1.00	0.81	2015	2	797	1.00	0.82	2014	2	3
<i><u>Industry categories (only fully realized deals)</u></i>											
Communications Services	943	0.14	0.10	2004	5	534	0.09	0.07	2005	5	7
Consumer Goods	1,257	0.23	0.15	2008	4	736	0.25	0.19	2009	4	7
Financials	288	1.00	0.64	2008	5	166	1.00	0.60	2008	5	7
Health Care	3,697	0.96	0.56	2006	5	2,277	0.97	0.61	2007	5	9
Industrials	505	0.37	0.24	2007	5	312	0.35	0.25	2007	5	9
Information Technology	9,489	0.37	0.25	2006	4	6,182	0.32	0.23	2006	4	7
Other	463	0.37	0.21	2007	6	270	0.37	0.21	2007	6	5
<i><u>Geographic categories (only fully realized deals)</u></i>											
Unknown	2,391	1.28	0.81	2006	6	1,535	1.27	0.80	2006	6	9
Africa	3	*	*	*	*	0					
Asia	1,282	1.00	0.64	2010	5	878	1.00	0.64	2009	5	5
Eastern Europe	19	0.80	0.62	2008	4	16	0.61	0.62	2009	4	8
Latin America	51	0.02	0.02	2011	3	29	0.03	0.03	2012	2	3
Middle East	242	0.06	0.03	2006	5	146	0.02	0.02	2007	4.5	4
North America	11,833	0.30	0.19	2005	4	7,348	0.24	0.18	2006	4	7
Pacific	48	0.03	0.02	2007	5	28	0.02	0.02	2007	3.5	4
Western Europe	773	0.27	0.20	2007	5	497	0.24	0.19	2007	5	6

\* is because N<5.

### Table A.3: Performance Characteristics of Buyout and Venture Capital Holdings

This table reports means (both value and equally weighted) for the multiple of invested capital (TVPI) along with the standard deviation and percentile values. The table also reports an approximation of a market adjusted public market equivalent (PME) using the S&P 500 as the public market index, the figures are calculated across all holdings, both active and exited, with size information.

#### Panel A: Buyout

	Mean (value- weighted)	Mean (equally weighted )	Standard Deviation	25 <sup>th</sup> Percentile	50 <sup>th</sup> Percentile	75 <sup>th</sup> Percentile
TVPI	1.91	2.14	2.83	1.00	1.56	2.66
PME	1.21	1.45	2.05	0.57	1.06	1.74

#### Panel B: Venture Capital

	Mean (value- weighted)	Mean (equally weighted )	Standard Deviation	25 <sup>th</sup> Percentile	50 <sup>th</sup> Percentile	75 <sup>th</sup> Percentile
TVPI	2.21	2.13	6.94	0.11	1.00	1.99
PME	1.33	1.35	4.19	0.08	0.71	1.31