HARBOURVEST

PRIVATE MARKET INSIGHTS

SECONDARIES: QUANTIFYING THE BENEFITS

> Our modeling demonstrates that adding a global secondary allocation to a US-only primary portfolio may improve internal rate of return (IRR) with limited adverse impact on money-multiple return at maturity.

> Analysis of secondary performance data highlights strong and potentially differentiated risk-adjusted returns relative to many private and public investments.

Once a niche strategy, secondary funds have quickly evolved into an essential component of a well-diversified private market portfolio. Some of the potential benefits include: a compelling risk-return profile, J-curve mitigation, accelerated capital deployment, and an enhanced distribution profile.

While these individual factors are attractive on their own, investors generally think about their private market allocations in a more holistic manner, considering their overall needs and limitations, and how the different investments in their portfolio complement each other. This paper leverages HarbourVest's proprietary data set to perform a deeper dive on the first two factors in the above list.

Specifically, we will highlight data that shows secondaries offer an attractive risk-return profile and the potential for differentiated returns. We will also quantify the impact on annual returns of adding secondaries to a private market portfolio.

For a high-level overview of secondary investments, please read our primer - Secondaries: Risk Reduction with Attractive Returns

access OPPORTUNITY

The results of this analysis demonstrate that adding a global secondary allocation to a US primary portfolio may improve risk-adjusted returns, driven by secondaries' reduced risk and relatively limited correlation to other private market asset classes. More broadly, these results and characteristics suggest that many multi-asset class portfolios might benefit from an allocation to secondaries.

BETTER ASSESSING RISK–ADJUSTED RETURNS

Any practical approach to portfolio construction must include an accurate appraisal of risk.

Standard risk measures, such as the Sharpe Ratio, are inappropriate for private markets as they rely upon the assumption of a symmetrical return distribution by measuring the standard deviation of returns.[1] However, the distribution of returns from private market investments is not normal and generally exhibits a significant positive skew. Furthermore, methodologies that employ standard deviation use the mean return as a target, and therefore do not necessarily reflect an investor's return needs.

A more appropriate measure of risk for private market investments is downside deviation, which focuses on the volatility of returns that fall below a defined minimum acceptable return ("MAR"). Replacing the Sharpe Ratio with the Sortino Ratio, which focuses on downside deviation, helps bypass the faulty assumption of symmetrical return distributions.[2] This allows us to calculate returns in relation to the amount of downside risk assumed – rather than penalizing a portfolio equally for harmful volatility and the positive volatility that contributes to outperformance.

Replacing the Sharpe Ratio with the Sortino Ratio...helps bypass the faulty assumption of symmetrical return distributions.

STRONG RISK–ADJUSTED RETURNS FROM SECONDARIES

Applying the Sortino Ratio to historical fund data highlights the compelling risk-adjusted returns offered by secondaries, particularly when compared to the broader private equity fund universe and major public market indices (see Chart 1).

> **Chart 1: Strong risk-adjusted returns from secondaries**
Sortino Ratio of selected indices for period
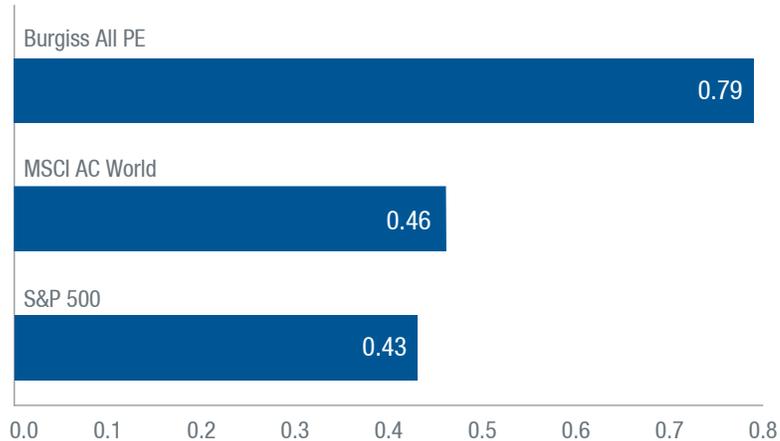January 1, 2000 to December 31, 2017
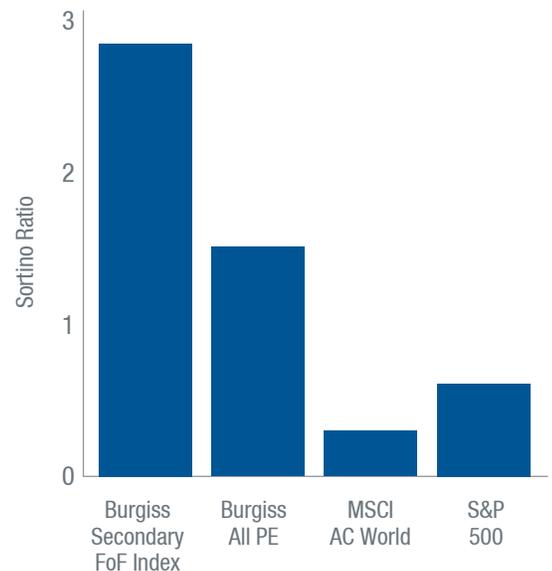
Sources: Burgiss, Bloomberg. The Burgiss All PE benchmark is represented by equity-only investments with vintage years 1993 through 2017. The Burgiss Secondary Fund-of-Funds benchmark is represented by secondary investments in equity and debt funds with vintage years 1990 through 2017. The public market indices shown (i.e., the MSCI AC World® Index and the S&P 500® Index) are not intended to, and do not, parallel the risk, investment strategy, or investment characteristics of private market funds. The securities comprising the public market indexes have substantially different characteristics than the investments held by private market funds, and accordingly a direct comparison may not be meaningful. The public market comparison is shown for illustrative purposes only. The public market indices are shown to demonstrate the approximate returns an investor may have received had the investor invested in certain publicly-traded equity securities in lieu of private market funds. Sortino Ratio uses MAR of 0% as the target return.

Correlation Coefficient of Burgiss Secondary FoF Index

Burgiss All PE

0.79

MSCI AC World

0.46

S&P 500

0.43

0.0 0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8

Sources: HarbourVest, Burgiss, Bloomberg. No investor received the indicated performance of the model portfolio. Past performance is not a reliable indicator of future results. The Burgiss All PE benchmark is represented by equity-only investments with vintage years 1993 through 2017. The Burgiss Secondary Fund-of-Funds benchmark is represented by secondary investments in equity and debt funds with vintage years 1990 through 2018. The public market indices shown (i.e., the MSCI AC World® Index and the S&P 500® Index) are not intended to, and do not, parallel the risk, investment strategy, or investment characteristics of private market funds. The securities comprising the public market indices have substantially different characteristics than the investments held by private market funds, and accordingly a direct comparison may not be meaningful. The public market indices are shown to demonstrate the approximate returns an investor may have received had the investor invested in certain publicly-traded equity securities in lieu of private market funds. For details of the correlation coefficient calculation methodology, please see Appendix.

For our analysis, we calculated the risk-adjusted returns for all secondary programs from 1990 to 2018 and found that secondaries had a higher Sortino Ratio than the broader private equity market, and much higher than public stock indices. For investors, a higher Sortino indicates a better return per unit of downside risk they assume.

Secondaries' strong Sortino Ratio stems largely from the risk reduction intrinsic to the investment strategy. Investing later in a fund's life may help lessen downside risk, due in part to reduced blind pool risk*. This is reflected in a lower incidence of secondary funds generating a loss: Our analysis of performance data found that just 1.8% of secondary funds globally had returned less than the initial investment, compared with 20.5% for buyout and venture capital funds combined.[3]

Additionally, secondaries may have the potential to act as a diversifier in a broad multi-asset investment portfolio. The data shows that secondaries generally have only a moderate correlation to major private and public market indices (see Chart 2).

However, HarbourVest has found that a secondary investment strategy focused on more complex transactions has historically delivered returns that are much less correlated with the Burgiss All PE Index or public market indices than the Burgiss Secondary FoF Index presented in Chart 2. For example, data tracked by HarbourVest

shows that relative to the Burgiss All PE Index, a strategy focused on complex transactions has exhibited a correlation coefficient of approximately 0.40 (compared to 0.79 for the Burgiss Secondary FoF Index).[4] Furthermore, HarbourVest's data suggests that a complex transaction-focused secondary strategy may exhibit correlation coefficients with major public market indices of just 0.25 or lower.[5]

The strong Sortino Ratio and limited correlation of returns with key industry benchmarks suggest that adding secondary exposure to a portfolio could help reduce overall downside risk.

PORTFOLIO RETURN MODELING

Many investors also allocate to secondaries for the potential to mitigate the J-curve effect**. Secondary funds typically generate gains relatively rapidly, which may boost early IRRs and help limit portfolio downside risk. To illustrate and quantify this impact, we performed an analysis of potential return outcomes from adding secondaries to a primary portfolio.

Our analysis is based on 23 years of private equity fund performance data.[6] This included more than 4,000 funds across different geographies, drawn from HarbourVest's proprietary historical data set of investment and due diligence data, and supplemented by several publicly available data

*Blind pool risk is the risk assumed when investing in primary funds, where the precise identity of the underlying investments is unknown at the point at which capital is committed.

**The J-curve is the typical shape of returns from primary funds when graphed. IRR tends to be negative early in the fund life before turning positive as investments mature.
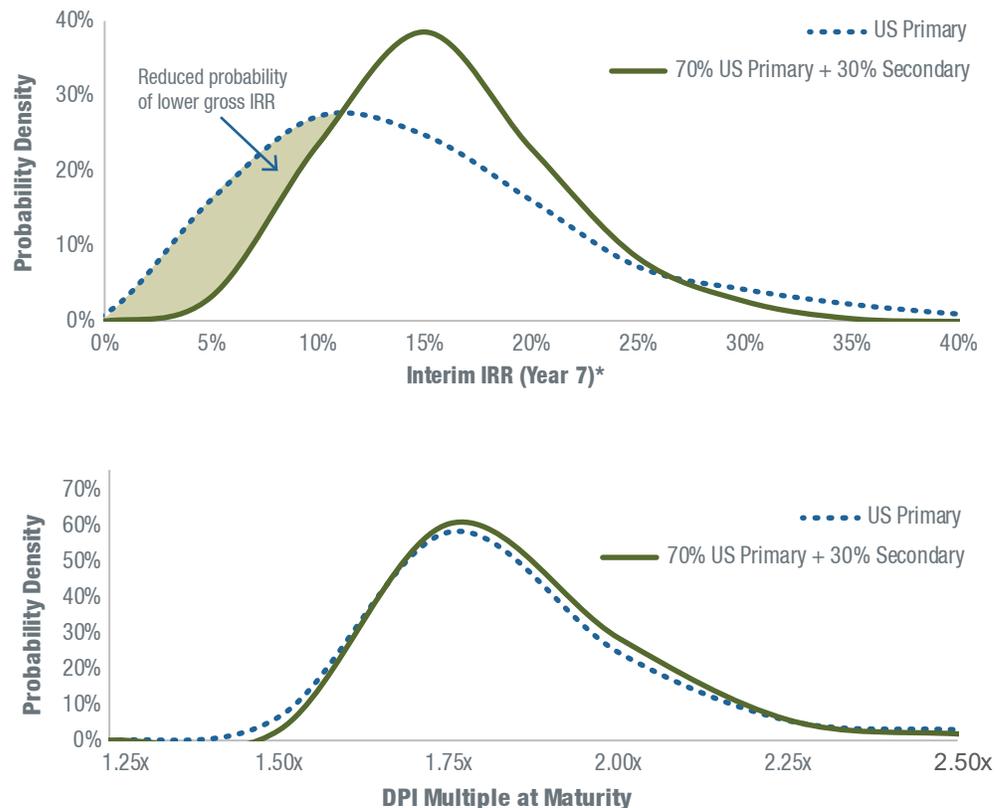
sources. Using this historical return data we conducted Monte Carlo simulations assessing the likelihood – the probability density – of different return outcomes from model portfolios.[7] We modeled two different portfolios – one US primary funds only, and one comprised of 70% US primary funds and 30% global secondary funds. These model portfolios were simulated as evenly-paced allocations to 60 funds over consecutive three-year periods to take into account the impact of the macroeconomic environment across different cycles.[8] This analysis produced probability estimates of the likely IRR after 7 years – the point at which we assessed that returns data becomes statistically significant due to an appropriate level of fund maturity – and the Distributed to Paid-In Capital ("DPI") Multiple at fund maturity.[9]

IMPROVED RETURN PROFILE FROM ADDING SECONDARIES EXPOSURE

The resulting analysis demonstrates that a portfolio with a 30% allocation to global secondary funds and a 70% allocation to US primary funds has a stronger return profile than one allocated entirely to US primary funds (see Chart 3). The improvement in probable gross IRR outcomes is clear, with a significant reduction in the probability of weaker performance.

The DPI at maturity changes very little with the addition of the secondaries exposure, highlighting that improved gross IRR need not come at the cost of a lower money multiple at portfolio maturity.

> Chart 3: Improved risk-return profile from portfolio including both US primary and global secondary funds
Portfolio Interim (Year 7) Gross IRR and DPI at Maturity

Reduced probability of lower gross IRR

Legend:
······ US Primary
——— 70% US Primary + 30% Secondary

X-axis: Interim IRR (Year 7)*
Y-axis: Probability Density

Legend:
······ US Primary
——— 70% US Primary + 30% Secondary

X-axis: DPI Multiple at Maturity
Y-axis: Probability Density

Source: HarbourVest. HarbourVest proprietary data set; Vintage years 1995-2017; even allocation over 3 years (specific timing of allocations assigned during HarbourVest analysis); 60 funds. US Primary portfolio weights: 70% US Buyouts / 30% US Venture; Blended portfolio weights: 70% US Primary Investments / 30% Global Secondary Investments. Interim IRR reflects IRR at year 7 in the life of each respective simulated portfolio. The graphs and data above are based on a Monte Carlo simulation. The performance information is presented on a gross basis. These returns do not reflect the management fees, carried interest, and other expenses that will be borne by investors in HarbourVest-managed funds/accounts, which will reduce returns. See 'Additional Important Information' at the end of the paper, including important disclosures related to Gross / Net Performance Returns, Fees and Expenses, and Monte Carlo Simulations. Past performance is not a reliable indicator of future results.

CONCLUSION

While the modeling in this paper has shown that adding secondary investments to a US primary fund portfolio would markedly improve that portfolio's return profile, it is clear that the positive characteristics of secondaries could be broadly additive to most multi-asset class portfolios. The high Sortino Ratio highlights the potential for attractive risk-adjusted returns, supported by attributes that help moderate downside risk. Furthermore, these returns may potentially have limited correlation to other asset classes, both within and beyond private markets.

For more information on the secondary market, and to find out how HarbourVest can help you realize your investment goals, please get in touch with your HarbourVest contact or email clientservice@harbourvest.com.

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APPENDIX

THE SORTINO RATIO

$$Sortino\ Ratio = \frac{E\ [R - MAR]}{DD}$$

Where:

R = Expected Return: the annual rate of return an investment is expected to generate.

MAR = Minimum Acceptable Return: the minimum acceptable return or target against which that investment is to be assessed.

DD = Target Downside Deviation: the calculation of downside risk. It is determined by first effectively eliminating positive returns from the calculation by treating them as underperformance of zero. Then you take the realized returns' underperformance relative to the MAR and calculate their deviations. Finally, you calculate the root-mean-square of these figures.

$$DD = \sqrt{\frac{1}{n}} * \sum_{i=1}^{n}\ ((min(0, x_i - MAR))^2$$

where x_i = i^{th} return
and N = total number of returns

ADDITIONAL IMPORTANT INFORMATION

Model performance results are inherently limited and should not be considered a reliable indicator of future results. No investor received the indicated model performance. Certain assumptions have been made for modeling purposes. No representation or warranty is made as to the reasonableness of the assumptions made. Changes in the assumptions may have a material impact on the hypothetical returns presented. Different model scenarios will provide different results.

Monte Carlo Simulations – These model (hypothetical) portfolios are intended for illustrative purposes only. Performance information for each hypothetical portfolio utilized a Monte Carlo Simulation and are based on the actual cash flows of a proprietary data set that includes partnership investments made by funds managed by HarbourVest, along with partnership data from external sources. The capital calls and distribution data are based on historic partnership investment cash flows, but does not represent the actual experience of any investor or fund. The results of the simulation are impacted by an uneven representation of funds with different vintage years, sizes, managers, and strategies, and a limited pool of investment cash flow data. The actual pace and timing of cash flows is likely to be different and will be highly dependent on the underlying partnerships' commitment pace, the types of investments made by the fund(s), market conditions, and terms of any relevant management agreements. The results presented are based entirely on the output from numerous mathematical simulations. The simulations are unconstrained by the fund size, market opportunity, and minimum commitment amount, and do not take into account the practical aspects of raising and managing a fund. The simulated hypothetical portfolio results should be used solely as a guide and should not be relied upon to manage your investments or make investment decisions.

Correlation Coefficient – calculated as follows:

$$Correlation\ Coefficient_{a,b} = \frac{Covariance_{a,b}\ ;}{\sigma_a \sigma_a}\ \ where:$$

$$Covariance_{a,b}\ ; = \sum \frac{(R_a - E(R_a)) * (R_b - E(R_b))}{n};\ \ where: R_a = investment\ return\ for\ asset\ a; R_b = investment\ return\ for\ asset\ b; E(R_a) = mean\ average\ return\ for\ asset\ a; E(R_b) = mean\ average\ return\ for\ asset\ b; \Sigma = sum; n = sample\ size.$$

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HarbourVest is an independent, global private market investment specialist with 36 years of experience and more than $64 billion in assets under management, as of June 30, 2019. The Firm's powerful global platform offers clients investment opportunities through primary fund investments, secondary investments, and direct co-investments in commingled funds or separately managed accounts. HarbourVest has more than 500 employees, including more than 125 investment professionals across Asia, Europe, and the Americas. This global team has committed more than $37 billion to newly-formed funds, completed over $21 billion in secondary purchases, and invested over $11 billion directly in operating companies. Partnering with HarbourVest, clients have access to customized solutions, longstanding relationships, actionable insights, and proven results.