

# Managing Private Equity Risk

## Macro-Sensitive Strategies Matter

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### **Why This Matters?**

The findings in this paper suggest that the private equity premium varies over time, driven by changes in long-term real economic growth and uncertainty. Moreover, the effects of these fluctuations could potentially be managed by systematically changing the private equity portfolio structure, in a macro-consistent fashion, via tailored publicly traded overlay strategies conditioned on our macro uncertainty index, and/or replicating private deals.

### **Who Should Read This Paper?**

The issues in this paper are important for managing the long-term risk of public and private equity assets and should be of interest to the risk and investment strategists, and asset allocators.

## Introduction

**Our earlier paper showed** that the private equity premium is growth-sensitive and reflects both financial leverage and exposure to long-term trend growth and uncertainty. Moreover, this premium changes over time, driven by changes in macro uncertainty. In the current lower trend growth and uncertainty environment, the premium has shrunk to nearly half its historical average. The question for investors with private equity investments is whether they can mitigate and benefit from these changes, and how. Our findings suggest that there are potential long run gains from systematically aligning private equity portfolios with macro uncertainty. Those gains can be achieved by using low-cost publicly traded growth-sensitive and growth-defen-

sive factor-based overlay strategies and/or private deals mimicking these public overlays.

**To illustrate the benefits** of macro-sensitive strategies for private equity investors, we first recall the example private equity buyout fund described in our previous paper and simulate its long-term expected real return under alternative scenarios about long-term economic trend growth and uncertainty. We then evaluate the potential benefit from using growth-sensitive and growth-defensive factor-based overlay strategies that are publicly traded. Last, we back-test the strategies and show how the performance can be attributed to realized changes in macro uncertainty.

## An Illustrative Private Equity Fund

**Exhibits 1A and 1B describe the main characteristics** of the illustrative private equity buyout fund of our previous paper. The fund has a debt/equity ratio of 70%, and is biased towards our growth-sensitive size factor, and growth-sensitive sectors.<sup>1</sup>

**Our macro-based asset pricing** and risk models use information about private equity size, sectors and leverage to evaluate a fund's exposure to our growth-

<sup>1</sup> Our models classify public equity style factors and sectors into growth-sensitive and growth-defensive categories. Growth-sensitive (growth-defensive) assets exhibit cash-flows that are more (less) sensitive to trend growth shocks compared to the equity market portfolio. Growth-sensitive style factors include Value (portfolio tilted towards high book-to-market stocks) and Size (portfolio tilted towards small cap stocks). The growth-sensitive sectors are Consumer Discretionary, Industrials, Materials, Information Technology, and Finance. Growth-defensive style factors include Profitability (portfolio tilted towards stocks with robust and stable profits). The growth-defensive sectors are Consumer Staples, Utilities, and Healthcare.

sensitive and growth-defensive factors. We use these characteristics to assess the fund’s exposure to macro risk – which we define as the risk of continued decline

in long-term real economic growth – and simulate long-term private equity returns under alternative scenarios of long-term trend growth and uncertainty.

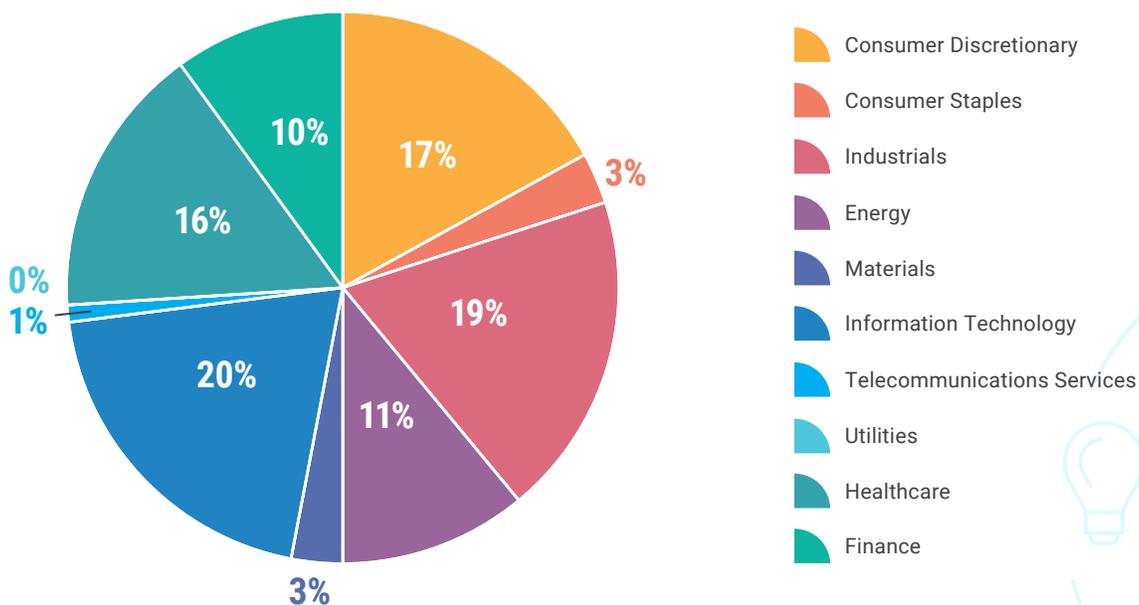
**Exhibit 1 A - Private Equity Has a Growth-Sensitive Bias**

	Illustrative Private Equity Fund	Public Equity Market
Average Firm Size (USD Million)	700	38,297
Growth-Sensitive Sector Exposure	80%	75%
Growth-Defensive Sector Exposure	19%	24%
Debt/Equity Ratio	70%	10%

The portfolio is illustrative of aggregate allocations to private equity buyout funds and does not reflect the characteristics of any specific private equity fund.

SOURCE: NAVEGA STRATEGIES LLC RESEARCH, LANDMARK PARTNERS

**Exhibit 1 B - Private Equity Fund Sector Decomposition**



The portfolio is illustrative of aggregate allocations to private equity buyout funds and does not reflect the characteristics of any specific private equity fund.

SOURCE: NAVEGA STRATEGIES LLC RESEARCH, LANDMARK PARTNERS

# Macro Scenarios Have Varied Effects on Private Equity

**Exhibit 2 describes three scenarios** that differ in their assumptions about US long-term trend growth and uncertainty (measured by our macro uncertainty index). Our baseline scenario is one of relatively low uncertainty around low long-term growth compared to the historical average. The other two scenarios assume a persistent decline in trend growth, from 1.6% to 1.1%. However, the first alternative scenario assumes lower uncertainty relative to the baseline, at levels similar to what was experienced in the early 1960s. By contrast, the second alternative scenario assumes significantly higher uncertainty, comparable to the 2008 global financial crisis experience.

**What do the different scenarios** mean for real yields and long-term returns? As shown in Exhibit 2, and

according to our models, lower uncertainty around a persistently lower trend growth (Alternative Scenario 1) lowers expected, long-term public equity market returns, and depresses the private equity premium over public equity even further, relative to our baseline scenario. Our illustrative private equity fund is more sensitive than the public market, due to its exposure to growth-sensitive factors and sectors, and higher leverage. Compared to our baseline scenario, real yields decline only moderately, as the negative impact of lower trend growth is balanced by the positive impact of lower uncertainty. By contrast, higher uncertainty (Alternative Scenario 2) lifts the expected public equity market return and the private equity premium, but depresses real yields, reflecting markets' demand for insurance against macro risk.

**Exhibit 2 - Private Equity Long-Term Returns Vary with Macro Environment**

	Baseline Scenario	Scenario 1: Lower Growth with Lower Uncertainty	Scenario 2: Lower Growth with Higher Uncertainty
<b>US Long-Term Growth and Uncertainty</b>			
Long-Term Real GDP Growth (Annualized, %)	1.6%	1.1%	1.1%
Uncertainty Premium Index	131	69	330
<b>US Long-Term Real Returns and Yield (Annualized, %)</b>			
Public Equity Market	5.1%	3.1%	6.1%
10-Year Constant Maturity TIPS Yield	1.2%	1.0%	0.0%
Private Equity Fund	7.1%	3.2%	9.6%

SOURCE: NAVEGA STRATEGIES LLC RESEARCH

As fluctuations in the private equity premium can be sizeable depending on macro conditions, the next question for investors is whether it is possible to mitigate and benefit from these changes, and how.

Our research and models suggest investors and managers can manage the structure of the private equity fund portfolio, using low-cost public equity overlay strategies and/or replicating private deals.

## Macro-Sensitive Overlay Strategies Can Improve Long-Run Efficiency

We build public equity macro-sensitive overlays by optimizing factor exposures under each macro scenario, keeping the private fund's portfolio structure and level of leverage unchanged. Exhibit 3 shows the impact of these overlays on the illustrative private equity fund's long-term expected return and risk.<sup>2</sup>

<sup>2</sup> To build efficient, macro scenario and model driven overlays, we need to set the investor's sensitivity to macro risk. To do this, we first derive market implied expected returns for all factors, that is, returns that are implied by the cap-weighted equity market portfolio. The risk sensitivity is set so that the portfolio of optimized factor exposures under the market implied returns has the same long-term risk as the illustrative fund (about 30%).

**Exhibit 3** - Public equity overlay strategies improve private-equity efficiency

	Fund with Macro-Sensitive Overlay			
	Current Fund	Baseline Scenario	Scenario 1: Lower Growth with Lower Uncertainty	Scenario 2: Lower Growth with Higher Uncertainty
<b>Portfolio Exposures</b>				
Market	1.5	1.5	1.5	1.5
Growth-Sensitive (Net of Market)	0.9	0.3	0.2	0.5
Growth-Defensive (Net of Market)	-0.1	-0.2	-0.2	-0.4
<b>Long-Term Real Return</b>	7.0%	7.0%	3.2%	10.4%
<b>Long-Term Risk</b>	30.0%	28.8%	28.0%	31.5%
<b>Long-Term Sharpe Ratio</b>	19.2%	20.7%	11.6%	32.9%
<b>Long-Term Sharpe Ratio Gain/Loss (Relative to No Hedging)</b>	0.0%	5.2%	55.0%	2.8%

SOURCE: NAVEGA STRATEGIES LLC RESEARCH

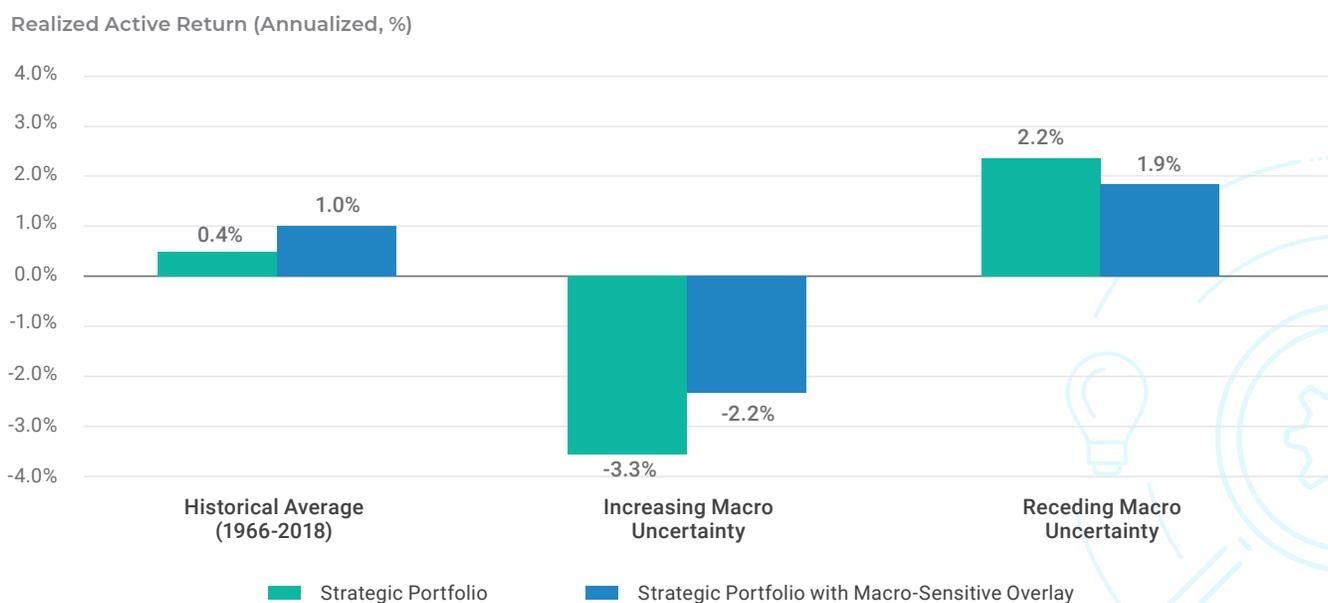
Remarkably, according to our models, the current fund's factor exposures are misaligned, even under the baseline scenario of continued low trend growth and uncertainty. In particular, they over-allocate to growth-sensitive assets. Overlay strategies that reduce the net growth-sensitive exposure help reduce the fund's risk and improve efficiency. In the two alternative scenarios, the optimized factor exposures of overlays are driven by changes in macro uncertainty. A projected lower uncertainty further decreases the overall, net growth-sensitive exposure, while a projected increase raises the net growth-sensitive exposure. There are sizeable gains in efficiency from the macro-sensitive overlays, up to 55% in times of receding uncertainty around a low trend growth.

**These results and insights** open another key question for long-term investors: how to assess and understand the sources of performance of forward-looking, macro-based strategies? We address this issue by back-

testing the overlay strategies conditioned on realized, quarterly changes in our macro uncertainty index from 1966 to 2018. More precisely, at the beginning of each quarter, we update views of long-term growth and uncertainty, with information about total factor productivity, labor force growth, and real GDP growth from previous quarters. We then build two portfolios: a publicly traded strategic portfolio with constant exposures to the growth-sensitive and growth-defensive factors, consistent with the historical average level of macro uncertainty. And a portfolio that adds a publicly traded, macro-sensitive overlay strategy. The dynamic overlay rebalances factor exposures, each quarter, conditioned on updated views about trend growth and uncertainty.

**Exhibit 4 shows** that, in the long run, there were significant, realized gains from aligning growth-sensitive and growth-defensive factor allocations with changes in macro uncertainty. We contrast the active

**Exhibit 4 - Macro-sensitive factor allocations mitigate losses in times of increased uncertainty**



SOURCE: NAVEGA STRATEGIES LLC RESEARCH, ALL DATA FROM 1966 TO 2018

performance (relative to the public equity market) of the strategic allocation and the dynamic strategy with macro-sensitive overlays in times of increasing and decreasing uncertainty. Over the 50-year back-test period, as predicted by our models, the strategic portfolio, tilted towards growth-sensitive factors and sectors, outperformed the market, by about 40bps on average per year. The dynamic strategy significantly outperformed both the market and strategic portfolio, on average by about 100bps and 60bps per year (respectively).

**Exhibit 4 also provides** a deeper understanding of the source of this systematic outperformance. Consistent with our model predictions, both growth-sensitive strategies lose relative to market when uncertainty rises, and gain when uncertainty declines. Thus, the growth-sensitive premium was reaped in times of receding uncertainty. However, realized losses for the

dynamic strategy are significantly lower in times of increasing uncertainty, typically concurring with greater market stress. Said differently, the dynamic strategy outperforms the static allocation over long horizons primarily because it is contrarian, providing a better hedge against macro uncertainty as it swings to higher levels. Gains are traced to the combination of relatively lower growth-sensitive exposure during periods of market stress, and relatively higher exposure when uncertainty premia and expected long-term return peak.

**Thus, aligning allocations** with changes in uncertainty improves realized returns in the long run by diversifying macro uncertainty. Exhibit 5 further confirms this point. On average over the 50-year back-test period and relative to the market, the dynamic strategy outperformed the strategic portfolio with significantly lower active risk.

**Exhibit 5 - Aligning strategies with uncertainty enhances long run, risk-adjusted returns**

	Equity Market	Strategic Portfolio	Strategic Portfolio With Macro Sensitive Overlay
<b>Excess Return*</b>	5.2%	5.6%	6.2%
<b>Historical Volatility</b>	16.9%	18.8%	18.6%
<b>Sharpe Ratio</b>	30.7%	29.8%	33.7%
<b>Active** Return</b>		0.4%	1.0%
<b>Active** Historical Volatility</b>		3.9%	1.9%
<b>Information Ratio</b>		9.7%	52.6%

\* Relative to 10-Year Constant Maturity Treasury Yield

\*\* Relative to Equity Market

SOURCE: NAVEGA STRATEGIES LLC RESEARCH, ALL DATA FROM 1966 TO 2018

## Conclusions

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**Our findings suggest that fluctuations** in the private equity premium are driven by changes in long-term real economic growth and uncertainty. Moreover, our results suggest that the effects of these fluctuations could potentially be managed by systematically changing the private equity portfolio structure, in a macro-consistent fashion. Changes can be implemented via tailored, publicly traded growth-sensitive and growth-defensive factor-based overlay strategies, conditioned on our macro uncertainty index, and/or replicating

private deals. These findings are further supported by historical back-testing over the last 50 years.

**While changes** in private equity portfolio structures can help manage macro risk, changes in financing structures and fee structures can also matter. In a companion note, we further explore how leverage, management and performance fees can be aligned with changes in macro uncertainty to improve net returns delivered to private equity investors.

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