INSTITUTIONAL ADVISORY & SOLUTIONS

PGIM

THE DIFFERENTIAL

New Developments in Portfolio Construction

September 2022 | Issue 6

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

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IN THIS ISSUE

Dear Investor,

The highlight of our summer was the 1st Annual IAS EMEA Research Conference at the London School of Economics on 20 June. Despite the lingering pandemic and the UK transit strike, we were joined by 11 CIOs, Heads of Asset Allocation and senior PMs from across EMEA for a half-day conference on asset allocation.

RESEARCHER	TOPIC
Noah Weisberger, PhD Managing Director IAS	Global Stock-Bond Correlation: Prospects for Regime Change and Portfolio Implications
Michelle (Yu) Teng, PhD, CFA Vice President & Co-Head, Private Assets Research Program, IAS	Portfolio Construction with Illiquid Private Assets: Measuring Liquidity Risk
Junying Shen, MS, CFA Vice President & Co-Head, Private Assets Research Program, IAS	Unlisted Infrastructure Investments and Their Portfolio Role
Harsh Parikh, PhD Principal & Head, Real Assets Research Program, IAS	Constructing Natural Capital Investment Portfolios
Lorne Johnson, PhD Managing Director & Head, Multi-Asset Portfolio Design PGIM Quantitative Solutions	Portfolio Implications of a Higher US Inflation Regime

The conference covered current areas of IAS research:

- What has been the historical pattern of global stock-bond correlation – is it driven by global or local factors? We also analyzed the potential portfolio consequences of a switch from a negative to a positive correlation world;
- We presented our framework (OASIS™) for portfolio construction with public and illiquid private assets and showed, using several portfolio applications of the framework, how to measure portfolio liquidity risk in a multi-asset, multi-period context;
- We discussed the risk and return properties of unlisted infrastructure (for both funds and direct investment vehicles) and highlighted, using a new framework to measure the cash flow risk of infrastructure investments, infrastructure's potential role as a diversifier and liquidity risk reducer in an institutional portfolio;
- We showed how a CIO can optimize a natural capital portfolio (farmland and timberland) by using crop-level expected return estimates while incorporating various traditional and non-traditional portfolio objectives such as correlation to public market assets, inflation sensitivity, carbon sequestration, and weather resilience; and
- We discussed the performance of various asset classes in low and high inflationary environments and provided a framework for analyzing potential portfolio outcomes if higher inflation were sustained.

The Conference lived up to its goal to be highly interactive. While each IAS researcher asked several polling questions to get and share views from the participants, there were many questions from participants directed at both IAS researchers and other participants. A very lively and productive day, indeed!

CONTINUED →

Senior IAS Researcher Junying Shen in Action

IAS EMEA Research Conference – Class of 2022

We are making plans to host our companion IAS North America Research Conference in January 2023 in New York City. Stay tuned for details.

Finally, we have some exciting papers forthcoming this Fall:

- "Measuring the Value of a Portfolio Liquidity Line" – September
- "Portfolio Implications of a Positive Stock-Bond Correlation World" – October
- "Asset Allocation with Infrastructure Investments: Cash Flow Characteristics & Portfolio Implications" – November

As always, IAS's goal is to deliver pragmatic and implementable research to help CIOs and their Investment Committees make better-informed portfolio management decisions.

The return to in-person meetings has been wonderful and exciting – with many new ideas and projects to consider and explore. The joy of original research is not knowing where our findings may take us and what the portfolio implications might be! All of us in IAS look forward to seeing you soon.

Warm regards,

Bruce D. Phelps, PhD, CFA

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

Portfolio Implications of a Positive Stock-Bond Correlation World

By Noah Weisberger, PhD & Xiang Xu, PhD
Fall 2022

In this paper, we explore the portfolio implications of positive stock-bond correlation, focusing on what a positive stock-bond correlation regime would mean for a balanced portfolio and how a CIO can best respond.

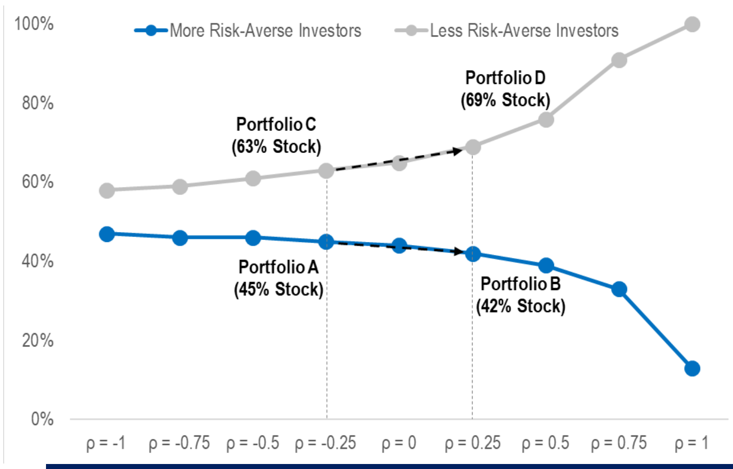
When stock-bond correlation is positive, CIOs should expect their current portfolio allocation to deliver more volatile portfolio performance, a wider set of potential long-term outcomes, more extreme tail events and deeper drawdowns.

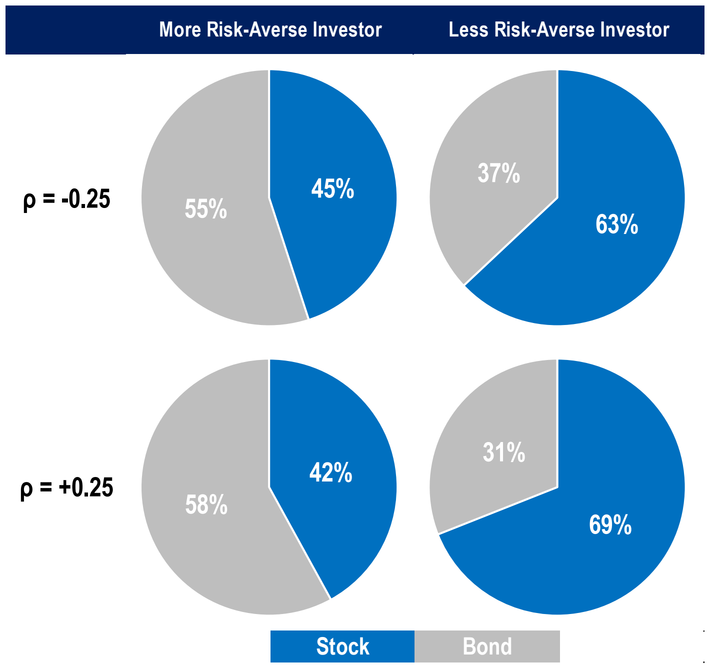
When correlation is positive, the optimal allocation to stocks is only slightly different relative to when correlation is negative. Being right about future correlation leads to only moderately better portfolio performance; equivalently, being wrong is only moderately costly.

Given the modest cost of being wrong about future correlation, we do not think investors need to rush and change their correlation assumption and re-optimize their asset mix until a new correlation regime seems well established. There is little urgency to make the "call" that the correlation regime has switched from negative to positive. In fact, remaining "overinvested" in stocks, following from an erroneous negative correlation view, can boost returns in a positive correlation world with only a modest increase in volatility.

Another important message that emerges from this study is that a balanced portfolio remains optimal even when correlation is positive, though optimal weights depend on investor objectives and capital market assumptions. Negative correlation is not the primary determinant of the optimality of a balanced portfolio. Rather, it is the lack of perfect positive correlation that lies behind the enduring benefits of diversification. We disagree with those who argue that a positive stock-bond correlation world signals the demise of a balanced 60/40 portfolio.

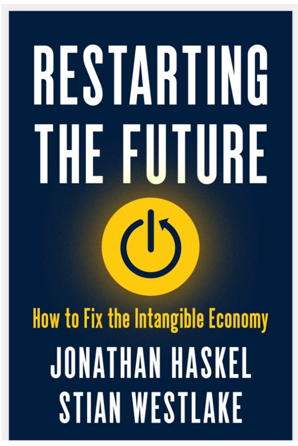
Optimal Stock Allocation as a Function of Stock-Bond Correlation





Note: Stocks and bonds have expected returns of 12%/y and 7%/y, and volatilities of 15%/y and 8%/y, respectively, based on 1970-2022 averages. For mean-variance optimization, the assumed coefficient of risk aversion is either 8 (more risk-averse) or 4 (less risk-averse). Source: PGIM IAS. For illustrative purposes only.

WHAT WE'RE READING



Restarting the Future: How to Fix the Intangible Economy

By Jonathan Haskel and Stian Westlake
Princeton University Press, 2022

We all have a sense that the economy is transitioning from a tangible (*i.e.,* physical) production economy of buildings, machines and hardware to a highly scalable, intangible production economy of networks, brands, and software. Nevertheless, as the authors argue, the economy has been disappointing, characterized by low growth (stagnation), inequality (inequality of esteem), concentrated market power (dysfunctional competition) and fragility (climate change and weak institutions). Is there a relationship between the transition from tangible to intangible capital and poor economic performance?

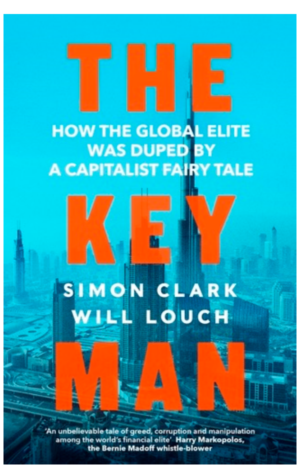
The authors offer a provocative hypothesis: our economic ills are a result of a slowdown in intangible investment which, in turn, is caused by our sclerotic economic institutions designed long ago for a tangible economy, not for an intangible economy. For the new economy to unleash its potential our institutions need to be overhauled.

For example, a growth benefit of intangible capital stems from spillovers – one company's new software may help another company design an innovative piece of software. However, current patent laws are structured to limit spillovers and may allow dominant companies to remain so by blocking emerging technologies from other companies that could supplant their market power. In this situation, the authors argue that we need to reform our patent system or perhaps promote more government R&D spending whose results are made available to all. However, the authors also acknowledge that a weakened patent system may act as a disincentive for innovation and that government R&D programs may be captured by special interests, so political reform is needed, too.

While the book offers an intriguing hypothesis that we need to reform our institutions to reverse the slowdown in intangible investment, the authors offer overly grandiose and vague suggestions for reform ("we need a patent system that promotes spillovers") without offering specific and practical recommendations for how to implement them or what might be the unintended consequences.

CIO Takeaway: Despite the captivating title and intriguing hypothesis this book was a disappointment and offers little for the busy CIO. While the authors are clear that they wish to promote more intangible investment and improve our economic performance, they offer little more than bromides for how we might accomplish this.

--Bruce P.



The Key Man: The True Story of How the Global Elite Was Duped by a Capitalist Fairy Tale

By Simon Clark and Will Louch
HarperCollins, 2021

Traditional business models focus exclusively on making profits for shareholders. However, this view diverts capital away from less-developed parts of the world where it is perceived to be difficult to earn a competitive return. This capital deficit may contribute to a widening rich-poor country wealth gap. Impact investing is an alternative business approach: invest for profits and simultaneously help the poor. If possible, many individuals, governments and social organizations would open their wallets.

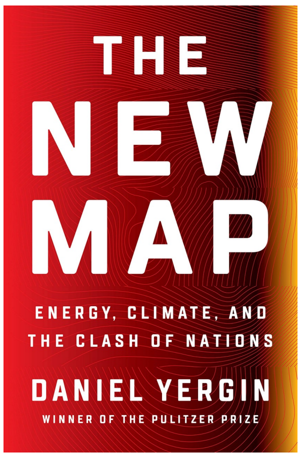
Enter the Abraaj Group. Abraaj was a private equity GP that made impact investments. Abraaj was founded in Dubai in 2002 by Arif Naqvi (the "Key Man") born into a middle-class Karachi family and educated at the LSE. Employing a combination of ambition, charm, cultivation of contacts throughout the Middle East and some fortuitous early investments, Abraaj began to attract institutional assets. Naqvi's charisma and spare-no-expense promotional activities allowed Abraaj to raise ever increasing amounts from the "Who's Who" of global finance and society (e.g., the Davos crowd). Naqvi's apparent wealth, international accolades, Harvard Business School's flattering case study (2012), and robust fund returns gave credence to the notion that impact investing could be profitable.

However, Abraaj's portfolio investments performed poorly and Naqvi was forced to spend ever more heavily to maintain Abraaj's profitable façade. Naqvi quickly found himself doubling down and began using fund assets to pay distributions to investors in other funds to boost reported returns. Abraaj ($14b at the time) began to unravel in 2017 when an LP investor complained that Abraaj kept asking for cash when the fund had not yet spent prior capital calls. Bank statements revealed "missing" cash. The end came when an insider contacted the *Wall Street Journal* (the book's authors). Naqvi is currently under house arrest in London pending extradition to the US.

CIO Takeaway: *The Key Man* is a cautionary, but perennial, tale of how "smart" investors, regulators and the press can be duped. Fundamentally, investors saw only what they wanted to believe – an opportunity to make outsized profits while simultaneously helping the poor. A combination of limited transparency in private markets and assets located in developing countries allowed the fraud to continue for many years.

--Bruce P.

WHAT WE'RE READING CONTINUED



The New Map: Energy, Climate, and the Clash of Nations

by Daniel Yergin
Penguin Press, 2020

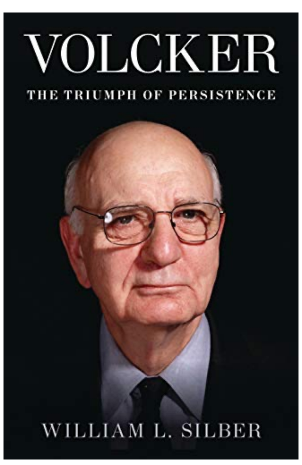
Many are familiar with Daniel Yergin's 1990 *The Prize*, which provided a global history of oil. *The New Map* brings together all the changes in the global oil market over the past 30y into a coherent narrative. The book, published in early 2020, also provides a prescient lens that brings the origins of the 2022 energy market tumult into much clearer focus.

The book's theme is how energy circumstances have changed for the US (shale), Russia (oil & gas and the State), China (energy security and territorial expansion) and the Middle East (climate change). Technology, besides fracking, also plays an important role in these changes: LNG as a global industry unconstrained by pipelines; the drive to EVs; and mobility as a service (*i.e.*, Uber) as an accepted part of daily life.

The "New Map" refers to how these new energy market conditions have redrawn geopolitical relationships. The US as a major oil and gas exporter has a new-found flexibility in its foreign policy. Imagine if the US were a major oil importer in 2022! Russia is now, thanks to meticulous nurturing by Putin, an energy superpower giving it the confidence and wherewithal to reclaim some of its former empire. China, oil and gas poor, must confront strengthening its energy security by both pivoting to Russia and securing maritime authority. Finally, the Middle East faces rivalry from Russia for control of the global energy market and the pressing need to diversify its economies, a need which was brought to the fore by the "negative" oil price shock during the pandemic. The Middle East has little time to adjust and diversify its economic base as Yergin predicts peak oil demand by the mid-2030s.

CIO Takeaway: *The New Map* will give CIOs a clearer understanding of energy's new role in the global economy and how it has contributed to the geopolitical alliances and rivalries that influence markets and which all investors must navigate today.

--Bruce P.



Volcker: The Triumph of Persistence

by William L. Silber
Bloomsbury Press, 2012

William Silber's biography of Paul Volcker provides the reader with a ringside seat to many of the watershed moments in the recent financial and economic history of the United States. In his career as a public servant, Volcker helped to shape the current structure of international finance, US fiscal policy, banking regulation and – most famously – monetary policy.

As a Treasury official, he was central in President Nixon's 1971 decision to end dollar convertibility to gold and the eventual abandonment of the Bretton Woods agreement, ushering in the era of floating exchange rates and burgeoning global trade.

As Fed Chairman, he reined in inflation and tamed inflation expectations. His persistence in doing so – even in the face of slowing growth and political pressure to (prematurely) ease – earned the Fed long-lasting credibility. Volcker was also a staunch defender of Fed independence, refusing to conduct monetary policy in concert with fiscal policy. In the face of fiscal-fear-driven upward pressure on Treasury yields, Volcker's unwillingness to cut rates and ease the government's interest expense burden ultimately helped to bring fiscal policymakers to heel and set fiscal policy on a more sustainable path (for a time).

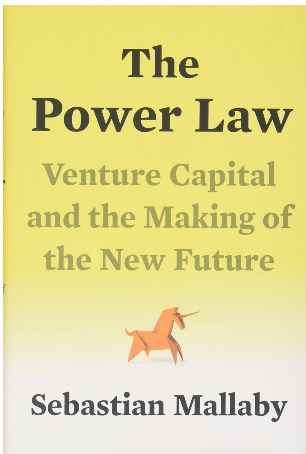
In 2010, when in his 80s, he was instrumental in promulgating landmark banking regulations, commonly known as "The Volcker Rule" (formally known as Section 619 of the Dodd–Frank Wall Street Reform and Consumer Protection Act), restricting US bank risk-taking, and reinforcing the stability and trustworthiness of the US banking system following the global financial crisis.

Although this biography is now 10 years old and discusses events from even longer ago, the economic scenarios that Paul Volcker had to navigate resonate in today's economic environment. It is all too easy to forget that the exorbitant privileges extended to US markets and assets were hard won, owing in large part to Volcker's fortitude; but those victories are reversible and those privileges are not guaranteed.

CIO Takeaway: The importance of central bank credibility and anchored inflation expectations is central to the current debate surrounding when the Fed ought to ease, while fiscal worries are less prevalent. However, as history teaches us, the potential loss of Fed independence and the toxic interaction between fiscal policy and monetary policy should be on CIOs' radar screens too.

--Noah W.

WHAT WE'RE READING CONTINUED



The Power Law: Venture Capital and the Making of the New Future

by Sebastian Mallaby
Penguin Press, 2022

Driven by a small number of massively large winners that offset many more losing investments, returns to venture capital investing follow a Power Law distribution (aka the "80/20 rule" or "Pareto principal"), from which the book draws its title. In Sebastian Mallaby's recounting of the 75y history of VC, Power Law returns have had an indelible effect on the mentality of VC investors and on shaping the VC industry itself.

Told through individual VC investors' triumphs and failures and the rise and fall of VC firms, the major theme in Mallaby's history of venture capital is the ever-evolving approach to issues like the balance between founder autonomy and investor activism, early-stage vs. late-stage investing, and the virtues of going public earlier relative to remaining private longer.

Alongside this theme, Mallaby also attempts to suss out from the historical narrative the *causal* role that VC has played in driving economy-wide technological progress and in ensuring the success of their own investments. Did venture capital investments spur the technological revolution of the last half-century or were VC investors just along for the ride?

Mallaby is circumspect in arguing that VC helped cause *economy-wide* technological advancement. However, at the "micro" level, the anecdotal evidence he marshals supports the existence of VC investor skill, which translates into investment "alpha," though the source of VC alpha is unclear. In most instances, Mallaby suggests that VC skill is the ability to identify winning technologies and firms early on. However, he also provides examples where VC investors' managerial, strategic and technological expertise contributed significantly to the eventual success of their own investments.

CIO Takeaway: While *The Power Law* is an enjoyable and informative history, *ex post* story telling is vastly different from *ex ante* investing and historical narratives are no guarantee of future success! Mallaby is mostly silent on issues critical to today's CIO: how Power Law VC returns – with a handful of huge winners and many more laggards – impact fund selection and the role of VC in a balanced portfolio.

--Noah W.

Meet IAS

Xiang Xu, PhD

Senior Associate
PGIM IAS

Xiang Xu is a Senior Associate in PGIM's Institutional Advisory & Solutions (IAS) group. He joined IAS from the Market Risk team at Capula Investment Management where he provided quantitative risk and P&L analyses and market risk assessments. Previously, he was a Market Risk Manager at Morgan Stanley. Xiang started his career as a Capital Markets Credit Risk Associate at JP Morgan. He received a Bachelor of Economics from the University of International Business and Economics in Beijing and a PhD in Economics from the State University of New York at Binghamton.

Tell us a bit about your background and how that prepared you for your current role in the IAS group?

A PhD in Economics – with a concentration in applied econometrics – has given me a solid foundation in economics and finance as well as first-hand experience in formulating a research question and conducting the empirical work to then answer it. Also, some of the softer skills that I honed as a graduate student through undergraduate teaching and presenting my own research have been invaluable in my current role; much of what we do at IAS is, basically, educating clients and it is important to present new and unfamiliar ideas simply, clearly and concisely. Much of my early career has been in risk management, working with PMs and traders on issues of portfolio construction, performance attribution and risk measurement. These are some of the same issues and research areas that we focus on at IAS.

Since joining IAS late last year, you have published a paper on the global nature of stock-bond correlation and have a forthcoming paper on the portfolio implications of positive stock-bond correlation. What is the motivation behind this research agenda and what can we learn from it?

Stock-bond correlation is an important factor in strategic portfolio construction and optimization. While much has been written about this issue from a US perspective, we take a global perspective, documenting the synchronicity of developed market stock-bond correlations and examining their common macroeconomic drivers that relate to both US and local fiscal and monetary policy developments. In the current inflationary environment, investor concerns about the supply vs. demand drivers of inflation, the anchoring of inflation expectations, and the inflationary pressures from fiscal policy excesses can also have an influence on the joint behavior of stocks and bonds.

We also have a forthcoming paper (summarized above) digging into what a positive stock-bond correlation world would mean for portfolio performance and optimal portfolio construction. We assess both historical *ex-post* and simulated *ex-ante* performance of multi-asset portfolios. While positive stock-bond correlation can amplify portfolio volatility and dampen portfolio returns, some have also argued that positive correlation will lead to the death of the classic 60/40 portfolio, but we show that a balanced portfolio remains optimal even when stock-bond correlation turns positive.

What research projects are you currently working on?

In addition to my work on strategic asset allocation issues, I am also getting my feet wet in the illiquid private asset stream of IAS research. Currently, I am working with my colleague Michelle Teng to develop a cash flow model for private credit. One of the long-term goals is to incorporate a rich, detailed and nuanced private credit model into the existing IAS OASIS portfolio construction framework. This will allow us to examine how private credit interacts with other private and public assets in an optimally constructed multi-asset portfolio, with a particular focus on liquidity risk.

I am also updating our Fair Comparison Framework to include recent data. This framework offers a systematic tool to compare private and public investment performance on a consistent, equal-risk basis. CIOs can use our framework to make better-informed decisions about asset allocation between public and private vehicles.

What else about yourself would you like to share with us?
I was born in Jingdezhen, located in northeastern Jiangxi province in China. Jingdezhen has a long history for producing the best Chinese ceramics, dating back over 1,000 years. When I came to the US for graduate school, I brought a dozen pairs of locally-made porcelain chopsticks, which I shared with my new classmates. Although from different cultural backgrounds, everyone appreciated the authentic porcelain chopsticks – they were far more beautiful and delicate than the usual ones that come with grad-school takeout food! Outside of work, I like travelling, skiing, playing pool, and exploring new restaurants with friends. I also have a bunch of exciting items on my to-do list, such as skydiving.

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