INSTITUTIONAL ADVISORY & SOLUTIONS

PGIM

THE DIFFERENTIAL

New Developments in Portfolio Construction

June 2024 | Issue 11

PGIM's Institutional Advisory and Solutions Group provides objective, data-informed analysis to help Chief Investment Officers and Investment Committees manage their portfolios.

To learn more about PGIM IAS, contact IAS@pgim.com or visit pgim.com/IAS.

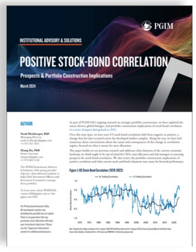
IN THIS ISSUE

Dear Investor,

2024 finds PGIM IAS actively engaged with major asset allocators around the world. While we continue to publish new research on portfolio construction, we are also heavily involved with investors who wish to utilize and implement some of our published tools and methodologies. Since our work is meant to have lasting strategic value, we are always gratified to be asked either to update some of our findings published years ago or to make them available via our ***CIO Interactive Toolkit.***

Importantly, as many of you know, IAS research often leads to bespoke projects, helping clients implement our research. These projects, often led by **Junying Shen, VP, Co-Head of Private Assets Research Program,** provide CIOs with objective and quantifiable analysis to help them make more informed portfolio management decisions. These projects can also leave CIOs with portfolio construction infrastructure that they can continue to use as they consider new scenarios or as they update their capital market assumptions.

We also continue to focus on proactive client outreach. Given the success of IAS' last three portfolio research conferences (London 2022–LSE, New York 2023 – Yale Club, and Shanghai 2023 – Shanghai Jiao Tong University, Advanced Institute of Finance), IAS has new conferences planned for the second half of 2024 (Europe/London and New York). Please be on the lookout for your invitation! Although still too soon to finalize an agenda, topics to be discussed will address important strategic issues for CIOs and will certainly include our most up to date research projects, with three new 2024 papers already (summarized here) and two more forthcoming (previewed in detail below).



Published in March, ***Positive Stock-Bond Correlation: Prospects & Portfolio Construction Implications*** by Noah Weisberger, PhD and Xiang Xu, PhD is IAS' fourth paper on stock-bond correlation – an IAS research program that began in early 2020 leading to their first publication ***"US Stock-Bond Correlation – What are the Macroeconomic Drivers?"*** (May 2021), which remains one of IAS' most downloaded research papers.

Their new paper addresses what elements of the current economic landscape augur for positive stock-bond correlation to persist going forward and the implications for portfolio construction and forward portfolio performance.

As we are all aware, US stock and bond prices have moved in tandem for more than 2y, declining sharply in 2022 and then rebounding together in 2023. These synchronized moves have pushed stock-bond correlation into positive territory, a clear change in regime after more than 20y of negative correlation. (To stay up to date on stock-bond correlation, both in the US and around the world, please visit the IAS' ***CIO Interactive Toolkit***.)

As Noah's and Xiang's research highlights, correlation regimes tend to be long-lived and driven by the prevailing **macroeconomic and fiscal/monetary policy backdrop.** Fiscal policy sustainability concerns, monetary policy uncertainty, and the supply-driven nature of recent economic fluctuations have helped push correlation into positive territory. If these forces become entrenched, positive stock-bond correlation could persist, as it did for over thirty years from 1970 to 2001.

A sustained positive stock-bond correlation regime would be a **new investing environment** for most market participants. Given the unfamiliar landscape and claims to the contrary, it is worth emphasizing that even when correlation is positive and bonds no longer hedge equity risk, **the optimal allocation to bonds remains little changed, with bonds continuing to play a critical role in the construction of a balanced portfolio.** Indeed, over the last 50y, a balanced portfolio of stocks and bonds has performed about as well in positive correlation environments as in negative ones (Figure 1). Moreover, the current narrow valuation gap between stocks and bonds is consistent with future bonds risk-adjusted outperformance relative to stocks, underscoring the importance of bonds in a balanced portfolio.

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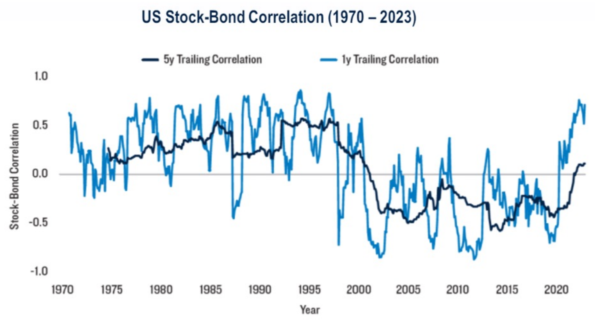
Figure 1: US Stock-Bond Correlation & 60/40 Portfolio Performance (1970-2023)



Note: Trailing 5y & 1y rolling correlations of 1m %-change in S&P 500 Total Return Index and 1m %-change in US 10y Treasury Constant Maturity Total Return Index. Source: Haver Analytics, Standard & Poor's, U.S. Treasury and PGIM IAS. For illustrative purposes only.

60/40 Portfolio Performance by Correlation Regime (1970 – 2022)

Correlation Regime	Positive (1/1970-12/2001)	Negative (1/2002-12/2022)
Average Return	11.9%	7.0%
Avg. Excess Return	4.1%	5.4%
Volatility	10.8%	8.9%
Sharpe Ratio	0.4	0.6

Note: Annualized monthly performance of a costlessly monthly rebalanced 60/40 stock-bond portfolio; excess returns are calculated relative to the average monthly LIBOR rate; correlation regime is determined by the sign of trailing 5y correlation between stock and bond returns. Source: Haver Analytics, Standard & Poor's, U.S. Treasury and PGIM IAS. For illustrative purposes only.

As Noah and Xiang have explored in previous work, the economic conditions, both in the US and in other developed markets, that support **positive stock-bond correlation** include:

- fiscal sustainability concerns;
- discretionary and procyclical monetary policy (*i.e.*, the Fed eases (tightens) to increase (slow) growth and inflation);
- supply-side drivers of economic activity; and
- interest rate uncertainty.

Currently, these forces all seem to be in play (in varying degrees) and could potentially support a sustained period of positive stock-bond correlation.

Fiscal sustainability concerns tend to put upward pressure on interest rates and downward pressure on economic growth, which translates into positive stock-bond correlation. Despite a long post-COVID expansion, US debt-to-GDP remains elevated and is poised to continue its climb. With seemingly little political will to address these issues, fiscal worries are likely to extend and to continue to provide support for positive stock-bond correlation.

Despite a sharp hiking cycle, economic growth and the labor market remain robust. As such, when **compared to rules-based measures of Fed policy, actual Fed funds rates appear accommodative.** Moreover, over the last several years, actual policy rates have deviated significantly from rules-based rates in a way that is reminiscent of the discretionary monetary policy environment of the 1970s – an era of entrenched positive correlation.

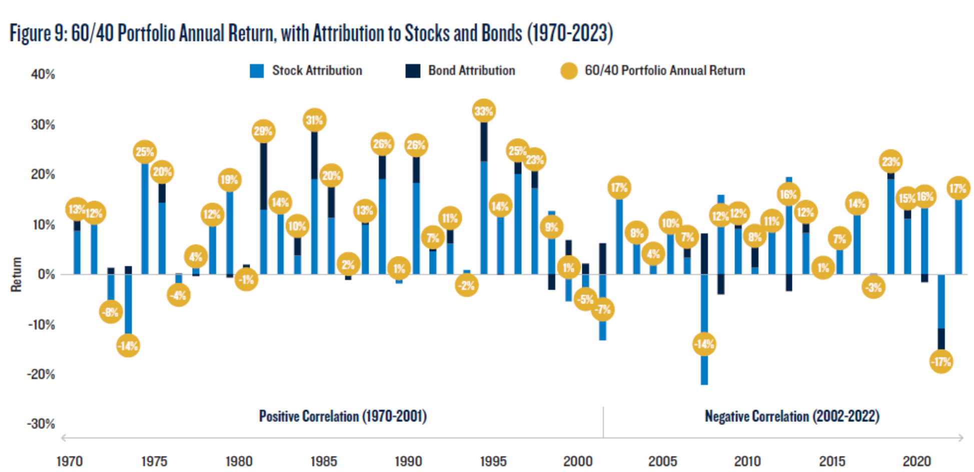
Supply-side developments have, in large part, driven inflation dynamics for the last several years. The waxing and waning of global supply chain pressures helped to push correlation into positive territory, but the impact of supply chain issues may fade as more typical business cycle dynamics prevail from here. That said, supply shocks – owing to geopolitical risks, say, and running thru energy markets – ought to remain on the radar screen as a potential driver of positive stock-bond correlation.

The current conduct of fiscal and monetary policy has led to an **increase in interest rate uncertainty,** pushing rates volatility to multi-year highs (in stark contrast to other measures of uncertainty). To the extent that fiscal sustainability and Fed independence and discretionary policymaking remain on the minds of investors, interest rate uncertainty may remain elevated too. This has direct implications for stock-bond correlations. Indeed, elevated interest rate volatility is responsible for a good deal of the uptick in stock-bond correlation and its shift from negative to positive.

Finally, the recent increase in bond yields has narrowed the valuation gap between stocks and bonds. This was highlighted last year by Xiang in his ***"Higher Bond Yields and the Fed Model"*** paper. (Xiang is currently extending this work to examine the optimal "sizing" of the stock-bond trade, conditional on real yield differences.) Historically, a narrow stock-bond yield gap has been associated with bonds outperforming stocks in terms of long-term future *risk-adjusted* returns – regardless of the correlation regime. This serves to strengthen the argument that bonds are likely to continue to play an important role in a balanced portfolio – despite prospects for persistent positive stock-bond correlation.

We cannot emphasize enough that positive correlation, in and of itself, did not cause dismal portfolio performance in 2022 – indeed, 2023 was a strong year for the 60/40 portfolio despite the prevailing positive correlation regime (Figure 2). Both history and theory point to the enduring value of a balanced portfolio regardless of correlation regime, with little to suggest that periods of positive stock-bond correlation are particularly challenging for multi-asset investing.

Figure 2: 60/40 Portfolio Annual Returns with Attribution to Stocks and Bonds (1970-2023)



Note: Annual %-change in end-of period S&P 500 Total Return Index, annual %-change in end-of-period US 10y Treasury Constant Maturity Total Return Index and annual %-change in costlessly, annually rebalanced 60/40 portfolio of stocks (S&P 500 Total Return Index) and bonds (US 10y Treasury Constant Maturity Total Return Index). Source: Haver Analytics, Standard & Poor's, US Treasury and PGIM IAS. For illustrative purposes only.

In **Styles of Responsible Investing: Attributes and Performance of Different RI Fund Varieties** (June 2024), author Stuart Jarvis aims at helping CIOs navigate the evolving responsible investing landscape.

All CIOs want to do the "right thing" for the owners of the assets that they manage. For some CIOs this means paying attention to environmental concerns while others may wish to have a broader social and environments impact.

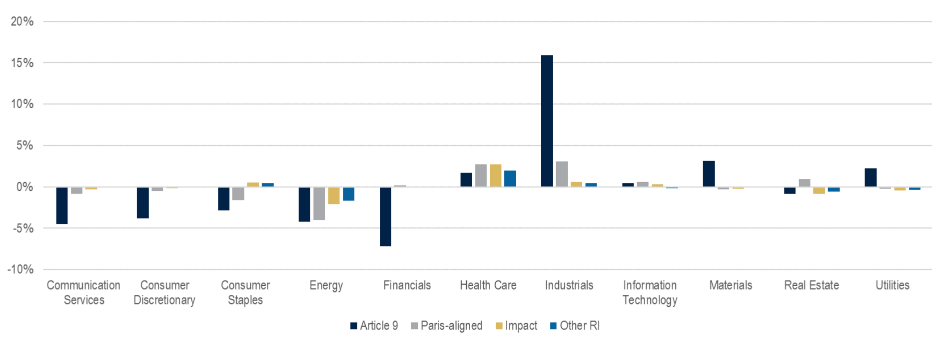
For CIOs there is an array of "responsible investing" (RI) strategies (or styles) which we have grouped using the following labels: "Impact funds", "Article 9 funds", "Paris-aligned funds" and "Other RI" funds.

Impact funds aspire to have a measurable social or environmental outcome; Article-9 funds have a core sustainability objective; Paris-aligned funds aim for consistency with the 2015 Paris treaty by not only having much lower financed emissions than broad market indices but also delivering meaningful annual reductions going forward; and Other RI funds follow a less rigidly defined RI strategy.

These labels can be confusing. Stuart's paper helps CIOs understand how these different RI fund styles differ in terms of their sector and security selection exposures, their relative financed emission levels and changes over time, and their relative performance. The paper can help CIOs determine which RI fund style may best meet their own responsible investment objective.

Figure 3 shows that there are significant differences in sector exposures across the four RI fund styles. The sectors with the largest GHG emissions are Utilities, Materials, Energy and Industrials. All four RI styles underweight the Energy sector. The Paris-aligned funds are also underweight Utilities and Materials. In contrast, Article-9 funds are overweight many of those sectors with high emissions! The difference between the two styles is that Paris-aligned funds must have low emissions – and continue to lower emissions – whereas Article-9 funds focus on sustainability and, so, can invest in high emission sectors which are embarking on a decarbonization path and may have faster rate of emission reductions.

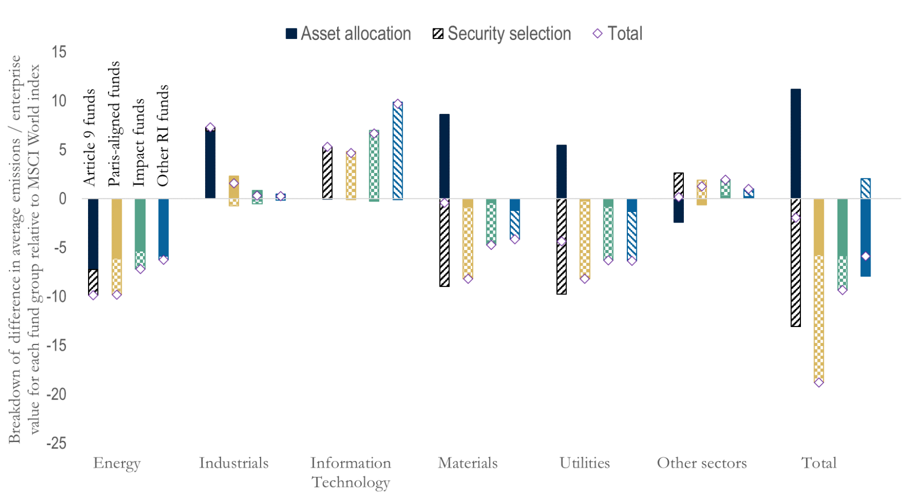
Figure 3: Sector Tilts for Different Varieties of Responsible Investing Global Equity Funds



Note: GICS sector tilts are shown as a percentage of the total weight relative to the MSCI World index, for the four non-overlapping fund groups shown in Figure 2 above. A geometric median measure (a multivariate version of the median) has been used, as a result of which, total tilts sum to zero. Source: LSEG Refinitiv Eikon – Lipper fund database, PGIM IAS calculations.

However, sector exposures tell only part of the story. Some sectors have companies that are high and low GHG emitters. Consequently, RI funds can exercise security selection to affect their overall level of financed emissions. For example, Figure 4 shows that although Article 9 funds are overweight Utilities, security selection within the sector allows the fund style to have an underweight of financed emissions compared to the broad index.

Figure 4: Contributions of Asset Allocation and Security Selection Across Sectors to Portfolio Emissions Levels



Note: Breakdown of portfolio emissions intensity, for different groups of responsible funds relative to MSCI World index. See note to Figure 5 for more detail of the metric used. Impact of asset allocation and security selection (see main text) assessed using averages from each fund group excluding outliers. Source: LSEG Refinitiv Eikon – Lipper fund database, PGIM IAS calculations, as of 31 December 2023.

Stuart highlights that while Paris-aligned RI funds have the lowest financed emissions, primarily due to heavy sector underweights in high GHG emitting sectors, these sector underweights versus the broad index (and more concentrated sector selection tilts within other sectors) are likely to increase over time given that these funds must continually reduce emissions over time.

Finally, Stuart presents the average performance of the four RI styles over the last 5y relative to the MSCI World index. In general, performance was strong in 2020 but all the fund groups have trailed the index on average in subsequent years. Fees weigh on the performance of all active funds, which explains some of the downward trend over time, but these performance differentials are related to fund flows: periods in which money flowed into RI funds tend to coincide with periods where RI funds outperformed the broader market; similarly flows out are broadly aligned with periods of underperformance.

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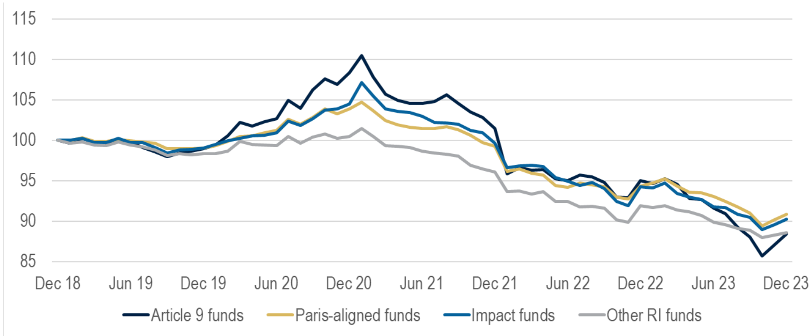
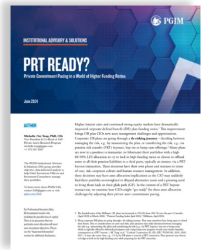
Figure 5: Average Performance Across Fund Groups



Source: Median cumulative performance relative to a MSCI world index tracker fund. LSEG Refinitiv Eikon – Lipper fund database, PGIM IAS calculations, as of 31 December 2023.

Different RI styles diverge from a primary objective of low financed emissions in important ways. A Paris-aligned RI style leads to significant portfolio tilts, often observed as divesting from high-emission sectors. However, since these tilts are towards sectors with low rates of emission reduction, it is less clear to what extent this style can drive real-world emissions reductions going forward. RI styles that frame their sustainability objectives differently, Article 9 and Impact styles, have demonstrated their ability to invest in companies at an earlier stage of their decarbonization path and may expect to benefit financially from the green transition, despite higher levels of financed emissions.



Michelle Teng's paper **PRT Ready? Private Commitment Pacing in a World of Higher Funding Ratios** was also published in June and it examines the potential set of issues facing DB plan CIOs in an environment where pension risk transfers are increasingly common.

Higher interest rates and continued strong equity markets have dramatically improved corporate defined benefit (DB) plan funding ratios. This improvement offers corporate sponsors new asset management challenges and opportunities.

Plan sponsors are now in a position to immunize (or hibernate) their portfolios with an 80-90% LDI allocation to try to lock in high funding ratios or choose to offload some or all their pension liabilities to a third party via a pension risk transfer (PRT) buyout transaction. These decisions have pluses and minuses in terms of cost, risk, corporate culture and human resource management. These decisions may also have asset allocation implications as CIOs may find their post-PRT portfolios have too large an allocation to illiquid private assets and may therefore need to act accordingly to reduce that allocation. In this paper, Michelle investigates how, in the context of a PRT buyout transaction, CIOs might "get ready" for these asset allocation challenges by adjusting their private asset commitment pacing.

Once plans reach a desirable funding ratio (say, 100%) some may choose to pursue an immunization strategy with a high allocation to LDI to align the duration and risk profile of plan assets with expected future liabilities. With immunization, the high allocation to LDI is usually accompanied by a small allocation to growth assets to help offset asset-liability slippage due to credit migration, portfolio losses, plan expenses including PBGC premiums, and underlying actuarial assumption changes that affect liability valuation (*e.g.,* longevity risk – life expectancy may increase more than what is incorporated in reserves).

Alternatively, with funding ratios at or above 100%, some plan sponsors may begin planning to reduce their pension liability exposure via a PRT transaction. Through a PRT buyout transaction a DB plan offloads part of their pension liability by purchasing a group annuity contract from an insurance company. The insurance company typically charges a single premium for assuming the responsibility for all future benefit payments to plan participants and the associated administrative overhead. The growth of PRT transactions is driven by such factors as continually improving funded status and increasing PBGC premiums. In addition, in recent years more insurers and capital have entered the PRT market, increasing overall PRT capacity and offering more competitive pricing.

In addition to high funding ratios, many plans have significant allocations to illiquid private assets following a sustained period of increasing allocations to these markets. The juxtaposition of improved funding ratios and significant allocations to private assets may pose a problem for DB plan CIOs going forward. If the plan decides to immunize or execute a PRT transaction, what happens to its illiquid assets? For example, most PRT transactions are executed via asset-in-kind (AIK) transfers whereby the DB plan transfers assets, usually public fixed income, to the insurance company to pay part, or all, of the PRT premium. If the AIK transfer excludes private assets, then immediately following a PRT transaction the remaining DB portfolio is suddenly over-weighted in private assets, sometimes significantly so.

If a PRT transaction produces an undesirable increase in portfolio allocations to illiquid assets what can the CIO do? They may consider:

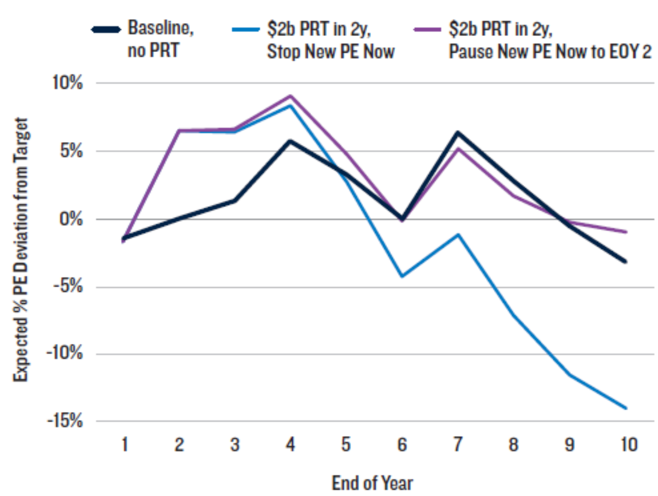
- Selling PE shares and prior commitments in the secondary market.
- Allocating additional corporate contributions to public equity.
- Adjusting their PE commitment pacing strategy.

We use the PGIM IAS OASIS™ asset allocation framework to examine various PRT scenarios, varying transaction size and execution lead-time, and including the impact of a range of market and economic conditions, to help CIOs better understand the consequences of a potential PRT transaction and help them evaluate alternative commitment pacing strategies. Our analysis shows that a PRT transaction can impact a DB plan's portfolio management significantly when they have meaningfully large allocations to private assets. In a world of high funding ratios, PRT planning today is a must for corporate DB plan CIOs to navigate the asset allocation challenges that may lie ahead.

CIOs need to carefully plan for - expected or unanticipated - PRT transactions to better stay the course. It is important for CIOs to have an asset allocation framework like OASIS that brings together their SAA targets, private asset investing activities, and various liquidity demands to better quantify their portfolios' liquidity profile well into the future and make more informed decisions about how to adjust their private asset strategies.

Figure 6: Private Equity NAV: Baseline vs. PRT Preparation Scenarios

(Assume: PRT in 2y: Stop PE Now vs. Immediately Pause PE for 2y; Expected Deviation of PE NAV% from SAA Target)



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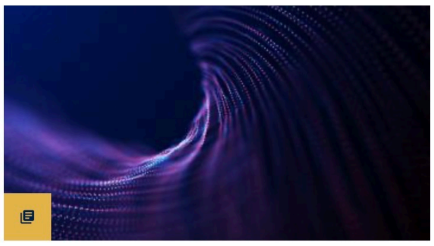
PGIM Marketing has also recently published three **"In Conversation With IAS"** interviews in a stand-alone format. These interviews originally appeared in previous editions of The IAS Differential and are an in-depth conversation between an IAS senior researcher and a senior PGIM portfolio manager.

Private Real Estate



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LEE MENIFEE AND MICHELLE TENG

Apr 30, 2024

IAS' Michelle Teng discusses recent trends in the commercial real estate market with PGIM Real Estate Head of Americas Investment Research, Lee Menifee.

Private Credit

INSTITUTIONAL ADVISORY & SOLUTIONS

TONY COLETTA AND JUNYING SHEN

May 1, 2024

IAS's Junying Shen discusses recent trends, risks and opportunities in private credit with PGIM Private Capital's Head of Investor Relations for Alternatives.

Private Equity

INSTITUTIONAL ADVISORY & SOLUTIONS

DR. CHRISTOPH JÄCKEL AND AILI CHEN

May 1, 2024

IAS's Aili Chen discusses recent trends, risks and opportunities in the secondary private equity market with Montana Capital Partners, Dr. Christoph Jackel.

We also have some exciting papers forthcoming early this Fall:

"How Well Did Inflation Hedging Strategies Perform during the Recent Inflationary Period?" – September 2024, expected.
Throughout 2021-2022 CIOs had available, and considered, a variety of real asset strategies to hedge expected and unexpected inflation. Subsequently, inflation appeared! The 2021-2023 runup and subsequent decline in inflation provides a laboratory to explore how well real asset strategies performed. Did they successfully hedge inflation? What worked and did not work? This research should help inform CIOs on their future real asset strategies.

"Asset Allocation for Dutch Solidarity Pension Schemes" – September 2024, expected.
Using the IAS OASIS asset allocation methodology, Ms. Aili Chen examines the liquidity consequences for a Dutch Solidarity Pension Scheme for various allocations to alternative illiquid assets (*e.g.,* infrastructure).

For an early peek at these forthcoming papers, please see the section on Forthcoming Research below.

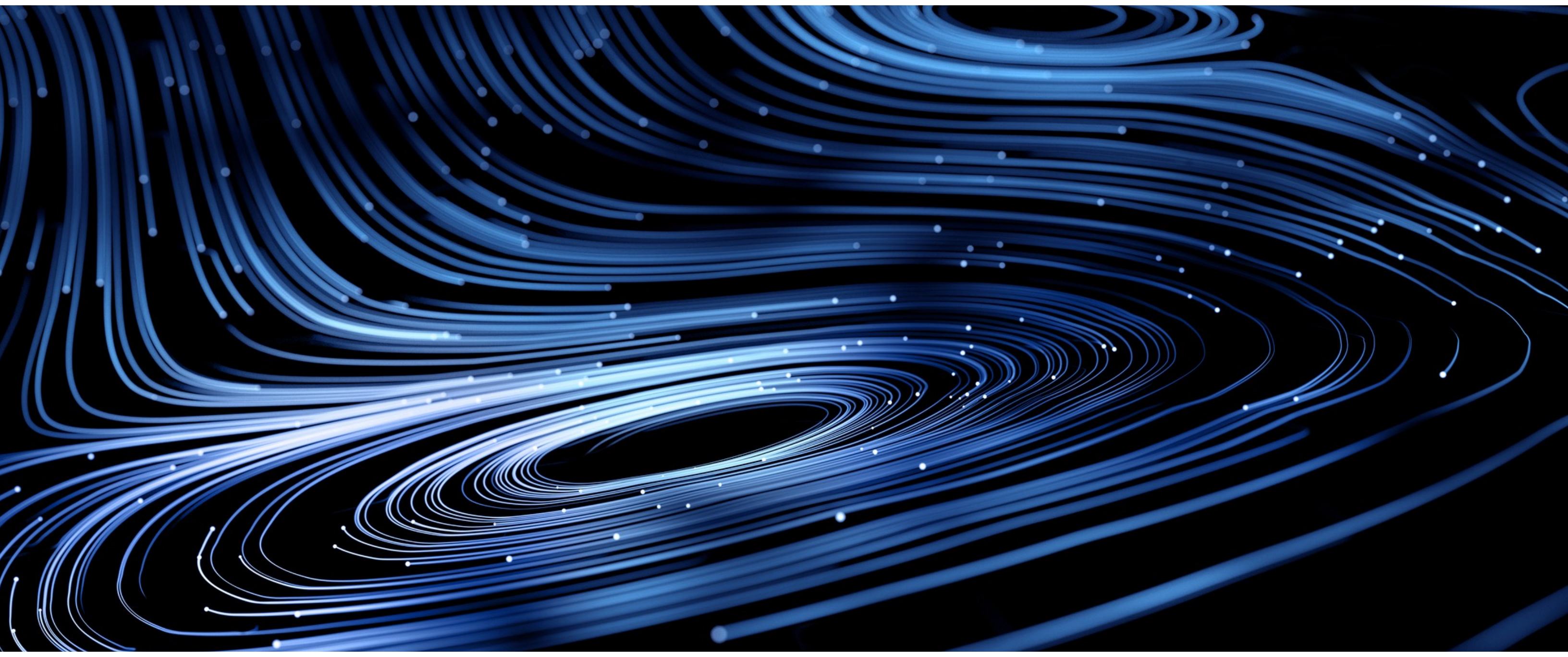
The previous IAS Differential introduced Dr. Stuart Jarvis, FIA, DPhil, Managing Director as the newest member of the IAS team, based in London. Given Dr. Jarvis' experience in the pensions area and the heavy interaction IAS has with clients located in the UK and Europe, Dr. Jarvis will nicely expand IAS' capabilities to conduct research from a European perspective and to engage more actively with clients. To help you get to know Stuart, in this edition of The Differential, we have a short, but up-close and personal, Q&A session with Stuart.

As always, IAS' goal is to deliver pragmatic and implementable research to help CIOs and their Investment Committees make better-informed portfolio management decisions. We in PGIM IAS are grateful for our client interactions around the world.

Best wishes for a wonderful summertime!

Warm regards,

Bruce D. Phelps, PhD, CFA
Managing Director
Had of IAS



FORTHCOMING RESEARCH

PGIM IAS currently has four research streams: Real Assets, Strategic Portfolio Construction, Manager Allocation & Selection and Asset Allocation with Illiquid Private Assets. The common thread throughout is our focus on addressing new and emerging issues that CIOs and asset allocators are facing that could affect long-term portfolio risk and performance. As always, we attempt to offer pragmatic, data-driven, actionable answers to critical questions.

STRATEGIC PORTFOLIO CONSTRUCTION & REAL ASSETS

Real Assets, Inflation Hedging & Portfolio Performance during the Post-COVID Inflation Surge

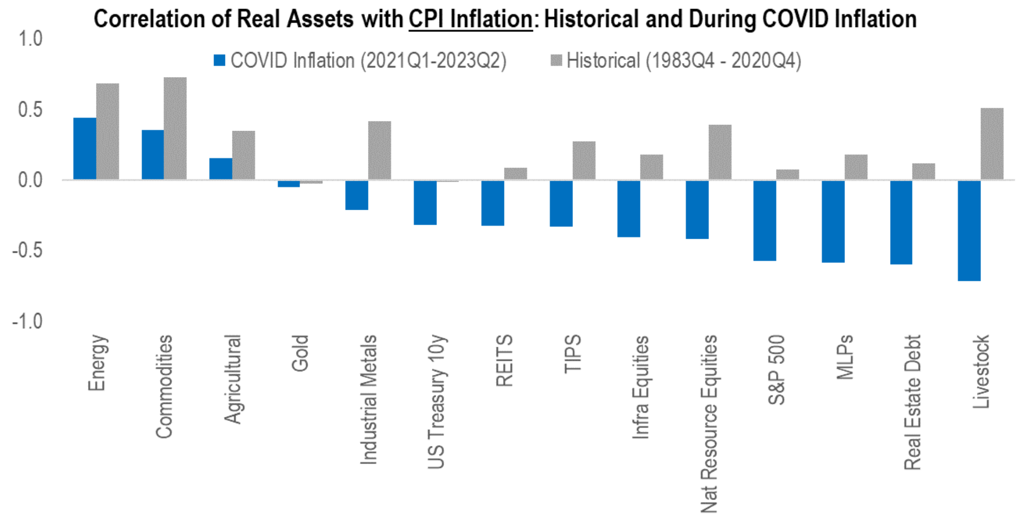
Fall 2024

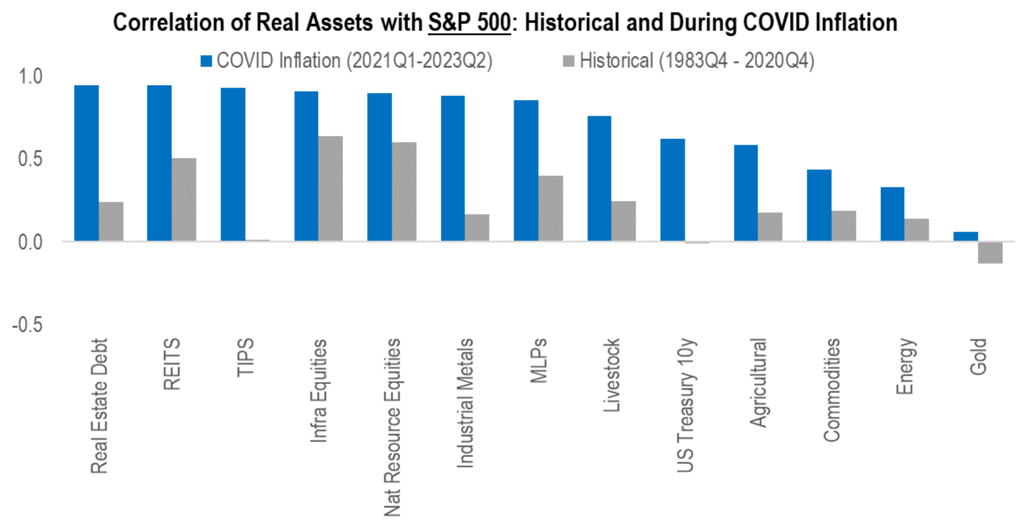
Noah Weisberger, PhD & Xiang Xu, PhD

Throughout 2021-2022 CIOs had available, and considered, a variety of real asset strategies to hedge expected and unexpected inflation. Subsequently, inflation appeared! The 2021-2023 runup and subsequent decline in inflation provides a laboratory to explore how well real asset strategies performed. Did they successfully hedge inflation? What worked and did not work? This research should help inform CIOs on their future real asset strategies.

Real assets are widely considered to be a candidate asset class to help protect a portfolio from inflationary risks. As IAS' existing RASA™ framework demonstrates – real asset return sensitivities to macroeconomic risks (*e.g.,* economic growth and inflation) and market risks (*e.g.,* US stocks and US bonds) differ significantly across the spectrum of real assets. Moreover, for those real assets that do have exposure to inflation and could potentially hedge the negative exposure embedded in a stock-bond portfolio, adding inflation exposure can weigh on portfolio performance when inflation declines sharply.

We use the post-COVID 2021/2022 spike in inflation and subsequent decline to examine *ex ante* and *ex post* performance of real assets themselves as well as portfolios optimized (in various ways) to include real assets. In focusing on whether or not real assets performed as expected in hedging inflation risk, we note that the correlation between real asset returns and realized CPI inflation was *lower* during the COVID inflation surge than what long-term historical estimates would have otherwise suggested; and the correlation between real asset returns and S&P 500 returns was *higher* during the COVID inflation surge than what long-term historical estimates would have otherwise suggested. Said differently, real assets seem to have been less correlated to inflation and more correlated to market risk than expected just when they were needed most, during the 2021/2023 period.





Note: Correlations are calculated based on annual percentage changes in index/price levels at a quarterly frequency. Source: Bureau of Labor Statistics, Datastream, Federal Reserve Bank of Chicago, Haver Analytics, John B. Levy & Company, Standard & Poor's, US Treasury and PGIM IAS. For illustrative purposes only.

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FORTHCOMING RESEARCH

ILLIQUID PRIVATE ASSETS

Assessing the Capacity for Alternative Investments in Collective Defined Contribution Schemes

Summer 2024
Aili Chen, CFA

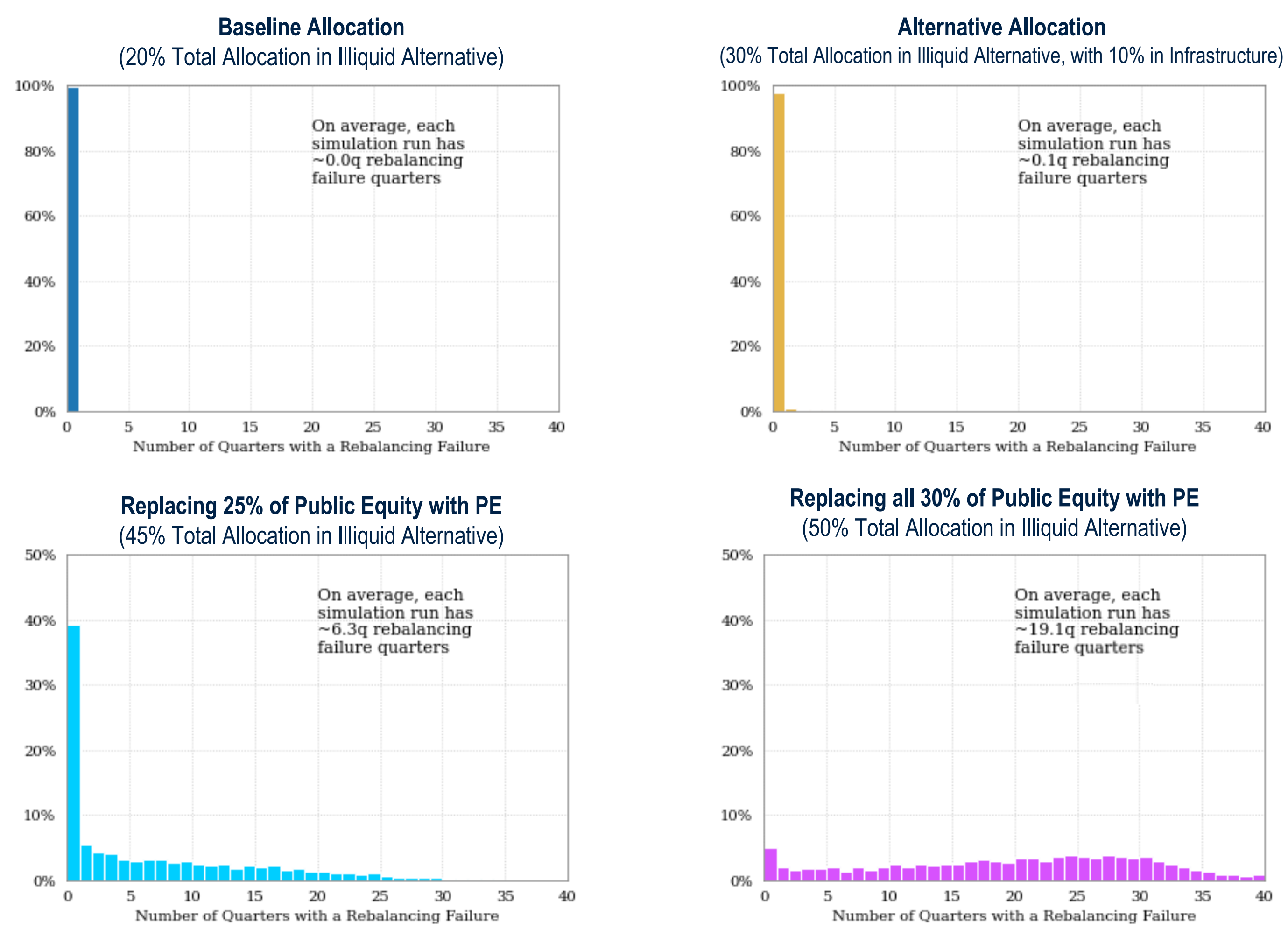
The Dutch pension system is transitioning from a defined benefit (DB) to a collective defined contribution (CDC) model. The shift toward more flexible and individualized pension planning has also been observed elsewhere globally.

With the reform, asset owners are now beginning to adjust their hedging policies and asset mix. Relaxation of regulatory constraints offers an opportunity for CDC schemes to explore a wider range of asset mixes, some of which were previously unattainable under DB schemes. Arguably, CDC schemes can adopt longer-term investment strategies as compared to regular DC schemes because they have a pooled mix of members, which allows investment risk and longevity risk to be spread across generations.

How will this transition reshape portfolio construction and will it allow CDC plans to allocate to illiquid alternatives (*e.g.,* infrastructure) to boost returns and meet more stringent climate goals and demands to promote national welfare and energy resilience?

We analyze and measure the capacity of a Dutch solidarity scheme to allocate to illiquid alternatives in terms of (1) how these assets may affect the scheme's liquidity properties (*e.g.,* the probability of rebalancing failures and the percentage of liquid assets consumed each quarter) and (2) the potential impact on retirement outcomes (*e.g.,* level and volatility) of benefit payments.

Impact of Increasing Private Assets, % of Market Paths with "n" Rebalancing Failures



Note: The histograms represent the probability (on the y-axis) of experiencing a certain number of quarters with rebalancing failures (on the x-axis) over a 40q horizon based on 5,000 simulated market paths. Each bar shows the percentage of simulations that resulted in a specific number of quarters with rebalancing failures. Source: PGIM IAS. For illustrative purposes only. Data as of 30 September 2023

PGIM IAS OUT & ABOUT

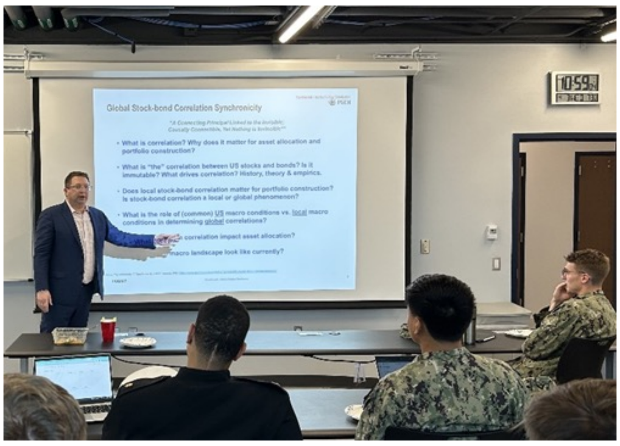
IAS research continues to attract the attention of academics and industry professionals alike. All IAS researchers welcome invitations to present their work and its implications for portfolio construction.

Institute of Private Capital, Chapel Hill NC

Aili Chen's paper ***"To Roll or Not to Roll (Forward): LP NAV Estimation for Private Equity and Real Estate,"*** – published last Fall – continues to attract industry interest as it directly addresses a key CIO concern: How to best obtain timely net asset values (NAVs) of private fund shares for reporting, risk management and rebalancing purposes?

Many CIOs, as limited partners (LPs), rely on NAVs reported by their general partners (GPs). Yet, timely GP-supplied NAVs can be elusive, prompting LPs to lean on their own estimates using the prior quarter's GP-supplied NAVs and recent financial data.

Aili recently participated in the Alternative Investment Conference sponsored by the Institute for Private Capital (an industry and academic research organization) at the University of North Carolina Chapel Hill, presenting her research findings on this important topic.

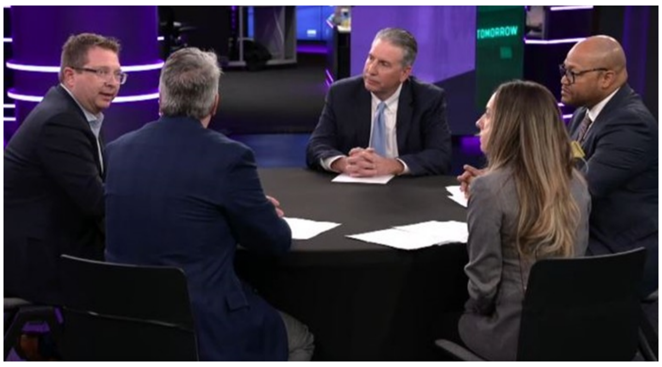


US Naval Academy, Annapolis MD

In April, Noah Weisberger was an invited guest lecturer in Computational Finance at the United States Naval Academy in Annapolis, Maryland. Hosted by Professor Aleksandar Timcenko, the John W. Sammon Jr. Distinguished Chair of Data Science, Noah discussed IAS research on the synchronicity of global stock-bond correlations with Midshipmen and USNA faculty.

Tuck School of Business, Dartmouth College, Hanover NH

Michelle Teng, VP and Co-Head of IAS' Private Assets Research Program (and proud Tuck alumna), delivered her third annual guest lecture at Dartmouth College's Tuck School of Business on the role of private asset investing in institutional portfolios to Professor Morten Sørensen's Quantitative Private Equity class.



NASDAQ TradeTalks, New York NY

Noah Weisberger joined host Jill Malandrino on Nasdaq TradeTalks in early January for a round table discussion of the economic, geopolitical and market factors to consider for portfolio allocations in 2024.

KPERS Investment Committee, Topeka KS

At the May public meeting of the KPERS Investment Committee, Dr. Noah Weisberger was invited to deliver the Investment Presentation in which he discussed macroeconomic risks, real assets, and portfolio construction.

IN CONVERSATION WITH IAS

IAS' Michelle Tang discusses recent trends, risks and potential opportunities in both public and private markets with Saku Peter Nousianinen, Investment Director of the Alfred P. Sloan Foundation.

Saku Peter Nousiainen, CFA, CAIA

Investment Director
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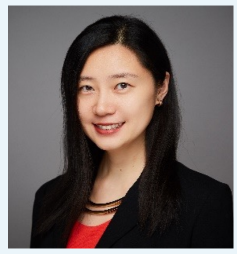

Michelle (Yu) Teng, PhD, CFA

Vice President
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PGIM IAS

Saku Peter Nousiainen has served as a generalist investment director at the Alfred P. Sloan Foundation since 2020. Prior to joining the Foundation, Saku served as a Senior Associate at The Church Pension Fund focusing on public equity and hedge fund investments for over six years. Before joining The Church Pension Fund, Saku worked with equities at Bloomberg L.P. and in corporate governance at Glass Lewis & Co. Saku holds an M.S. in Finance from the University of Gothenburg and is a CFA and CAIA charterholder. He is also a professionally trained pianist and holds an M.A. in Music from New York University where he studied as a Fulbright grantee.

Michelle Teng has been part of the PGIM IAS team for more than six years and is currently Co-Head of IAS' Private Assets Research Program. She joined IAS from the Prudential Retirement's Investment & Pension Solutions team where she focused on developing and delivering innovative solutions for the company's institutional clients. Michelle was previously an Assistant Vice President at Bank of America Merrill Lynch, where she was responsible for building quantitative models in Global Markets. Michelle received a PhD in Electronic and Electrical Engineering from University College London and an MBA from Tuck School of Business at Dartmouth. She is a CFA charterholder.

MT: Over the last several years, market movements have been quite dynamic – with a broad equity selloff in 2022 followed by a subsequent reversal - alongside ongoing structural changes in the asset management industry. What has been top of mind for asset owners as they have navigated these cross currents?

SN: I will address three topics here: the 2022 equity sell-off, increased allocations to multi-strategy hedge funds, and competition for talent in the hedge fund industry.

MT: Let's get started with the 2022 equity sell-off...

SN: Regarding the 2022 equity sell-off, there were three main interrelated issues: the denominator effect, liquidity management, and rebalancing.

The 2022 equity sell-off affected investors profoundly and far beyond just the direct impact of an 18% decline in the S&P 500. One impact for asset owners was the "denominator effect" that pushed the value of and allocation to other asset classes up in relative terms as public equities were in drawdown. Things were made more challenging by the fact that valuations of private investments had been creeping up for several years, making those allocations go through the roof and contributing to a situation where investors were overallocated to illiquid privates and under allocated to public markets. Investors with sufficient liquidity were able to allocate to public equities and rebalance their portfolios. Some investors had various top-down overlay programs in place that allowed them to allocate back to their desired targets even if they had limited liquidity. In contrast, there were other investors without good rebalancing options who decided to remain under allocated. So, investor outcomes and the ability to keep the portfolio close to its desired composition depended on what type of rebalancing policies and tools were at their disposal. I acknowledge that some investors may have had credit lines in place for additional liquidity, but this solution is typically not available for everyone – often due to policy reasons or tax implications. For me, this has reinforced the importance of thinking ahead and being prepared for possible adverse events.

While the public equity market has more than recovered, some "second order" impacts are still affecting asset owners. Private markets have been very quiet for some time now limiting distributions that LPs use as a liquidity source. Additionally, US foundations are required to follow a 5% annual spending rule to stay tax exempt. When fund AUM is pushed higher due to highly valued private assets, that 5% spending threshold is also pushed higher in actual dollar terms and cuts into limited liquid reserves. Some allocators also had high unfunded or other commitments adding to liquidity risks.

Finally, the issue has really been rebalancing: Do investors have enough liquid assets to be able to rebalance without exiting their less liquid assets at a discount?

For other types of investors, for example pensions and endowments, their situation is different, as they have capital inflows such as corporate contributions or alumni donations that can act as a buffer and source of liquidity. Often, pensions have lower allocations to illiquid investments (relative to, say, endowment and foundation investors who follow the endowment model), making their liquidity position stronger. Here at Sloan, we do not have capital inflows, so we have been very prudent about our liquidity position even before the public market drawdown.

MT: How about multi-strategy hedge funds?

SN: We have seen increased interest from allocators to invest in multi-strategy hedge funds over the past few years. First, large investors such as pension funds have large investment ticket sizes and large multi-strategy funds can absorb this amount of capital. Multi-strategy funds naturally have higher capacity and can quickly put larger amounts of investor money to work across different strategies, a far less cumbersome option for asset owners relative to having to find several smaller single-strategy funds and allocating separately to each.

A second motivation is related to portfolio construction and the diversification benefits of multi-strategy funds. For many institutional investors, these funds are diversifiers rather than return-generators due to their absolute return or market neutral nature. Investors do not expect the highest possible returns from them but merely *sufficient* returns with low drawdowns in all market conditions. What is that "high enough" return? A normal return target for a foundation is somewhere around 7% or 8% when considering a 5% spending requirement, long-term inflation, and something on top of all that to cover management and organizational costs. If a market neutral multi-strategy fund can generate high single digit returns and provide solid all-weather diversification that would be enough for me.

Having said that, the final reason for allocator interest in multi-strategy hedge funds is the prospect of good returns. Multi-strategy funds have (in relative terms) performed well lately spurring investor interest. Right now, higher interest rates are also contributing to hedge fund performance, especially to capital efficient strategies. All-in-all, there is a lot of capital searching for these opportunities. In fact, I think the asset owner community is starting to think about the implications of all this investment flow and is expressing concerns related to crowding and potential wider systemic risks when all this capital is put to work.

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IN CONVERSATION WITH IAS

MT: What do you think about competition for talent in the hedge fund space?

SN: There is an unbelievable war for talent in the hedge fund industry; multi-strategy hedge funds are hiring a lot. More narrowly, multi-PM funds, or so-called "pod shops," need to hire new PMs continuously, due to both PM turnover and to be able to manage AUM inflows. However, because the pool of experienced, high performing PMs is limited, firms are forced to provide ever higher incentives to attract top talent. There are only so many tested PMs out there with an actual track record and/or a strong pedigree. You might argue that there are always young talented people but do those firms have conviction to allocate to PMs who do not have experience in managing money independently? A consequence of this talent competition is that hedge funds often are willing to pay large, upfront signing bonuses. The concern from asset owners is that these costs will translate into higher management fees and higher costs that ultimately may dilute net returns. To be sure, many multi-PM platforms have a pass-through cost structure, so they are passing such costs on to investors already. My best guess is that those costs may turn out to be higher than many people expect. That being said, it is interesting that, according to some studies, multi-strategy platforms with pass-through fee structures have as a group outperformed funds without pass-through fees.

MT: Turning to public markets, what issues are on your mind?

SN: In the public equity space, the allocator community has focused on thinking through the implications of the massive outperformance by the "Magnificent Seven" (tech & AI development) on the prospects for market-wide performance, benchmarking, and the role of overlay strategies.

The Magnificent Seven has been a hot topic for everybody including institutional asset owners. Mega cap tech companies have been driving most of the returns and as a result have become an increasingly large part of public equity market capitalization. The irony is that many investors have knowingly under-allocated to mega cap names. The premise was that "asset owners could easily own those names themselves," and that true public equity alpha lay elsewhere in the market. So, investors wanted their active managers to focus on other names, excluding the mega caps. Unfortunately, very few investors built mega-cap completion portfolios to manage this tracking error. Consequently, some investors were left with enormous and lumpy tracking errors in the core of their portfolios. Implicitly, investors have been taking a factor bet that mega caps would underperform. As an alternative view, this underperformance is, in part, a benchmarking issue; investors could have used equal-weighted indices as benchmarks in case they believe in active management with large and concentrated tracking errors.

This underperformance has led to deeper questions among asset owners and their investment committees about the virtues of active versus passive equity management. Some investors have already moved to passive equity investments, especially for the US markets, believing that harvesting alpha from that market is too difficult. But even then, should one have active allocations in less efficient markets? Ultimately, most people in my sphere still seem to believe in active public equity management even for US markets.

Many asset owners have factor tilts in their portfolios – either deliberate or inadvertent. Commonly, institutional investors often have quality, small-cap, and China-heavy portfolios.

Now, pretty much all these factor bets have led to underperformance lately. My question is: How has active equity management performed after removing these well-understood factor bets from the recent underperformance (leaving the residual and idiosyncratic alpha)? I haven't seen any research on that, but it would be interesting to know. More generally, from my perspective, allocators are increasingly focused on tracking error management. Investors are slicing and dicing their equity portfolios to see what they really own, and there is a growing interest in alpha extension equity strategies (*i.e.,* long-short equity strategies with similar risk characteristics to their benchmark index that, when added to a portfolio, can help limit tracking error).

Finally, our earlier discussion about public equity under-allocation relative to privates is also relevant in this context. The question is how to maintain high enough equity beta so as to not depart too much from a market benchmark particularly when active external managers have a lot of low-beta "quality" exposures and often hold cash that further decreases equity market exposures. So, on top of relative under allocation to public markets, investors may also be under allocated to equity beta risk within their public market allocations.

MT: How about on the private side?

SN: Times are very interesting in private markets as well. I think key issues are the slow-down of IPO/M&A activities, liquidity and distributions, valuations, and appropriate future commitment pacing.

As we all know, the IPO and M&A window is more or less closed for now, which has several implications for asset owners. Ultimately, the problem is simple – sellers and buyers cannot agree about the appropriate price with current valuations elevated and the outlook uncertain. Therefore, the market does not clear to reach its equilibrium. Personally, I don't have high hopes that much will change over the course of 2024 so this will be a longer-term issue and not something that will get resolved overnight.

This is a real issue for asset owners with large private programs. Distributions provide LPs with the liquidity needed to pay the bills, cover spending, make new private allocations, and rebalance. Distributions may also help to lower private allocations in the overall portfolio, which is critical as many asset owners are already over their skis with privates.

With the IPO market remaining sluggish, another issue that may arise is that both asset managers with drawdown funds and asset owners with liquidity problems may need to turn to the secondary market to reduce their exposure to privates and raise liquidity. How will the secondary market respond? When do asset owners become "motivated sellers" and start to tap the secondary market despite well-known secondary market valuation haircuts? Do GP-led secondaries and continuation funds become more common to sort out the asset manager side of the equation?

One interesting development relates to NAV loans. As the exit environment hasn't been favorable and growth is muted, some underlying portfolio companies have suffered. With GPs reluctant to go back to their LPs for additional capital, especially for older funds, they may seek capital from creditors using underlying assets in their portfolios as collateral. The use of leverage to finance growth seems to have become a common practice though there are some more concerning situations where loan-taking is less transparent and used to make distributions to LPs.

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IN CONVERSATION WITH IAS

MT: How about capital calls and distributions? Distributions are down, but so are calls too. Any thoughts?

SN: The capital raising environment is difficult for asset managers. Asset owners are protecting their liquidity positions. They are already allocated – sometimes over-allocated – to privates and are hesitant to make new commitments. They are also concerned about potentially high unfunded commitments. Maybe luckily asset managers have been relatively slow to call new capital as deals are few and far between. Allocators face very different types of challenges depending on their portfolios right now. Those with mature private investments programs may have been anticipating some distributions to cover future capital calls. But those with newer programs may still be at the beginning stages of their J-curve and are not expecting distributions anyway.

MT: We talked about distributions and valuations. Another difficult issue for allocators is commitment pacing. How should investors be thinking about that?

I believe the key question right now is: How much should we allocate to privates going forward to maintain vintage year diversification without becoming too over allocated? Additionally, how much of this allocation should we be able to cover from distributions? Addressing these questions is especially difficult in this environment. The problem is that estimates are normally based on historical data. Over a full business cycle, they are likely to work well, but this market environment might deviate materially from history. If so, running detailed analyses may provide false confidence if the big picture assumptions turn out to be incorrect. It is good to remember that estimates are an art, or perhaps better said, the result of qualitative thinking, rather than an output of quantitative science.

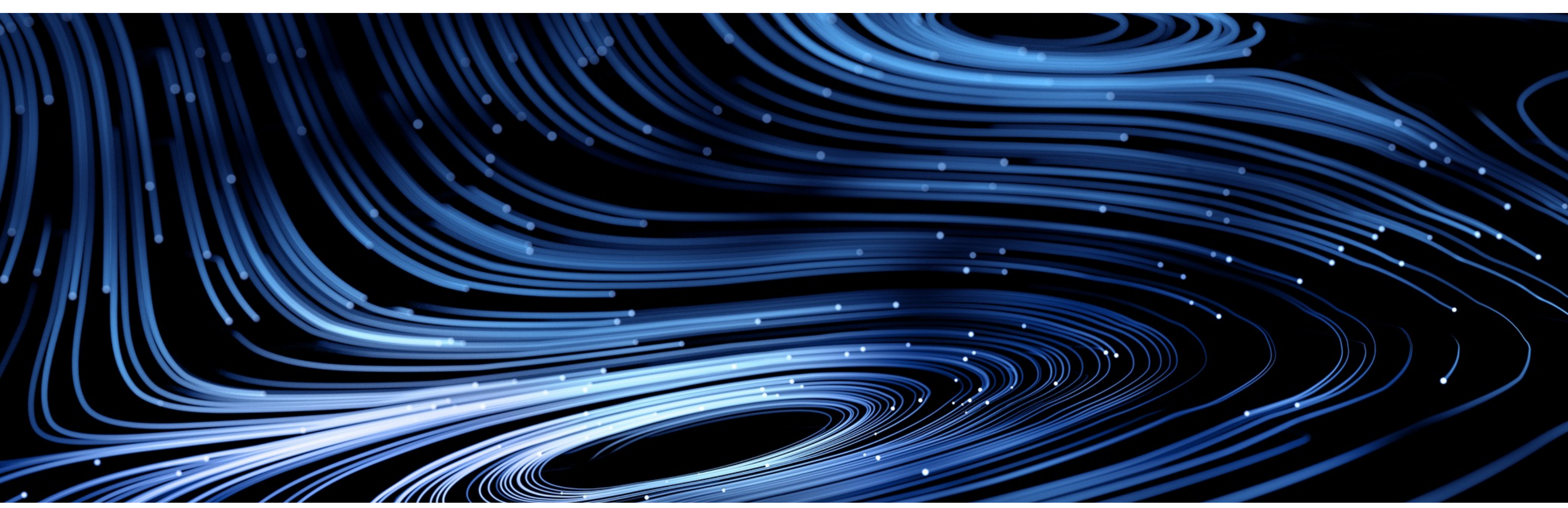
Another question is how overcommitted you want to be (as GPs don't usually call all the committed capital)? Naturally, this depends on how much portfolio liquidity one has.

MT: What do you think about private credit opportunities?

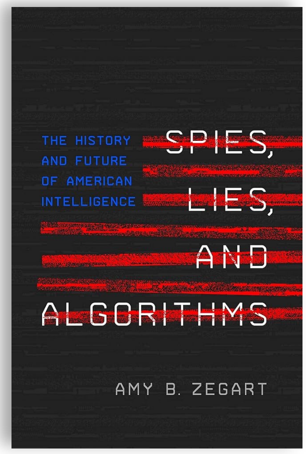
SN: Private credit gets lots of investor attention right now. The private credit market has grown dramatically – during the Global Financial Crisis the industry was less than $500 billion and now it is more than $1.5 trillion. Market-related reasons behind this move include regulatory changes limiting bank lending, regional banks having suffered from providing large amounts of real estate and other financing, an increased demand for credit, and higher interest rates causing stress for corporates.

Then there are investment-side reasons. Private credit is taking on a new role in asset owners' portfolios, adding to their investment appetite. In the past, institutional investors put private credit in their illiquid asset bucket alongside venture capital, buyouts, etc. But due to lower returns relative to other illiquid alternatives, private credit investments were pushed out of the portfolio. Now, investors are starting to pay more attention to private credit's yield income and shorter fund lives, meaning that credit may have its own place in asset owners' liquidity continuum. Additionally, credit can actually provide equity-like returns from idiosyncratic sources providing diversification and, optimally, lower drawdowns. This is very helpful for endowment and foundation investors who are particularly sensitive to drawdowns owing to their spending mission.

With many things seemingly changing, I am worried about the rapid growth of the private credit market and investor crowding as large amounts of capital are seeking opportunities on this side of the market. As such, I am currently seeking opportunities in more idiosyncratic parts of the market such as asset-backed lending and similar areas where, hopefully, less capital is being allocated.



WHAT WE'RE READING



Spies, Lies, and Algorithms

By Amy B. Zegart
Princeton University Press, 2022

An FBI wiretap of an American suspected terrorist requires a court order, but a CIA drone strike to kill him does not. Zegart, a political scientist and Hoover Institute fellow, helps us make sense of this.

The US intelligence community (IC) comprises 18 US federal agencies employing over one hundred thousand people. Some of these agencies are independent (*e.g.,* CIA), others fall within the Defense Department (*e.g.,* NSA), and the rest are part of other Executive departments (*e.g.,* FBI). Zegart argues that most Americans have a distorted view of the IC, heavily influenced by Hollywood. Zegart's volume aims to provide a balanced and informed review of the origins, functions, and capabilities of America's IC.

Zegart traces the history of American IC from an on-again/off-again wartime concern to a permanent concern of strategic national importance. Zegart first discusses what "intelligence" is and why it is so difficult. Intelligence is not policy making but, instead, is designed to collect and interpret public and. less-frequently, secret, information to give political authorities an advantage over adversaries. Zegart highlights biases that can cripple good intelligence and "de-biasing" strategies to counteract this.

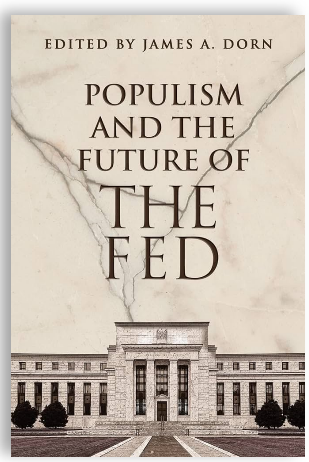
The challenge for the IC is knowing when they have gotten things right! Winning and losing are not always clear in foreign policy, so how can the IC train its predictive algorithms to improve? Zegart highlights that the cost of bad intelligence can be catastrophic. During the Korean War, US intelligence grossly misjudged China's reaction and capabilities in response to MacArthur's push towards the Yalu River. The consequence was a routed American army and a divided Korean peninsula with a repressive North Korean regime firmly in place.

Zegart discusses why Congressional oversight of the IC is so challenging and often ineffective: elected officials receive little credit from constituents for the required time and energy required to provide thoughtful oversight.

Finally, Zegart discusses how, in a world with public satellites and AI, the public is now actively involved in intelligence gathering. Private groups have identified undeclared missile sites in adversary territory before the IC has. This poses a risk for policy makers. Making this information public may sometimes force the hand of policy makers.

CIO Takeaway: Dr. Zegart's book provides a vivid and thoughtful history of America's IC and the challenges it faces. Given heightened foreign policy concerns, knowing the capabilities and limitations of the IC will help CIOs react in a more informed way to foreign policy developments.

--Bruce P.



Populism and the Future of the Fed

Edited by James A. Dorn
Cato Institute, 2022

Populism and the Future of the Fed is a collection of 18 essays from leading academics and policy experts (including Charles Plosser, Raghuram Rajan, Charles Goodhart, and John Cochrane) examining how US monetary policy has shifted over the last decade or so – both *de facto* and *de jure* – and what the consequences of those shifts may be going forward. Compiled by the conservative/libertarian-leaning Cato Institute, the collection is organized into four sections: (1) The Populist Challenge to Fed Independence, (2) Fiscal Dominance and the Return of Inflation, (3) An Expanded Fed Mandate? and (4) Helicopter Money and Fiscal QE.

Many of the essays in the volume, written before the post-COVID burst of inflation took hold, reflect on monetary policy that followed the 2008 Great Financial Crisis during a period of sluggish growth, historically low inflation, anchored inflation expectations and extremely low nominal and real interest rates, a combination indicative of a breakdown in the (empirically elusive) unemployment/inflation tradeoff that is enshrined in the "Philips Curve" model of the macroeconomy.

Presciently, a common thread throughout is a discussion of the outlook for the conduct of monetary policy and possible forward paths for inflation and interest rates. In light of explicit shifts in the Fed's objectives (from inflation targeting to average long-term inflation targeting and broad-based and inclusive employment), the cumulative impact of expansionary fiscal policy (particularly in the US), the populist tilt in the political landscape, and the widening mandate for monetary policy to include financial stability, long-term environmental risks, asset bubbles and inequality (alongside price stability and full employment), the broad thrust that emerges from the essays is that monetary policy makers likely will – either purposefully or as an unintended consequence – become more tolerant of inflation.

CIO Takeaway: The path of monetary policy is an important consideration when assessing financial market risks and asset allocation decisions. The bedrock principles of monetary policy making that held sway in the years prior to the GFC seem to be shifting, with the potential for populist political trends to amplify and accelerate those changes. As such, it is important for asset allocators and investment professionals to understand how changes in the policy-setting landscape may affect the economy and financial markets on a go forward basis and set their inflation and rates expectations accordingly.

--Noah W.

MEET IAS

Stuart Jarvis, FIA, DPhil

Managing Director
PGIM IAS

Stuart Jarvis joined PGIM IAS in 2023 after 19 years in investment solutions teams at Barclays Global Investors, BlackRock and most recently Columbia Threadneedle. Prior to these roles, Stuart was a pensions consultant at Hewitt, Bacon & Woodrow (now Aon) for 7 years. Stuart holds a doctorate in Mathematics from Oxford University, a Masters from Cambridge University and is a Fellow of the Institute of Actuaries.

What attracted you to a career in investment research?

From my time as a consultant, I have been interested in helping institutional clients grapple with asset allocation questions. Even though such questions don't admit the neat results enjoyed by mathematical ones, the pursuit of answers involves similar approaches – building models, testing alternatives, creatively thinking about different approaches, reading the literature to understand what others have tried or concluded *etc.* At the same time, the goals of finance research and mathematics research are different: a strategy that can be readily understood, implemented, and monitored within real-world governance frameworks is far preferable to one that is overly precise and difficult to execute. This makes empirical research designed to be applied very appealing: by boiling down complex analyses or theoretical models to effective implementations investors are able to derive real value from our research.

What have you been working on in your time at IAS?

My first project looks at Responsible Investing (RI) strategies. Fund managers, partly in response to regulations, use a variety of labels to describe their strategies: some funds focus on 'impact' in various dimensions, others claim to be 'aligned' with the Paris climate treaty. Within the EU, funds can report as 'Article 9' funds if they have sustainability as their primary goal. Others may say that they are responsible investors but use none of these labels. The questions we asked ourselves included: Do different labels correspond to distinctive fund behaviour? How should investors navigate these labels? Do these separate labels match up to the particular objectives that investors may have?

The large number of RI funds available provide a good testing ground for seeing how these differently labelled funds behave, both *ex-ante* (how do fund holdings differ?) and *ex-post* (did performance vary between groups?). It was reassuring to see that the various labels do indeed correspond to distinct investment approaches, and even align with debates that many investors are now having about how their investment policy can best support the economy's green transition.

What else have you been working on?

I have been looking at investment governance models. There has been a consolidation trend within the UK defined contribution market and the Dutch pension market, resulting in larger pools of money that benefit from economies of scale. But larger investors don't just reap the benefit of lower costs; they change what they do, building up their capacity for investing in private assets or domestic infrastructure projects for example. Governments are often keen to promote the domestic component in particular – sometimes putting them in conflict with advisers who recommend removing 'home bias' from portfolios. It will be interesting to see if global comparators elsewhere support consolidation in the UK and Holland, which may lead to an increase in investment capacity and the adoption of different investing models.

You are based in London. Why has IAS expanded beyond the US for the first time?

IAS research is relevant to a broad range of clients globally, and this is reflected in the client projects that the team undertakes. But my long experience with UK pension plans and European regulatory regimes helps us stay current with themes that may not be so visible from the US. One large trend in the UK market at the moment is for newly-well-funded pension plans buying out their liabilities with an insurer: moving from a corporate balance sheet to an insurance balance sheet. And within the Netherlands, there is the move from defined benefit to a form of collective defined contribution over the next few years. My colleagues are already engaging on these issues, but I hope my local perspective will help us to provide additional colour and insights.

What you like to do in your free time?

I love being outside, often in the mountains, and enjoy long-term projects. My family and I walked the entirey of the Camino de Santiago in Northern Spain in one- or two-week blocks over a period of 9 years: a wonderful experience. My eldest daughter and I are 'Munro baggers*' and are slowly making our way around the Scottish hills over 3,000 ft high, a few one weekend, a few another. After 8 years, we're about 25% of the way through the list.

**Editor's Note: Munros are Scottish mountain peaks greater than 3,000 feet and named for a founder of the Scottish Mountaineering Club – Sir Hugh Munro (1856 –1919) - who was the first to compile a comprehensive list of such peaks. The current count of Munros stands at 282, so with c69 under his belt, Stuart has around 213 more to go.*

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