



Alternative Investment Analyst Review

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Private Equity: Manager Selection, Portfolio Construction, and Outperformance

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For years as Private Equity (PE) has evolved as an asset class, investors have attempted to understand the relationship between private equity, public equity, and leverage. A skeptical view is that PE simply represents levered exposure to public equity, and that any outperformance relative to public markets is the result of additional risk that was taken in the form of leverage, size of underlying investments, liquidity, or something else. Most recently L'Her et al. (2016) found that when using a risk adjusted benchmark which represents the size, sector, and leverage of portfolio companies, in conjunction with using value-weighted (VW) returns, private equity does not outperform the public market equivalent in aggregate.

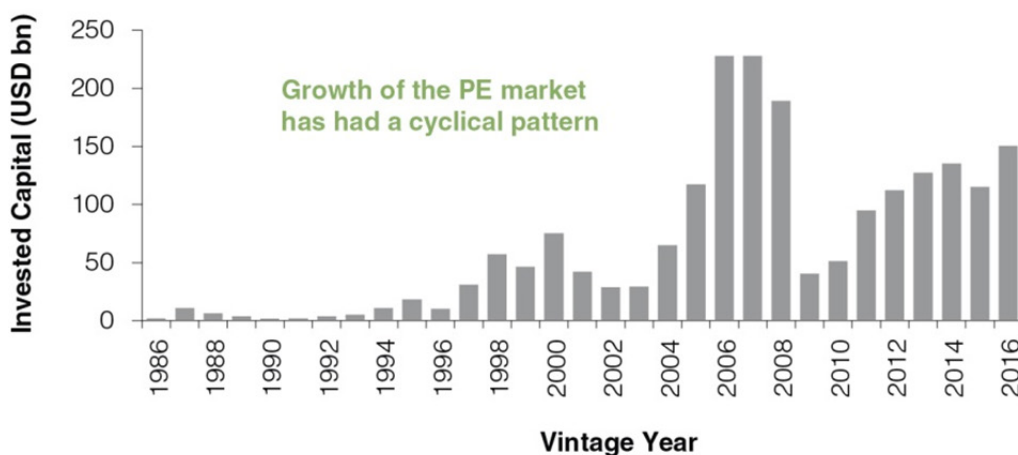
Despite the data limitations inherent in analyzing PE, the overall conclusion appears to be on point based on observation and intuition. For PE investors, simply buying “the market”¹ may not provide additional compensation beyond what is warranted by the risk that is

being taken. Despite the industry’s challenge in generating excess risk-adjusted returns, Adams Street Partners (ASP) believes that a manager can add value² to a PE program in a number of ways:

- Consistent capital deployment
- Successful manager selection
- Fundamental business and improvement in operations, as opposed to relying on the use of leverage or multiple expansion which are more subject to market temperament
- Portfolio diversification

This analysis will focus on the first three sources of added value. Portfolio diversification has been the subject of extensive work of ASP’s Advanced Analytics team and is dependent on the unique characteristics of an investment portfolio. It should be analyzed in a different framework and is a topic for separate analysis.

Exhibit 1: Total Invested Capital, Global Buyout Investments



Source: Burgiss, as of 12/31/2016. See "Notes to Performance: Burgiss Data" on page 25 for important information.

Consistent Capital Deployment

L'Her et al. cite the importance of using a value-weighted (VW) benchmark in order to most fairly measure the relative performance of PE. For the purpose of benchmarking this is no doubt the correct approach. The PE market (and segments within the PE market) is subject to fundraising and investment cycles which result in very different amounts of capital being raised every year. Years in which more capital is invested should carry more weight in a benchmark because they represent larger portions of the overall market.

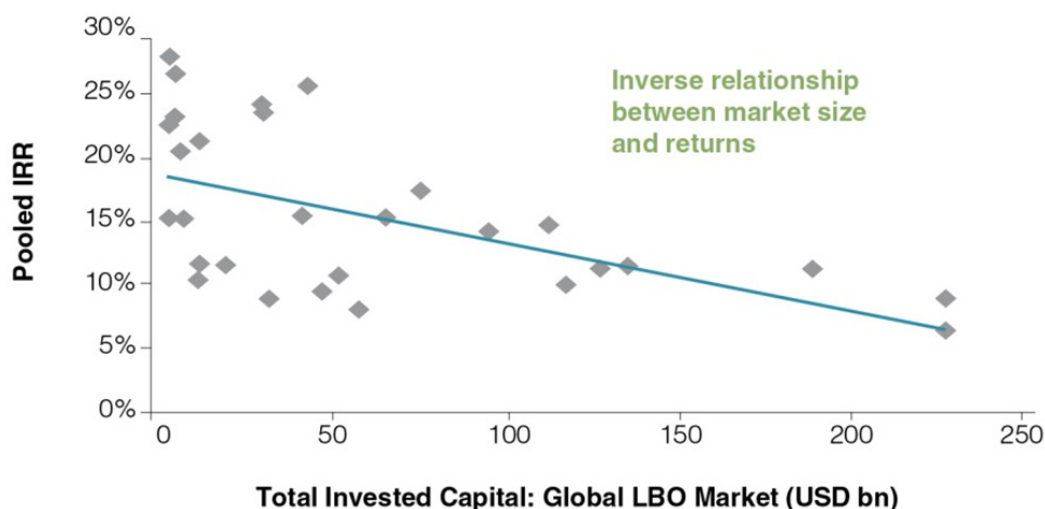
From an investment perspective, capital deployment that matches the overall level of fundraising in the market is a recipe for mediocrity at best, and regret in the worst case. Not only does this approach force returns to gravitate to the market, but it actually impedes performance on an absolute basis by leading to overinvestment during more competitive times. ASP has observed a consistent trend in which the amount of capital invested is inversely related to the returns that are ultimately generated.

The relationship is an intuitive result of the supply-demand dynamic within the universe of private equity investment opportunities. When more capital is being raised, deals are more competitive and close at higher valuations. This reduces the overall rate of return for investors. Additionally, PE fundraising cycles tend to follow credit cycles (see Exhibits 4 and 5 on the next page). Therefore, leverage is more predominant in years when more capital is raised and deals are more competitive, generally speaking. The implication is that investments at the top of the capital raising cycle probably come with more inherent risk in the form of leverage at the deal level.

An ideal strategy would be to only invest in the vintage years in which minimal capital is raised while avoiding the exuberant years altogether. However, this is not practical as the overall level of fundraising in the market is not predictable. PE investors require visibility for years in advance in order to best deploy capital.

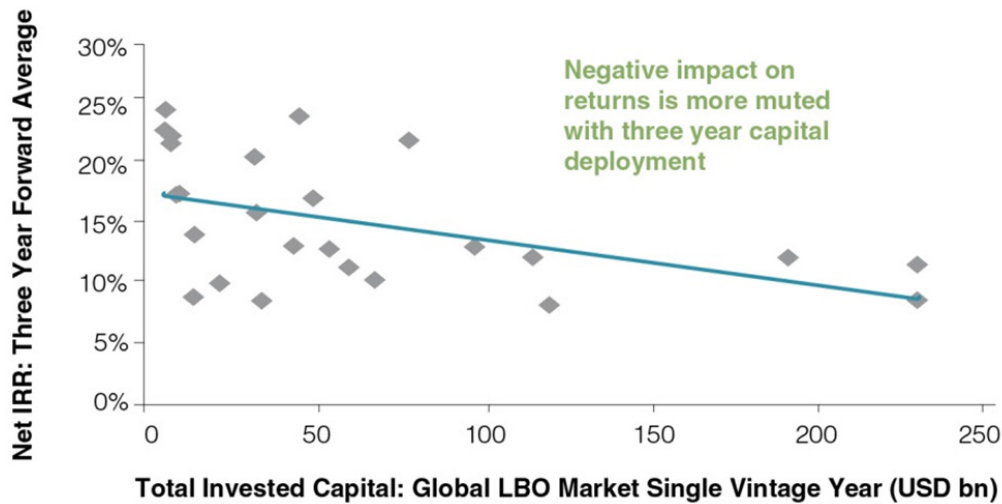
A more effective approach is to adopt a policy of consistent capital deployment across more than one vintage year. Consider a simple

Exhibit 2: Global Returns VS Invested Capital, by Vintage Year (1986-2014)



Source: Burgiss, as of 12/31/2016. See "Notes to Performance: Burgiss Data" on page 25 for important information.

Exhibit 3: Global PE Three Year Average Returns VS Invested Capital, by Vintage Years (1988-2012)



Source: Burgiss, as of 12/31/2016. See "Notes to Performance: Burgiss Data" on page 25 for important information.

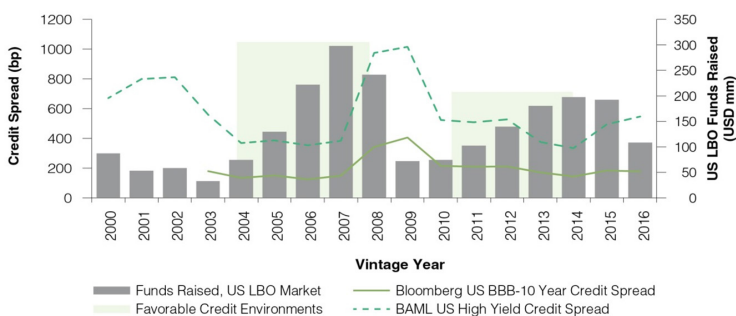
comparison of two investors, who invest the same amount of capital. One investor invests the full amount in a single vintage year while the other spreads out the investment over three vintage years. The historical returns that these investors would have generated are shown in Exhibits 6 and 7, respectively. The three year capital deployment strategy benefits from time diversification in that it delivers a similar average rate of return with a markedly lower dispersion of returns.

It should be noted that this investment policy may not be ideal for all investors, such as those with a greater risk appetite, other asset allocation considerations, or who intend to time the market for various reasons. But for ASP, and for other investors with a similar desire for generating consistent long term performance, disciplined capital deployment can be an important, persistent source of outperformance.

The same relationship is true on a public market-relative basis. Investor B realizes a similar average return relative to the MSCI ACWI, with outcomes that are less extreme:

In other words, investors should employ an equal weighted capital deployment plan while using a value weighted benchmark to fairly represent the performance of the market. For both practical and behavioral reasons, this is often easier said than done.

Exhibit 4: Fundraising Environment is Influenced by The State of The Credit Markets



Source: Pitchbook, Bloomberg, as of 12/31/2016

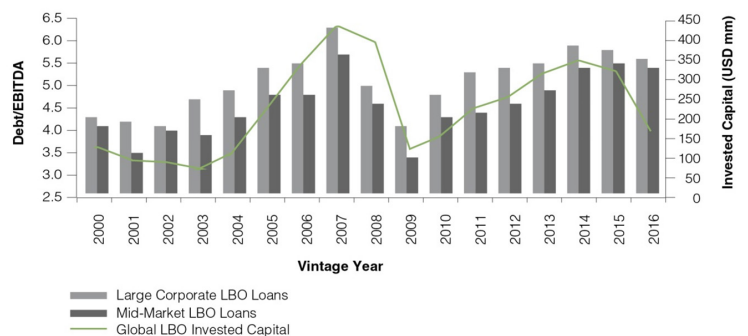
Manager Selection

Effective manager selection is important in any market, but this is especially true within the world of private equity where returns are disproportionately influenced by top tier funds. The impact of positive outliers causes the performance profile for the pool of all funds to have a positive skew. This is evident in the fact that the pooled mean return is typically higher than the median return (see Exhibit 8 on the next page).

Consequently, those investors who can at the margin identify a few more top performing funds while avoiding a few more bottom performing funds should generate a significantly stronger track record over time.

The second reason for the disproportionate impact of top performing funds is the illiquid nature of private equity. In contrast to most public markets, PE investors must commit capital to a closed end fund without the ability to efficiently buy or sell as the investment matures.⁴ In a public market setting, the ability of investors to move capital in and out as performance diverges tends to mitigate the distribution of returns relative to that of the

Exhibit 5: LBO Deal Leverage VS Fundraising



Source: S&P (Large Corporate LBO Loans and Mid-Market LBO Loans); Burgiss (Global LBO Invested Capital) as of 12/31/2016. See "Notes to Performance: Burgiss Data" on page 25 for important information.

Exhibit 6: Single VS Three Year Capital Deployment Global Buyout Fund Investments

	Investor A: (Single Year Deployment)	Investor B: (Three Year Deployment)	Improvement
Min:	6.2%	8.3%	2.05%
Max:	27.7%	24.8%	-2.93%
Average:	15.4%	15.4%	-0.04%
St Dev:	6.3%	5.4%	-0.86%
Sharpe Ratio (rf=0%): [†]	2.45	2.82	0.38
Sharpe Ratio (rf=3%):	1.97	2.27	0.30

Source: Burgiss, as of 12/31/2016. See "Notes to Performance: Burgiss Data" on page 25 for important information. Data is from the vintage years 1986-2014. Standard Deviation and Sharpe Ratio were calculated based on the underlying data set from Burgiss.

[†]Sharpe Ratio is a commonly used metric which measures the excess return per unit of risk. In this case it is calculated as the ratio of Average IRR less the risk-free rate, divided by the standard deviation of returns.

Exhibit 7: K&S PME And Capital Deployment^{3‡}

	Investor A: (Single Year Deployment)	Investor B: (Three Year Deployment)	Investor C: (Five Year Deployment)
Average:	1.25	1.25	1.24
Worst:	1.01	1.04	1.06
Best:	1.61	1.53	1.47
St Dev:	0.18	0.15	0.14

Source: Burgiss, as of 12/31/2016. See "Notes to Performance: Burgiss Data" on page 25 for important information. K&S PME is for MCSI ACWI Total Returns Index.

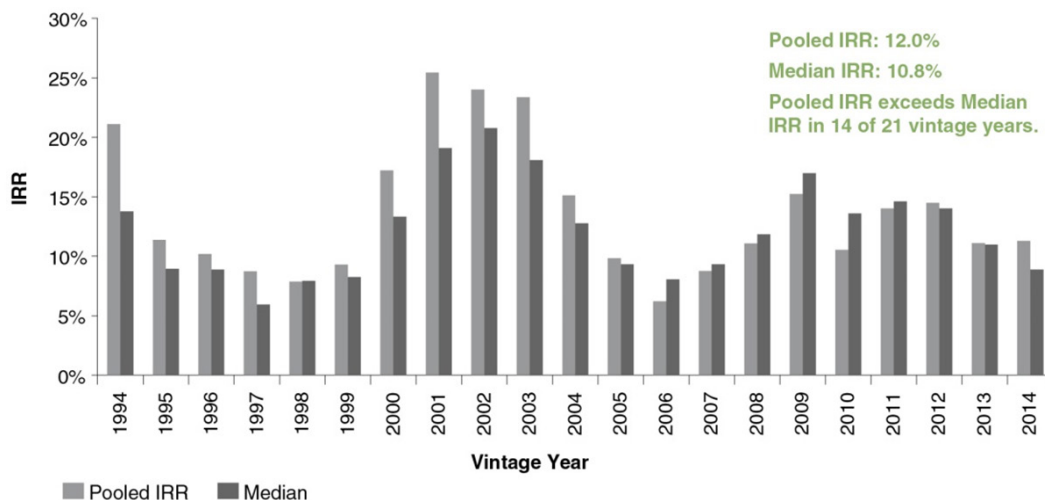
[‡]K&S PME represents the ratio of the future value of fund distributions and NAV, grown at the rate of return of the public market index, to the future value of fund capital calls grown at the same rate of return. Values greater than 1.0 indicate outperformance relative to the public market whereas values less than 1.0 indicate underperformance.

PE market, which has more distinct winners and losers at either extreme. This relationship of private markets featuring a greater dispersion of returns across managers relative to public markets was first recognized in David Swenson's book *Pioneering Portfolio Management* (2000), which cited the inter-quartile range of Buyouts to be more than four times the range for International Equity managers.

Considering the long time horizon of PE, the compounding effect of this return distribution is even more powerful. To illustrate this point, we compare the returns of two hypothetical investors who by definition are able to select managers of a certain quality level ahead of time.

An investor who was able to consistently select and access top quartile managers every year, from 1994 to 2014, would have compounded the initial investment by a factor of 140x. The importance of identifying top tier managers at the margin is shown by the outperformance of the pooled return versus the median return: an investor who earned the pooled IRR every year over this time period compounded wealth by a factor of 13x versus 10x for the median case (37% more wealth). In other words, a process of randomly selecting managers every year (assuming equal investment amounts) would have underperformed significantly.

Exhibit 8: K&S PME And Capital Deployment^{3‡}



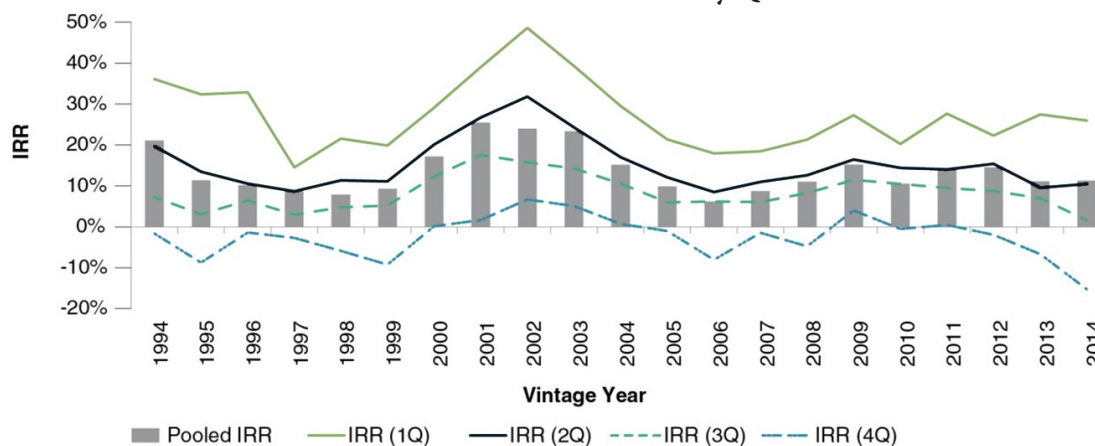
Source: Burgiss, as of 12/31/2016. See "Notes to Performance: Burgiss Data" on page 25 for important information.

Exhibit 9: Pooled IRR, Global LBO: Vintage Years 1987-2014

1st Quartile	2nd Quartile	Pooled IRR	3rd Quartile	4th Quartile
29.2%	14.1%	11.4%	7.4%	-3.9%

Source: Burgiss, as of 12/31/2016. See "Notes to Performance: Burgiss Data" on page 25 for important information.

Exhibit 10: Global LBO Returns by Quartile



Source: Burgiss, as of 12/31/2016. See "Notes to Performance: Burgiss Data" on page 25 for important information.

Of course it is not realistic for an investor to expect to consistently select managers in the top quartile every year, but this data illustrates the importance of being right more often than being wrong. The difference between delivering alpha versus simply "buying the market" comes from the ability to identify a few top performing funds and avoid a few bottom performing funds over time. In order to reap the benefits of effective manager selection in this regard, it is important that capital is deployed in consistent amounts across funds. Consistent allocation is a critical component of ASP's investment process.

This disparity in absolute returns is also true in terms of returns relative to public markets. Using the same set of global buyout funds from vintage years 1994-2014 (Exhibit 12), an investor who simply "bought the market" and earned the pooled rate of return for this set of funds would have outperformed the MSCI ACWI by 13% on an IRR basis. L'Her and others would argue

that this outperformance was actually much lower if not zero after adjusting for risk.

It is worth noting that the average K&S PME's are higher than the pooled numbers, which further demonstrates the benefits to disciplined capital deployment.

Value Creation

L'Her et. al. cite leverage as a key factor explaining outperformance of PE versus public markets. Once leverage is accounted for by leveraging up the public index benchmark, the PE market is found to perform in-line with public markets of comparable risk. In other words, the PE market outperforms on the aggregate because managers take additional risk in the form of leverage beyond what is represented in the public markets. While this finding is not surprising, like the other findings it reflects the PE market as a whole and suggests that investment selection is critical. Empirical

Exhibit 11: Wealth Index, Global LBO Fund Investments by Vintage Year (1994-2014)

1st Quartile Funds	2nd Quartile Funds	Pooled Return	Median Return	3rd Quartile Funds	4th Quartile Funds
151.6x	19.0x	14.3x	11.0x	5.3x	0.6x

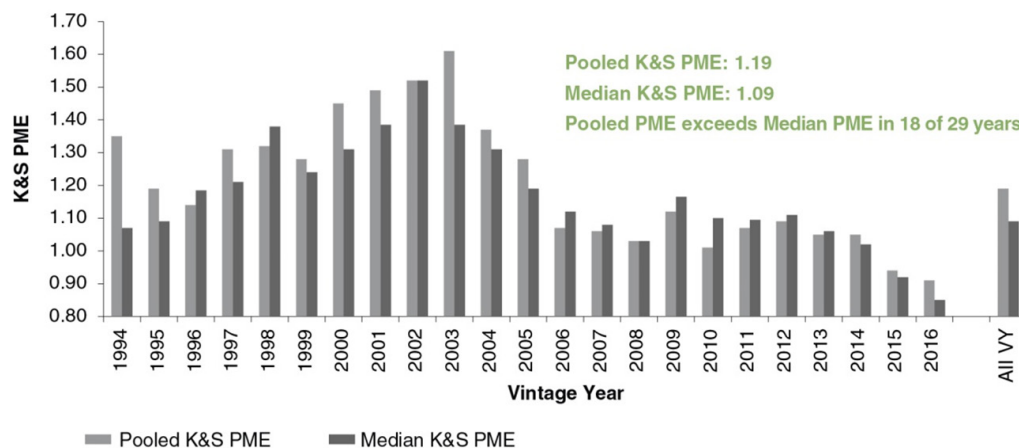
Source: Burgiss, as of 12/31/2016. See "Notes to Performance: Burgiss Data" on page 25 for important information.

Exhibit 12: Global LBO Fund: K&S PME (MSCI ACWI)

	Top Quartile Cutoff	Median	Bottom Quartile Cutoff
Average by VY	1.46	1.19	0.94
Pooled (1988-2014)	1.38	1.13	0.93

Source: Burgiss, as of 12/31/2016. See "Notes to Performance: Burgiss Data" on page 25 for important information.

Exhibit 13: Global LBO Funds Returns Relative to MSCI ACWI



Source: Burgiss, as of 12/31/2016. See "Notes to Performance: Burgiss Data" on page 25 for important information.

Exhibit 14: Net Debt/Enterprise Value⁶

ASP Portfolio All Time Periods (Pooled)	ASP Portfolio 12/31/2015 (Value Weighted)	ASP Portfolio 12/31/2015 (Equal Weighted)	L'Her et. al Market Estimate
0.44	0.38	0.31	0.55

Source: Adams Street Partners as of 12/31/2015

evidence shows that it is possible to outperform while using less leverage than the market. There are two underlying reasons.

First, value can be created through sources other than leverage. This includes improvement in fundamentals, such as revenue growth and margin improvements. Changing market conditions, reflected in changes of valuation multiples, are another driver of gains and losses. While leverage is important and useful, it introduces additional risk as well. Leverage can be a driver of excess returns when market conditions allow; however, reliance on leverage alone is not a sustainable investment strategy. This philosophy is evident in the leverage ratios of ASP's buyout fund portfolio⁵ relative to the estimate of market leverage from L'Her et al.

By using significantly less leverage than the market while continuing to outperform the PME over time, ASP has shown that sources of return other than leverage can deliver superior returns. In fact, it is possible that companies with dimmer prospects for value creation through fundamentals are inclined to have additional leverage. Thus the overall market leverage (estimated at 0.55) could be a reflection of managers leveraging up companies that would otherwise struggle to provide the required rate of return to investors.

A second reason behind the gap in performance between levered and unlevered returns identified in the paper is that leverage is probably a proxy for fund size. Overall, larger funds invest in larger companies and tend to use more leverage relative to smaller funds. This occurs for a number of reasons including differing company risk profiles and the availability of leverage for different borrowers, but ASP has found it to be true for the market as a whole. ASP's portfolio of buyout investments reflects this

phenomenon as well, as evident in the portfolio's smaller company size and lower degree of leverage.

In conclusion, ASP is in agreement with the data which suggests that investors cannot expect to outperform public markets, on a risk adjusted basis, by simply buying the PE market. Disciplined capital deployment, manager selection, and prudent use of leverage are necessary.

Endnotes

1. In the absence of a perfect market benchmark, we represent a strategy that buys "the market" as one which invests at random across the spectrum of possible PE investments, without any tactical element such as market timing, manager selection, or any investment constraints on strategy, geography, vintage years, etc.
2. Adams Street Partners defines "value" as outperforming public markets and improving investor utility.
3. K&S PME defined as: Kaplan & Schoar (2005), "Private Equity Performance: Returns, Persistence and Capital Flows."
4. A secondary market does exist but it is not always cost efficient for every investor.
5. Buyout investments only.
6. ASP data is drawn from ASP's Core Portfolios' primary investments in US and non-US private equity funds across various subclasses which include: venture capital, buyouts, mezzanine and special situation funds. Exhibit 14 show composite company-level data provided by the applicable underlying general partners. Data is subject to availability as reported by the general partners in response to ASP inquiries. The data presented here covers all

time periods, but predominantly represents 2013-2016 as a result of data availability. Data is not available for 100% of the portfolio, but does represent what ASP considers to be a meaningful and representative sample. “Core Portfolios” are funds and separate accounts (excluding special mandate funds and non-discretionary separate accounts) of which Adams Street Partners is the general partner, manager or investment adviser (as applicable) and for which Adams Street Partners makes discretionary investments in private equity funds. Core Portfolios include separate accounts no longer with Adams Street Partners.

References

Swensen, David F., *Pioneering Portfolio Management: An Unconventional Approach to Institutional Investment*. New York: Simon & Schuster, Inc, 2000. Print.

L’Her, Jean-François, et al., “A Bottom-Up Approach to the Risk-Adjusted Performance of the Buyout Fund Market.” *Financial Analysts Journal* Volume 72, Number 4 (2016). Print.

Kaplan, Steve and Schoar, Antoinette. “Private Equity Performance: Returns, Persistence and Capital Flows.” *Journal of Finance* 60 (August 2005). Print.

Notes to Performance: Burgiss data

The Burgiss data presented here includes a global set of funds which are invested on a primary basis in venture capital, buyout, and other strategies and excludes secondary investments. Numbers are subject to updates by Burgiss. Burgiss is a recognized source of private equity data, and the Burgiss Manager Universe includes funds representing the full range of private capital strategies; it may not include all private equity funds and may include some funds which have investment focuses that Adams Street Partners does not invest in. Calculations prepared by Adams Street Partners using Burgiss data, sourced on May 2017. IRRs are net of fees, carried interest and expenses paid by the funds.

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Authors' Bios



Raymond Chan, CFA, FRM
Adams Street Partners

As a Partner and Head of Risk Management and Advanced Analytics, Ray is responsible for developing the advanced analytics and risk management framework and methodology utilized in Adams Street’s portfolio construction process to achieve successful risk/return outcomes for our

clients. In this capacity, Ray also oversees the Firm’s Performance Reporting function.

Prior to joining Adams Street Partners, Ray served as the Managing Director/Head of Investment Capabilities at UBS Global Asset Management. In his eleven-year tenure with UBS, he was responsible for managing a global team that was involved with the research, design and implementation of quantitative and technological solutions that support asset allocation and risk analysis portfolio decision processes.

Ray is a member of the GIPS Private Equity Working Group of the CFA Institute, which reviews and makes recommendations concerning standards for reporting performance in the private equity asset class. He is also a Director and Research Council member for the Institute for Private Capital (IPC) at UNC Kenan-Flagler Business School.

Ray is a member of the Adams Street Partners Operating Committee and the Portfolio Construction Committee, the CFA Institute, the CFA Society of Chicago and the Global Association of Risk Professionals.



Jeffrey Diehl
Adams Street Partners

Jeff is the Managing Partner and Head of Investments at Adams Street. He is responsible for each of Adams Street’s investment teams, including their processes and strategies. As a member of our Venture/Growth Team, Jeff invests in venture and growth-oriented companies in the software,

IT-enabled business services and consumer internet/media sectors.

Jeff serves on the Boards of Directors of Apto, BoomTown, cbanc Network, LogRhythm, Paylocity (NASDAQ: PCTY), Peerless Network, Q2ebanking (NYSE: QTWO) and Sympoz. He is a Board Observer at Dolex, SnagAJob and Spiceworks. His past investment include AMWINS (bought by New Mountain), Ancestry.com (NASDAQ: ACOM), CBeyond (NASDAQ: CBey), Borderfree (NASDAQ: BRDR), Gevity HR (NASDAQ: GVHR), MagicJack (NASDAQ: CALL), MxLogic (bought by McAfee), Stratavia (bought by Hewlett-Packard), TrendKite, TurnKey, and TicketsNow (bought by Ticketmaster).

Before joining in 2000, Jeff served as a Principal for The Parthenon Group, a Boston-based strategy consulting and principal investing firm with Bain Consulting roots.

Jeff is the Chair of Adams Street Partner's Portfolio Construction Committee, a member of the firm's Executive Committee, and has served on the firm's Strategic Advisory Committee for the last six years.



Miguel Gonzalo, CFA
Adams Street Partners

As a Partner and Head of Investment Strategy, Miguel combines our bottom up investment research with top down forward-looking views in order to construct portfolios that meet our clients' objectives. Miguel collaborates with investors to formulate strategies that leverage Adams

Street Partners' global capabilities.

Miguel has worked closely with investors in the management of their portfolios, including the development and ongoing monitoring of their private equity programs since 2000. He is actively involved in the portfolio construction and ongoing monitoring of the various fund of funds programs and separate accounts. In addition, he maintains relationships with investment consultants to ensure continuity with client objectives.

Prior to joining the Private Equity Group in 2000, Miguel was Head of the Performance Analysis Group in the Asset Allocation/Currency Group of Brinson Partners where he oversaw the design and management of the Firm's performance attribution and analytics systems.

Miguel is a member of the Adams Street Partners Portfolio Construction Committee, the CFA Society of Chicago and the CFA Institute.



Tobias True, CAIA, CFA, FRM
Adams Street Partners

Toby is responsible for applying the Firm's advanced analytical capabilities to support activities related to performance attribution and portfolio risk management utilized in the firm's investor relations and investment processes.

Prior to joining Adams Street Partners, Toby served as a Vice President and Risk Specialist with MSCI Barra and as an Analyst with Bloomberg L.P. His experience includes working closely with clients to implement customized risk models and develop performance attribution analyses to enhance portfolio construction decisions.

Toby is a member of the Adams Street Partners Portfolio Construction Committee, the CFA Institute, the CFA Society of Chicago and the Global Association of Risk Professionals.