

Memorandum

TO: Private Investments Subcommittee of the Asset Management Advisory Committee

FROM: Division of Economic and Risk Analysis (“DERA”),¹ U.S. Securities and Exchange Commission

DATE: September 1, 2020

RE: Academic Literature on Potential Benefits for Portfolio Efficiency of Private Equity Investments

This memorandum is intended to facilitate consideration by the Subcommittee of certain issues relating to private equity investments, namely whether private equity, as an asset class, provides incremental portfolio efficiency benefits vis-à-vis other assets classes, such as public equity and debt.² The memorandum proceeds in two steps. First, it surveys the literature on the risk-adjusted returns of private equity investments relative to various public market benchmarks. Second, it collects the main findings in the literature as to whether expanding an investor's opportunity set to include private equity as an asset class may provide portfolio efficiency benefits by improving the risk-return tradeoff of an investor's portfolio. This memorandum is based on a review of academic literature and DERA has not undertaken an independent analysis of the risk-adjusted returns or potential portfolio efficiency benefits of private equity investments.

The private equity literature is still evolving and has not reached a consensus on the appropriate method for measuring risk-adjusted returns in this market nor on whether private equity returns provide portfolio efficiency benefits above and beyond the investment opportunities available in public markets. This lack of consensus is attributable to various factors, including the inapplicability of traditional public market measures of risk and return to the private equity market.

This memorandum draws on several recent literature surveys of private equity performance. First, (Kaplan & Sensoy, 2015) review the academic literature on the performance of private equity investments that focuses on their performance relative to the public equity market, including a limited discussion of risk-adjusting private equity returns. Second, (Korteweg A. , 2019) surveys the evolution of the literature on risk-adjusting private equity returns and summarizes the results of most studies to date. Finally, (Døskeland & Strömberg, 2018) provide a survey oriented towards determining whether a pension fund should expand its investment

¹ This is a memorandum by the staff of the Division of Economic and Risk Analysis of the U.S. Securities and Exchange Commission. The Commission has expressed no view regarding the analysis, statements, findings, or conclusions contained herein.

² The surveyed literature generally categorizes private equity funds into two main types: leveraged buyout and venture capital. (See, for example, Korteweg A., 2019.) As this memorandum describes the surveyed literature, it follows this general convention.

mandate to include private equity investments. All three surveys also include additional background on the private equity industry beyond what this memorandum covers.

Background

This memorandum focuses on private equity funds, which are usually organized as limited partnerships in which investors (the limited partners, or “LPs”) commit capital to a fund that makes investments in portfolio companies.³ Typically, the fund's general partner (or “GP”) hires an affiliated investment adviser who uses the committed capital to invest in portfolio companies and plays an active role in how those portfolio companies are managed and operated.⁴

A private equity fund's LPs typically pay a management fee to the investment adviser, typically assessed on the committed capital in the early years of a fund and invested capital in the later years, and a carried interest allocation to the GP, for portfolio company returns above a pre-specified hurdle rate.⁵ In addition, GPs sometimes, and depending on various factors, charge other fees, such as monitoring fees, to the fund’s portfolio companies in exchange for services provided to those portfolio companies, which can affect the after-fee return to LPs.⁶ According to (Døskeland & Strömberg, 2018), the majority of empirical studies support the notion that investments by private equity funds improve the performance of portfolio companies, adding economic value before accounting for fees. The literature on risk-adjusted private equity returns generally focuses on the investment returns to fund LPs after subtracting the cost of the investment, including the management fee, the carried interest allocation, monitoring fees and any other costs (“after-fee returns”).

Measuring Returns

Studies state that a major impediment to assessing the risk and return characteristics of private equity is that, unlike public securities, neither the interests in private equity funds nor their portfolio companies trade on public markets at regular frequencies.⁷ Therefore, typical risk measures that might inform portfolio choices, such as volatility and covariance, are difficult to compute. To measure after-fee returns, which are most relevant to investors in private equity funds, researchers typically use LPs’ after-fee cash flows, including their invested capital and any distributions the fund pays.⁸ While earlier studies used the internal rate of return (IRR) for these cash flows to measure performance, possible issues with the IRR have led researchers to employ other measures in the literature.⁹

The public market equivalent (“PME”) of (Kaplan & Schoar, 2005) is, thus far, the dominant performance measure in the literature. The PME is a multiple that measures the cumulative

³ See, for example, (Kaplan & Sensoy, 2015).

⁴ See (Kaplan & Sensoy, 2015) and (Metrick & Yasuda, 2010) for a more detailed discussion of the structure of private equity funds.

⁵ See, for example, (Lemke, Rube, & Lins, 2019).

⁶ See (Phalippou, Rauch, & Umler, 2018) for a discussion of these fees in the context of buyout funds.

⁷ See, for example, (Kaplan & Sensoy, 2015).

⁸ Some studies, e.g. (Cochrane, 2005), analyze the gross returns to individual investments in portfolio companies.

⁹ See (Ang & Sorensen, 2012), (Kaplan & Sensoy, 2015), and (Korteweg A. , 2019) discuss the strengths and weaknesses of IRR and alternative measures in more detail.

return to an investment over a benchmark, typically a public equity index such as the S&P 500.¹⁰ (Sorensen & Jagannathan, 2015) provide theoretical support for this measure by showing that using the PME is equivalent to using a stochastic discount factor (SDF) for an investor with log utility. Studies incorporating the latest datasets find that both the venture capital and leveraged buyout segments of the private equity market consistently outperform the public equity market when measured using PME.¹¹

The generalized PME (“GPME”) is a relatively new extension of the PME that uses modern empirical asset pricing techniques to value private equity cash flows. For example, (Korteweg & Nagel, 2016) use a more general SDF than (Sorensen & Jagannathan, 2015), calibrating its parameters to match the return distribution of other publicly traded assets and applying them to private equity cash flows. The study posits that this approach has the benefit of more accurately controlling for market performance in a given sample period as well as the leverage employed by some private equity funds. Using data on venture capital (“VC”) funds and VC portfolio companies, (Korteweg & Nagel, 2016) find that the PME can incorrectly indicate over-performance relative to a benchmark. Recent applications of this technique expand the set of factors used to calibrate the SDF on publicly traded securities before pricing private equity investments.¹²

(Ang, Chen, Goetzmann, & Phalippou, 2014) use a statistical approach to infer a latent quarterly series of returns to private equity investments. They explain that more traditional factor estimation techniques can then be used to assess the extent to which private equity returns are driven by typical public equity market factors versus being driven by potentially novel risk factors that are not available in public markets (measured by the “alpha” of private equity returns relative to a given benchmark factor model). They find that while private equity returns substantially capture known public market factors, there is some statistically significant evidence that they believe suggests that private equity returns do not fully span public market exposures.

Other frequently-referenced approaches to measuring private equity returns include (Jegadeesh, Kräussl, & Pollet, 2015), who analyze the returns of European fund-of-funds that invest in private equity as well as publicly-listed private equity firms, and (Boyer, Nadauld, Vorkink, & Weisbach, 2018), who use proprietary data from over-the-counter transactions in the secondary market for LP interests in private equity funds to measure returns.

Portfolio Efficiency

There is no clear consensus in the surveyed literature as to whether a typical public market investor could achieve a more efficient risk-return tradeoff if given the ability to invest in private equity as an asset class. This is the result of data limitations and the lack of consensus in the literature with respect to how private equity returns should be measured and adjusted for risk, as well as how those risk-adjusted returns should be interpreted. Therefore, this section presents the main results from the surveyed literature in two categories: studies that find support for the portfolio efficiency benefits to private equity, and studies that do not find such support.

¹⁰ See, for example, (Kaplan & Sensoy, 2015).

¹¹ See (Harris, Jenkinson, & Kaplan, 2014), (Harris, Jenkinson, & Kaplan, 2015), and (Kaplan & Sensoy, 2015).

¹² See (Gredil, Sørensen, & Waller, 2019) and (Gupta & Nieuwerburgh, 2019).

Results unresponsive of portfolio efficiency benefits

Assuming PME is an accurate measure of fund performance, early studies such as (Kaplan & Schoar, 2005) and (Phalippou & Gottschalg, 2009) cautiously find that private equity outperforms public market equivalents. And, while recent results in the literature using more comprehensive data sets produce private equity PMEs that consistently outperform the public market, there is still no consensus on the extent to which these results accurately adjust for risk. More recent generalizations of PME, such as the GPME measure in (Korteweg & Nagel, 2016), suggest that PME can be misleading because once it is adjusted for risk, VC funds and VC portfolio companies no longer exhibit superior risk-adjusted returns relative to public markets.

Two studies suggest that the risk and return of private equity is captured by tradable public equity market factors, which could imply that investors can obtain an equivalent risk-return trade-off via public market investments. (Franzoni, Nowak, & Phalippou, 2012) find that the “alpha” of VC investments is not significantly different from zero once a systematic liquidity factor is included in the factor model, which they find suggests that any premium these investments offer over the market return is compensation for liquidity risk that is also obtainable in public markets. Similarly, (Stafford, 2017) finds that the returns to leveraged buyout funds can be replicated in public markets by a strategy that invests in small-cap low EBITDA firms, and that this strategy produces CAPM alphas that are consistent with other studies of buyout returns in the literature.

Heterogeneity in GPs’ skill and heterogeneity in investors’ ability to choose among managers have led to heterogeneity in investors’ experience of private equity performance. Specifically, some studies suggest (a) that the skill of GPs and their affiliated investment advisers is persistent across the funds that they manage, (b) that there is substantial cross-sectional heterogeneity in the performance of GPs and their affiliated investment advisers, and (c) that different types of LPs vary in their ability to identify this skill.¹³ Surveys of private equity oriented towards its potential role in an institutional portfolio, such as (Ang, Goetzmann, & Schaefer, 2009) and (Døskeland & Strömberg, 2018), refer to those studies and emphasize the importance of building internal teams that can assess the skill of GPs and their affiliated investment advisers and leveraging an institution’s size to obtain access to highly-skilled GPs and affiliated investment advisers. In addition, these surveys recommend that these institutions explore ways to reduce the impact of the fees on private equity returns by, for example, internalizing some fund management functions and directly participating in co-investments alongside other LPs.

Results supportive of portfolio efficiency benefits

Given the current lack of consensus regarding how the returns to private equity should be adjusted for risk, some studies present PME as a simple, straightforward metric. Studies using the most comprehensive data sets state that both buyout and venture capital funds consistently outperform the public market.¹⁴ This finding is relatively robust to benchmarking against alternative market indices that may match the risk of private equity investments more closely,

¹³ See (Kaplan & Schoar, 2005) and (Korteweg & Sorensen, 2017) for analyses of skill persistence among private equity GPs. See, also, (Lerner, Schoar, & Wongsunwai, 2007) who show that some types of institutions, such as endowments, are better at identifying follow-on funds from GPs that are likely to outperform.

¹⁴ See, e.g. (Kaplan & Sensory, 2015).

including small-cap stocks, small value stocks, and small growth stocks, as well as levered positions in a market index such as the S&P 500.¹⁵

In addition, (Døskeland & Strömberg, 2018) and (Korteweg & Nagel, 2016) point out that any abnormal private equity returns relative to a given benchmark, factor model, or stochastic discount factor could reflect unique risks and associated risk premia in the private equity market that are not captured by public market factors. For example, (Ang, Chen, Goetzmann, & Phalippou, 2014) find statistical evidence suggesting that private equity returns are not completely spanned by typical public market factors, while (Sorensen, Wang, & Yang, 2014) provide a theoretical model that they find shows investors may earn a premium for bearing liquidity risk that is unique to investments like private equity.

Finally, (Ang, Chen, Goetzmann, & Phalippou, 2014) acknowledge that even if private equity returns in the data can be replicated by exposure to public market factors, directly investing in private equity markets could be a more cost efficient way to obtain those exposures after taking transaction costs into account. (Døskeland & Strömberg, 2018) point out that the market capitalization of private equity funds is a substantial fraction of the market capitalization associated with some of these public market factors, and they state that obtaining this exposure in public markets may be cost prohibitive. In addition, the authors point out that, ex-ante, it is difficult to anticipate the extent to which a private equity replication strategy should load on each of these factors because estimates of these loadings change across sub-samples in the data and may change over time as the private equity industry varies investments in different industries, geographies, and sectors.

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¹⁵ See (Harris, Jenkinson, & Kaplan, 2014) and (Harris, Jenkinson, & Kaplan, 2015).

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