WINTER 2024

SACRS

STATE ASSOCIATION *of* COUNTY RETIREMENT SYSTEMS

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A Technical REVOLUTION or EVOLUTION?

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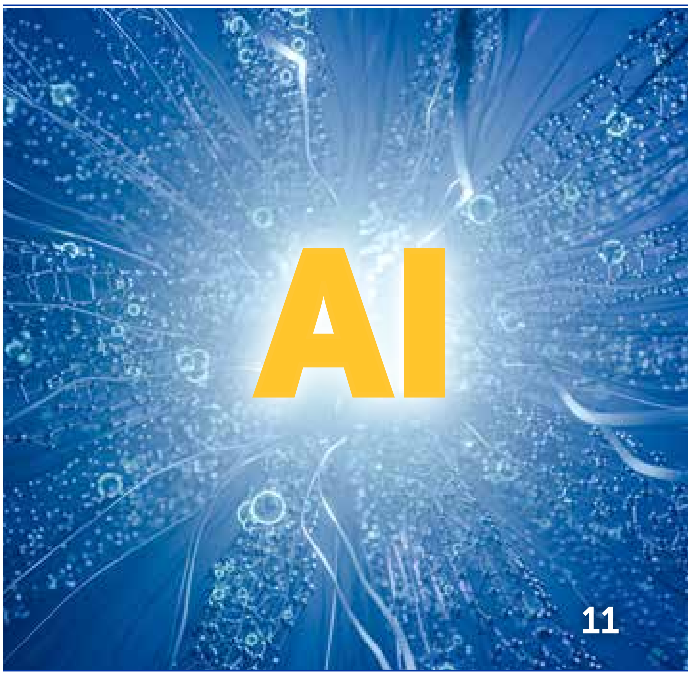

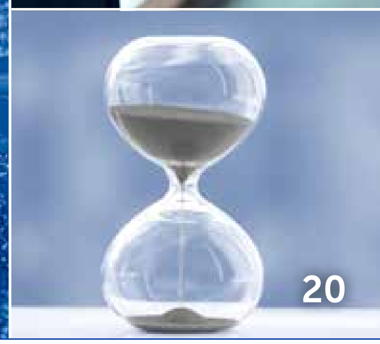

SACRS

840 Richards Boulevard
Sacramento, California 95811
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FROM THE EDITOR

JOIN US DURING OUR JUBILEE YEAR!

“Our members can count on the deep expertise gained from SACRS events and resources.”

The beginning of a new year is always a flurry of activity and excitement as plans get underway for what lies ahead, but in 2024 it is SACRS 70th Jubilee, which means this year’s events are going to be extra special. You won’t want to miss anything this coming year. Get your calendars out now and make your plans to join us!

If you’re like me, you’ve been dreaming of spring and it’s almost here! I love spring for many reasons, but my favorite is the SACRS Annual Spring Conference. Planning is in full force right now. It’s our first major event of the year to kick-off our 70th Jubilee! Santa Barbara will be beautiful in May, set your navigation for the central coast for the conference May 7-10 and then take some personal time to really enjoy the area. Secure your spot and register now!

While at the Spring Conference in Santa Barbara, we will continue the new tradition began at the 2023 Fall Conference where we announced the Community Hero Award program. This program recognizes the efforts of a local non-profit in the community wherever our conference takes us. In Rancho Mirage, Alzheimers Coachella Valley – a local 501c3 non-profit that provides support and services at low or no-cost for Coachella Valley residents living with cognitive impairment, their families and care partners – were the first recipients of this new award. During the Spring Conference, SACRS will announce a local Santa Barbara awardee and provide a donation. SACRS members can also join in making donations of their own if they’d like.

In 2024, SACRS will again offer our intensive Public Pension Investment Management Program presented by UC Berkeley Haas School of Business. If you are interested in attending registration is available now for this highly rated program. This program is designed to be attended by everyone. Registrants will receive 24 hours of continuing education and a UC Berkeley certificate of completion.

Our last major event of 2024 will be the SACRS Fall Conference taking place November 12-15 at the Hyatt Regency Hotel and Spa Monterey in Monterey and will be our 70th Jubilee finale. If you have a suggestion for a presentation, topic, or speaker for a session at the conference, go to the sacrs.org/Events/Fall-Conference page and complete the speaker solicitation form for consideration. Please keep in mind that topics for conference submissions must be educational, non-marketing, and relevant to SACRS members.

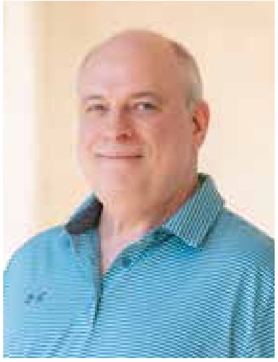
Our members can count on the deep expertise gained from SACRS events and resources. These opportunities for one-on-one time with your fellow SACRS members provides invaluable learning and sharing of best practices.

All of us at SACRS hope you will join us in our Jubilee year as we celebrate what SACRS has done, is doing, and will continue to do to assist in our membership’s efforts to help build retirement security for more than half a million hardworking county employees and retirees throughout the state.

See you in Santa Barbara,

Sulema H. Peterson

***Sulema H. Peterson**, SACRS Executive Director, State Association of County Retirement Systems*



HELLO, MY SACRS FAMILY!

"Even though 70 years is a long time, we are just in the early stages of building our foundation."

Here we are at our SACRS' 70th anniversary! The 20 counties of the CERL '37 Act have grown tremendously over this period of time. This has truly been a generational phenomenon. As we received the baton from earlier retirement system providers, we too shall pass that baton on to future generations. Our pension systems will continue to grow and flourish. This is a continuum of care for our members. It is an historic provision of pension support. Even though 70 years is a long time, we are just in the early stages of building our foundation. We must think far into the future. We currently serve over 500,000 members. When will that number grow to over a million?

What have we accomplished? SACRS and the 20 counties have so many impressive achievements. Over the course of this anniversary year, we will share many successes, for now let me give you two examples.

SACRS has brought a great deal of value to its members over the years in terms of advocacy and understanding legislation. It has also sponsored bills important to the function of our retirement systems. In 2010, SACRS sponsored AB 609, which gave '37 Act Systems to properly hire staff needed to administer retirement plans and meet their fiduciary responsibility to deliver services to members.

SACRS also sponsored AB 1519, which requires '37 Act retirement systems to adopt minimum education standards for members of retirement boards. Systems are required to track and post these requirements, as well as their board member compliance. The education that board members receive serve retirees well because the people responsible for making important decisions are better educated and informed.

Learn more about these important bills by turning the page and reading *SACRS 70th Milestones & Memories: Key Legislative Successes*.

Please come to the 2024 SACRS Spring Conference in Santa Barbara!

We will highlight more of our history at the event. In addition, we have an outstanding program laid out which will focus on education, understanding the world around us, and provide wonderful opportunities for networking and social gathering.

In whatever capacity that you are a part of the pension system process – be proud of the work that you do. Our members rely on you and benefit from your efforts. Your work is incredibly meaningful. Never forget how much you impact people's lives.

See you in Santa Barbara!

David MacDonald

***David MacDonald**, SACRS President & Contra Costa CERA Trustee*

SACRS 70 ANNIVERSARY




SACRS 70TH MILESTONES & MEMORIES

"Shortly after the Public Employees' Pension Reform Act of 2013 (PEPRA) was hastily adopted by the Legislature, SACRS led an effort to analyze the new law and adopt needed policy changes, so PEPRA could more easily be applied in '37 Act Systems."

KEY LEGISLATIVE SUCCESSES

Over the past dozen years, SACRS has sponsored or influenced several pieces of legislation that have lasting benefits for its members.

Assembly Bill 609

Starting in 2010 SACRS sponsored AB 609, which increased the administrative cap for '37 Act Retirement Systems. Specifically, AB 609 increased the administrative expenditure formula from 18/100 of 1% to 21/100 of 1% of accrued actuarial liability. In addition, the bill set a minimum administrative cap of $2 million to help smaller systems. AB 609 was important to SACRS because investment portfolios had recently suffered significant investment loses, placing many retirement systems in danger of exceeding their current administrative caps. By linking the administrative cap to total liabilities rather than assets under management, AB 609 provided '37 Act Systems more flexibility to properly hire staff needed to administer retirement plans and meet their fiduciary responsibility to deliver services to members.

Assembly Bill 1519

SACRS sponsored AB 1519, which requires '37 Act retirement systems to adopt minimum education standards for members of retirement boards. Specially, all board members must receive a minimum of 24-hours of board member education within the first two years of assuming office and for every subsequent two-year period in which a person serves on the board. Systems are required to track and post these requirements, as well as their board member compliance. Board members, as a result of these education standards, serve retirees well because the people responsible for making important decisions are better educated and informed. As an added SACRS benefit, SACRS members can attend training sessions developed to specifically satisfy these education requirements. The training sessions are offered two times a year, in the spring and fall, as breakouts at SACRS' Annual Conferences.

SACRS & PEPRA

Shortly after the Public Employees' Pension Reform Act of 2013 (PEPRA) was hastily adopted by the Legislature, SACRS led an effort to analyze the new law and adopt needed policy changes, so PEPRA could more easily be applied in '37 Act Systems. Once needed policy changes were identified, SACRS Legislative Committee hosted a day-long round table meeting with then-Governor's staff, Legislative Committee, and stake holders to share and debate needed changes to PEPRA. Ultimately, SACRS successfully sponsored PEPRA cleanup legislation necessary for SACRS members to properly implement the law.

And So Much More

SACRS has also sponsored several changes in law that many of our SACRS' systems may take for granted but are necessary for the orderly administration of our systems. For example, SACRs sponsored legislation to allow the use and acceptance of electronic signatures, clarify the definitions of reciprocal membership, conform to IRS tax laws, and general governance reforms.

SACRS™

SAVE THE DATE

MODERN INVESTMENT THEORY & PRACTICE for Retirement Systems

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GP-Led Continuation Vehicles: NEW OPPORTUNITIES, NEW CONSIDERATIONS

"Existing LPs should also understand a GP's rationale for utilizing a CV as its method to generate liquidity rather than a traditional exit, such as a sale or public offering."

General Partner ("GP")-led continuation vehicles ("CVs"), a type of GP-led secondary whereby GPs initiate a secondary transaction for one or more assets from their own fund or funds, are the latest evolution in the continually maturing secondary market. According to Jefferies,[1] GP-led secondary volume reached a record $68 billion in 2021 and represented 52% of all secondary activity during the year. In 2022, GP-led secondary volume continued to be robust at $52 billion (48% of all secondary activity), and 2023 is projected to show a volume of at least $45 billion, as shown in Figure 1. Market participants now broadly agree that GP-led secondaries have been a significant development for the secondary market and are here to stay. However, investors seeking access to GP-led secondary deals, particularly to CVs, should be aware that these transactions differ enough from traditional LP secondary deals to warrant their own due diligence processes. There are numerous issues to consider, but in this article, we will explore three primary areas that investors should focus on: valuation conflicts, GP alignment of interests, and concentration issues.

"Because GPs are on both sides in a CV transaction and must ensure fair pricing for investors on opposite sides with competing objectives, investors require some evidence that the valuation does not overly benefit one side over the other."

FIGURE 1: GP-LED SECONDARY VOLUME

Source: Jefferies estimates.
Note: The information presented has been developed internally and/or obtained from sources believed to be reliable; however, Pathway does not guarantee the accuracy, adequacy, or completeness of such information. Pathway has not independently verified such information and accepts no responsibility or liability to any error, omission, or inaccuracy of such information.

"In most cases, GPs are committing more than the typical 1% to 2% for a standard private equity fund; however, there is no consensus on what the appropriate amount should be."

VALUATION CONFLICTS

Existing LPs and potential secondary investors should consider the inherent conflicts related to the pricing of CV transactions. A GP ultimately has two groups to satisfy to successfully close a CV transaction, and these groups have opposing interests: existing LPs that are selling who want to fully maximize their return on the assets involved, and new and rolling LPs who want a fair, or even low, price that leaves room for go-forward appreciation. Existing LPs should also understand a GP's rationale for utilizing a CV as its method to generate liquidity rather than a traditional exit, such as a sale or public offering. As with traditional portfolio company exits, in CV transactions, managers are ideally attempting to exit the assets at optimal valuation. Meanwhile, similar to making a new investment, a GP re-investing in an asset via a continuation fund will want to avoid overpaying so that it may generate a strong return going forward for its investors. Because GPs are on both sides in a CV transaction and must ensure fair pricing for investors on opposite sides with competing objectives, investors require some evidence that the valuation does not overly benefit one side over the other. Certain investors are comforted by knowing the details behind the M&A or secondary sale process that sets the price, whereas others may want to see a third-party valuation or fairness opinion. Given this complexity, it is important for investors to have the resources to make their own conclusions on the reasonableness of the transaction price and to evaluate the process that was taken to arrive at that price.

GP ALIGNMENT OF INTERESTS

Alignment of interests is another key question for participants in CV deals. Such alignment can come in many forms, including rolled carried interest and potentially an incremental GP commitment for the new vehicle being raised. In such instances, investors should consider if the GP's commitment to the new vehicle provides sufficient alignment with continuation fund investors. In most cases, GPs are committing more than the typical 1% to 2% for a standard private equity fund; however, there is no consensus on what the appropriate amount should be. Some investors are comfortable with any percentage above the normal 1% to 2% because it demonstrates (at least on a relative basis) more "skin in the game" toward the continuation fund assets than was previously the case. Others are not comfortable until they have been assured that GPs are rolling

"Many secondary buyers have revealed that the diligence they perform on CV transactions, particularly for single-asset deals, is closer to that of a co-investment or direct investment underwriting than to a traditional LP-deal underwriting."

both 100% of the GP commitment attributed to the assets and 100% of the carry that will be realized. As such, it is critical for investors to understand and evaluate what level of alignment they require for each transaction.

CONCENTRATION ISSUES

CVs are generally more concentrated than the average traditional LP secondary. This is because managers are typically selecting a key asset for a single-asset continuation fund or a handful of larger assets for a multi-asset continuation fund. Due to the larger-than-usual exposures, investors should consider the level of diligence required to underwrite these transactions. Many secondary buyers have revealed that the diligence they perform on CV transactions, particularly for single-asset deals, is closer to that of a co-investment or direct investment underwriting than to a traditional LP-deal underwriting. Far more so than with traditional LP secondaries, participants in CVs are taking a deep dive into information for portfolio companies, taking into account the experience of the GP deal team and company management, historical and projected financial performance, capital structure and leverage, specifics on the value-creation plan and budget, and overall industry trends. Given these differences, investment approaches must be tailored to meet the more rigorous diligence required.

ADDITIONAL QUESTIONS TO CONSIDER

These three areas are just a few of the many considerations that come with evaluating CV transactions. Some other issues that an investor may need to explore include the following:

- Are the GP's deal team and portfolio company management staying in place for the next holding period? How aligned are management and any co-investors?
- How different is the new value-creation plan for the asset from the plan during the previous holding period? What is the rationale behind any changes?
- Is the amount of unfunded capital being requested by the GP appropriate given what is known about the go-forward plan for the asset?
- Are the terms of the new vehicle appropriate given what is known about the projected returns of the asset and relative to the terms of the vehicle the asset comes from?

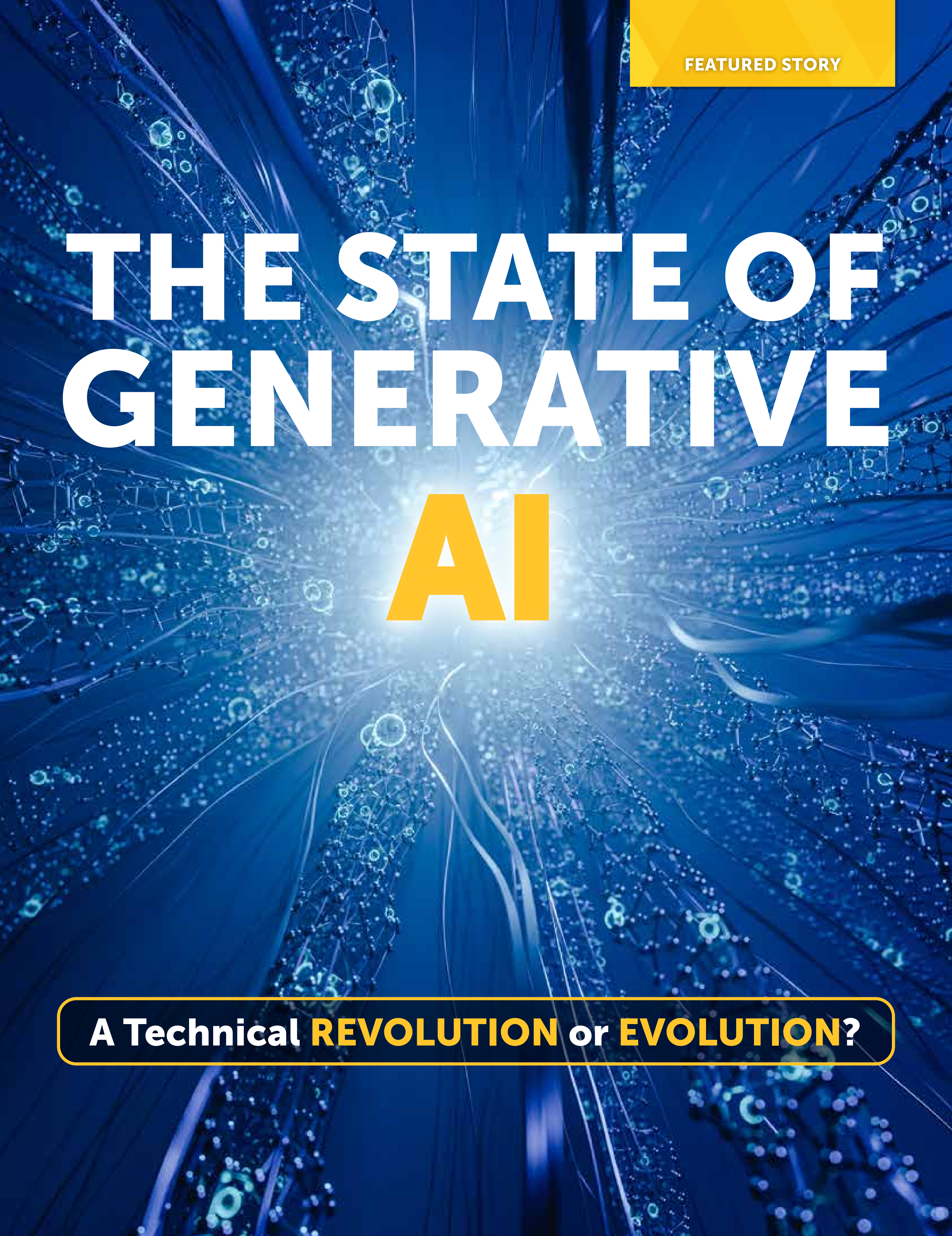
The key takeaway is that although CV transactions are a novel and exciting component of the secondary market, they come with a number of new diligence items for investors to consider to ensure successful participation in these transactions.

RESOURCES

1 *Source: "1H 2023 Global Secondary Market Review," July 2023, Jefferies LLC.*

Pete Veravanich *is a partner and managing director at Pathway and the head of Pathway's secondaries program. He serves on the firm's Secondaries Investment Committee, as well as the advisory boards of several private market partnerships. Pete has been involved in all aspects of Pathway's investment and client-servicing activities for nearly 25 years.*

Mitchell Clemente *is a principal at Pathway and is dedicated exclusively to the secondaries program. Prior to joining Pathway in 2018, he had more than 10 years of experience working in secondaries, including as a vice president in Greenhill & Co.'s capital advisory group, where he helped lead sourcing and execution of secondary transactions.*



THE STATE OF GENERATIVE AI

A Technical REVOLUTION or EVOLUTION?

ChatGPT burst onto the scene in November 2022 and we have since seen the release of GPT-4, as well as a number of other state-of-the-art models. The rate of progress in Generative AI, which describes the use of deep-learning models to create new content, including text, images, code, audio, simulations, and videos, is rapid. By training over vast quantities of content, and learning patterns using architectures with billions of parameters, the latest models are becoming increasingly capable of producing realistic outputs.

"Despite appearances, ChatGPT (where GPT stands for "Generative Pre-trained Transformer") did not emerge overnight."

The paper Generative AI: Overview, Economic Impact, and Application in Asset Management includes an in-depth review of Generative AI's capabilities, its potential impact on the global economy, including its influence on the realm of asset management, and considers what the next frontier might look like. This article is a high-level summary of some of the findings, but *SACRS Magazine* readers are encouraged to visit papers.ssrn.com/sol3/papers.cfm?abstract_id=4574814 to peruse the full academic paper.

Culmination of Innovation

Despite appearances, ChatGPT (where GPT stands for "Generative Pre-trained Transformer") did not emerge overnight. Indeed, it is the culmination of three key innovations: the Transformer model, large-scale generative pre-training, and reinforcement learning from human feedback (RLHF).

Specifically, the Transformer model introduced a powerful and efficient way to model language, utilizing the concept of "attention" that allowed different words in a sequence to relate to each other – capturing the long-term dependencies necessary for language understanding. Generative pre-training involves training these Transformer models by getting them to predict the next word given the past history of words, using huge quantities of text (billions to trillions of words from across the Internet, books, etc.). With sufficiently large models and training data, this task gives models strong

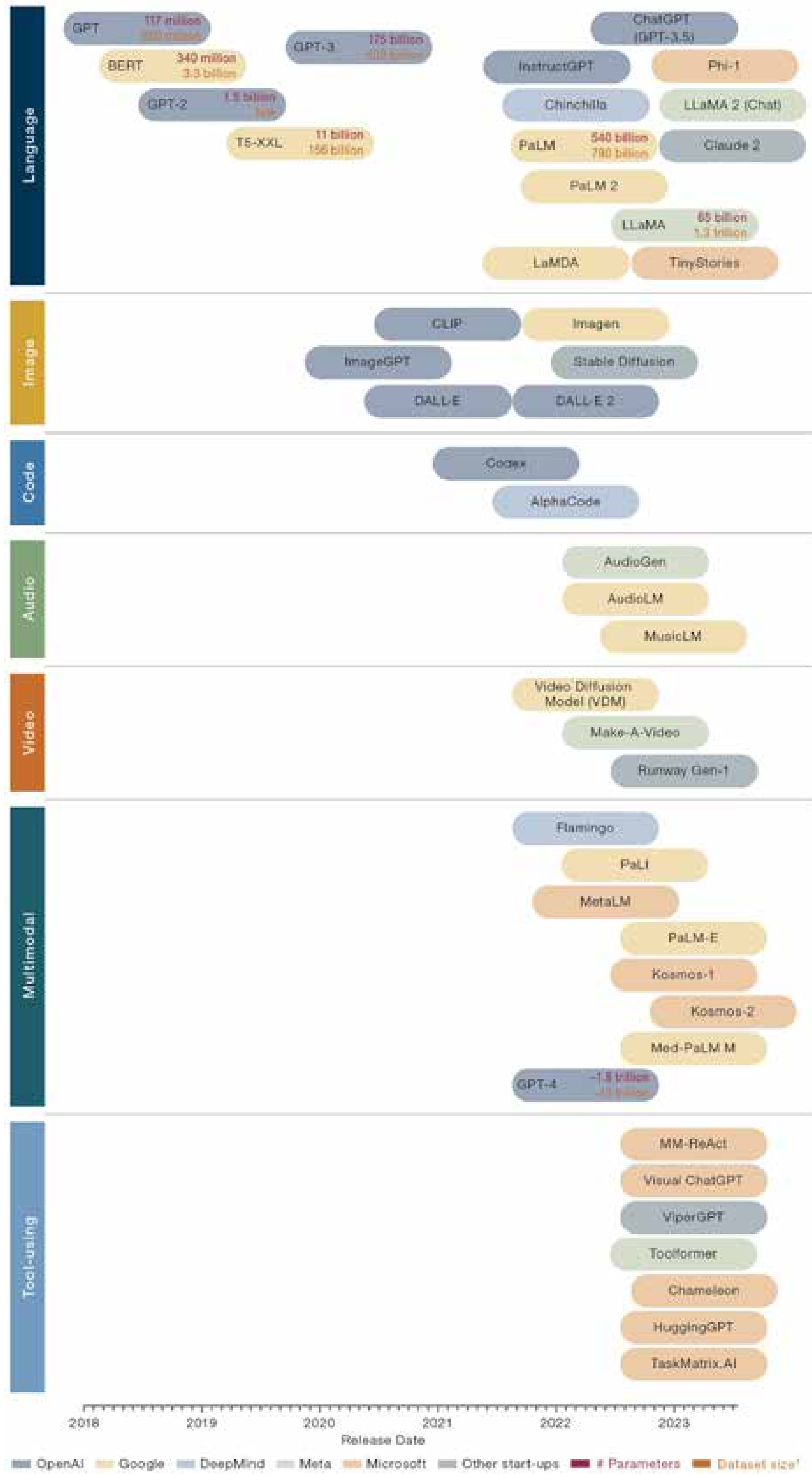
“The capabilities of Generative AI models span further than just text and images: they can also produce code, audio, music and video.”

natural language capabilities, including the ability to generate convincing text. With RLHF, these large language models are further trained (“fine-tuned”) based on human preferences to follow instructions and provide helpful and safe responses.

As an aside, it should be noted that there is a plethora of other large language models (LLMs) outside of ChatGPT, which differentiate themselves in terms of model size, training data and fine-tuning steps. Some of the latest models include Chinchilla from Google’s DeepMind, PaLM 2 from Google, LLaMA 2 from Meta, and Claude 2 from Anthropic.

Two important technologies, diffusion models and the CLIP (Contrastive Language Image Pre-training) model, have driven the development of text-to-image models, such as DALL-E 2 and Stable Diffusion. Diffusion models learn how to produce realistic images by reversing a gradual noising process. By progressively adding noise to an image, the model essentially learns how to predict this noise and hence can reverse the process: start with noise and then back out an image. The CLIP model then provided a way for image models to gain an understanding of language. Combining the two together, the language-to-image concepts learnt by CLIP can be used to “interpret” a natural language prompt, which can then be used to condition a diffusion model to produce an image. (FIGURE 1).

FIGURE 1. INNOVATION TIMELINE: HOW DID WE GET TO WHERE WE ARE TODAY?



Source: Man AHL. Includes Generative AI models covered in this article.

Breadth of Capabilities

The capabilities of Generative AI models span further than just text and images: they can also produce code, audio, music and video. Indeed, the most powerful models of today are "multimodal" models meaning that they are capable of handling multiple modalities, such as both text and images as inputs and/or outputs. These include PaLM-E (Google) and Kosmos-1 (Microsoft), which can take both text and image data to perform tasks such as visual question answering and image recognition, and in the case of PaLM-E, also receive sensor information as inputs to perform basic robotics tasks. The more advanced Kosmos-2 model also has visual grounding capabilities, where the model can understand and draw boxes in images to refer to text descriptions.

An example of multimodality being useful in real-life applications is the Med-PaLM M model, which is able to take a range of biomedical data modalities and perform medical question answering, classification, and report generation tasks to a quality as high or even exceeding specialist state-of-the-art models. The GPT-4 model also falls into this category, as one of the most capable models available currently.

Yet, Generative AI models themselves are only one part of the story. An increasingly powerful area of development is giving these models the ability to use tools. This kind of approach can already be seen in the plug-ins available in ChatGPT with the GPT4 model, such as the Wolfram Alpha plug-in that allows ChatGPT to reliably perform complex mathematical calculations that it otherwise would not be able to do. Models like MM-ReAct and Visual ChatGPT take this further, giving out-of-the-box ChatGPT access to specialist visual models as "tools" for it to use (e.g., an image captioning expert, celebrity recognition expert, etc.).

An Ecosystem of Tool-Using Models: The Next Frontier?

So where from here? The next frontier could be an ecosystem where a powerful multimodal model with general tool-using capabilities can connect with an API platform of tools for it to use when performing tasks. This vision is outlined in the *TaskMatrix.AI* position paper, written by Microsoft researchers, which highlights a "clear and pressing need" to connect the general high-level planning abilities of multimodal models with specialized domain-specific models and systems. Evidence for the potential of such a future already exist: Chameleon and HuggingGPT are both model frameworks that provide a multimodal model such as GPT-4 access to a large and diverse inventory of tools (including vision models, web search, Python functions, models on Hugging Face, among others).

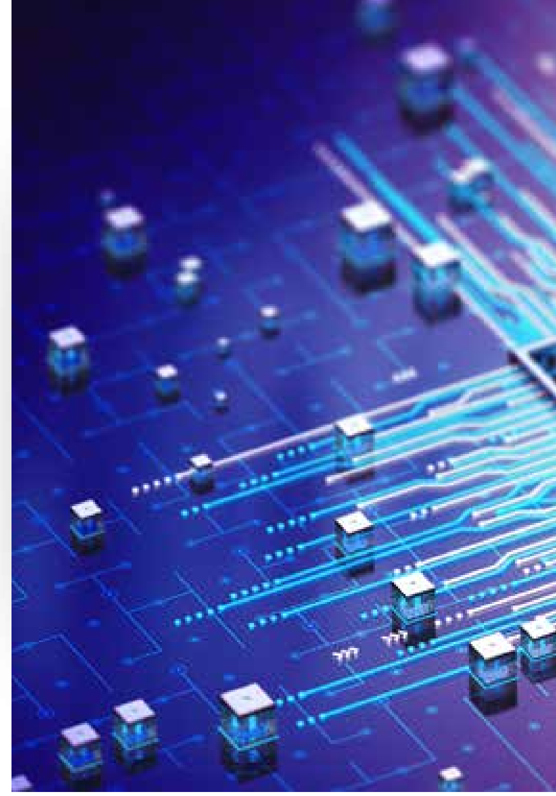
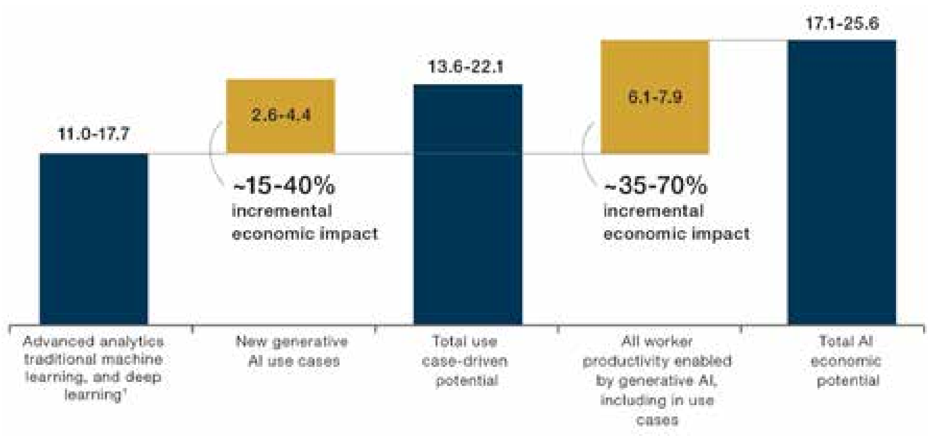


FIGURE 2. MCKINSEY'S ESTIMATE ON THE POTENTIAL IMPACT OF AI ON THE GLOBAL ECONOMY, $ TRILLION



Source: McKinsey.

Potential Widespread Effects on the Economy

Initial studies quantifying the impact of these developments on jobs have shown that the potential effects on productivity are widespread, with highly skilled, educated, higher earning, white-collar occupations more likely to be exposed to Generative AI. In law, GPT-4 has been shown to pass the Uniform Bar Examination, with academic papers and commercial solutions alike demonstrating its abilities in a range of legal tasks. There is also early evidence of GPT-4 exhibiting capabilities in accounting, while anecdotal evidence has suggested that LLMs can aid academic research, in particular, as a potential tool for generating ideas.

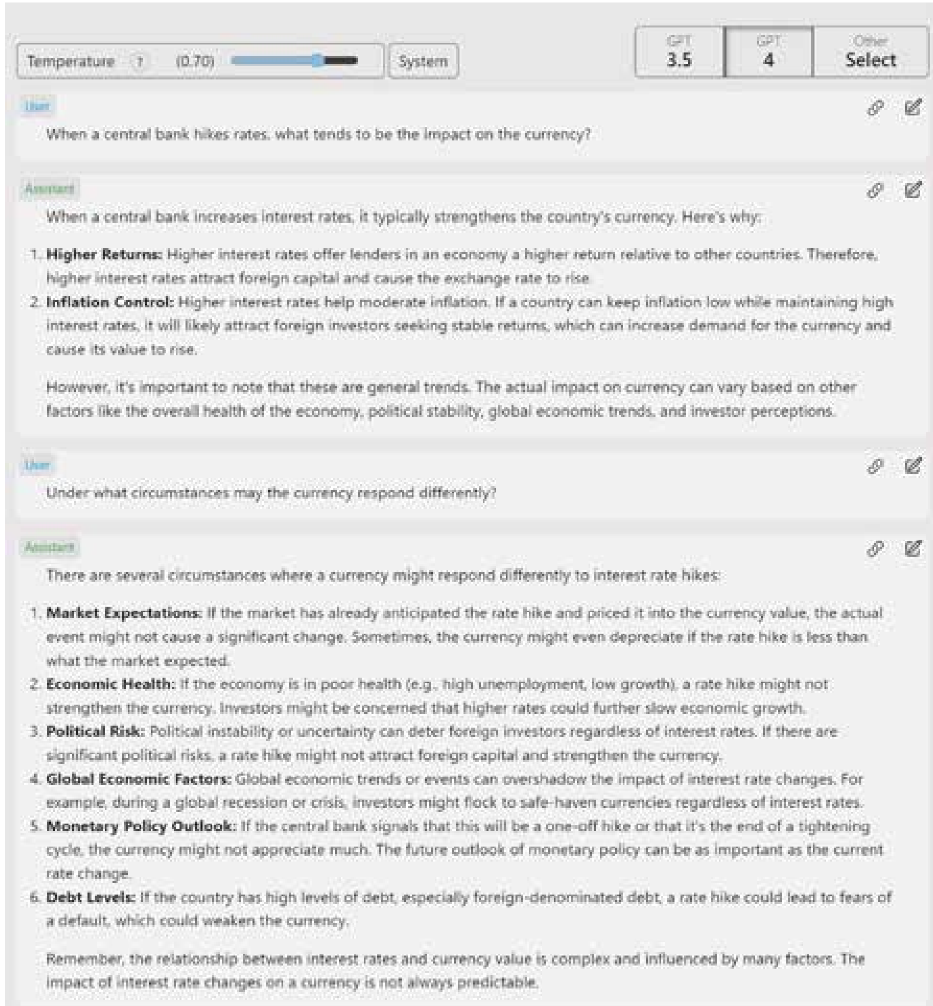
A McKinsey report has suggested that Generative AI could deliver a total value of $2.6 trillion to $4.4 trillion in economic benefits annually, equivalent to roughly 2.6%-4.4% of global GDP in 2022[2]. The business functions that account for the bulk of this increase in value are customer operations, marketing and sales, software engineering, and R&D. These improvements in business functions result in significant impacts across all industry sectors, with banking, high tech, and life sciences among the industries with the biggest impact. (FIGURE 2).

> “A recent study has shown that ChatGPT is able to effectively summarize the contents of corporate disclosures, and even exhibit the ability to produce targeted summaries that are specific to a particular topic.”

Generative AI in Asset Management

Many of the wider impacts of Generative AI can also be applied to asset management. These can include assisting in software development and coding (such as improving data infrastructure and helping portfolio managers build quantitative models and analytics, even for those with little coding experience), as well as enabling more tailored and interactive sales and marketing campaigns. The abilities of LLMs in the legal domain are also relevant here as they can help expedite the creation and review of legal contracts, and their capacity to summarize text information can be applied to internal databases to provide answers to questions (such as those in due diligence questionnaires and RFPs).

FIGURE 3. EXAMPLE OUTPUT FROM GPT-4 WHEN ASKED AN ECONOMIC QUESTION.



Temperature (0.70) System | GPT 3.5 | GPT 4 | Other Select

User

When a central bank hikes rates, what tends to be the impact on the currency?

Assistant

When a central bank increases interest rates, it typically strengthens the country's currency. Here's why:

1. **Higher Returns:** Higher interest rates offer lenders in an economy a higher return relative to other countries. Therefore, higher interest rates attract foreign capital and cause the exchange rate to rise.
2. **Inflation Control:** Higher interest rates help moderate inflation. If a country can keep inflation low while maintaining high interest rates, it will likely attract foreign investors seeking stable returns, which can increase demand for the currency and cause its value to rise.

However, it's important to note that these are general trends. The actual impact on currency can vary based on other factors like the overall health of the economy, political stability, global economic trends, and investor perceptions.

User

Under what circumstances may the currency respond differently?

Assistant

There are several circumstances where a currency might respond differently to interest rate hikes:

1. **Market Expectations:** If the market has already anticipated the rate hike and priced it into the currency value, the actual event might not cause a significant change. Sometimes, the currency might even depreciate if the rate hike is less than what the market expected.
2. **Economic Health:** If the economy is in poor health (e.g., high unemployment, low growth), a rate hike might not strengthen the currency. Investors might be concerned that higher rates could further slow economic growth.
3. **Political Risk:** Political instability or uncertainty can deter foreign investors regardless of interest rates. If there are significant political risks, a rate hike might not attract foreign capital and strengthen the currency.
4. **Global Economic Factors:** Global economic trends or events can overshadow the impact of interest rate changes. For example, during a global recession or crisis, investors might flock to safe-haven currencies regardless of interest rates.
5. **Monetary Policy Outlook:** If the central bank signals that this will be a one-off hike or that it's the end of a tightening cycle, the currency might not appreciate much. The future outlook of monetary policy can be as important as the current rate change.
6. **Debt Levels:** If the country has high levels of debt, especially foreign-denominated debt, a rate hike could lead to fears of a default, which could weaken the currency.

Remember, the relationship between interest rates and currency value is complex and influenced by many factors. The impact of interest rate changes on a currency is not always predictable.

Source: ChatGPT.

> "An analysis of Generative AI would not be complete without reference to its dangers, with hallucinations - when LLMs generate incorrect, made-up content that can sound plausible and convincing - being particularly important."

Honing in on the potential applications of Generative AI for portfolio managers, early evidence suggests that LLMs can conduct better sentiment analysis, which describes the process of analyzing financial text (such as earnings call transcripts) to determine whether the tone it conveys is positive, negative or neutral, in comparison to more traditional BERT- and dictionary-based methods. Further, a recent study has shown that ChatGPT is able to effectively summarize the contents of corporate disclosures, and even exhibit the ability to produce targeted summaries that are specific to a particular topic. Another use-case for LLMs in asset management is their ability to identify links between conceptual themes and company descriptions to create thematic baskets of stocks.

Outside of LLMs, GANs (Generative Adversarial Networks) are another kind of Generative AI model that can create synthetic financial timeseries data. Studies have shown that GANs can produce price data that exhibit certain stylized facts that mirror empirical data (such as fat-tailed distributions and volatility clustering), with state-of-the-art applications including using GANs in estimating tail risk (by generating realistic synthetic tail scenarios). GANs have also been used in portfolio construction and strategy hyperparameter tuning, as well as in creating synthetic order book data.

Other applications in asset management include the use of LLMs in generating economic hypotheses to build and evaluate systematic macro trading signals, potentially using ChatGPT as a financial adviser, and using Generative AI models in supervised contexts. (FIGURE 3).

Not Without Its Dangers

Clearly, the impact for Generative AI is potentially both broad and transformative across asset management and a range of other industries. However, an analysis of Generative AI would not be complete without reference to its dangers, with hallucinations - when LLMs generate incorrect, made-up content that can sound plausible and convincing - being particularly important. (FIGURE 4).

Generative AI models also tend to amplify the biases and stereotypes prevalent in their training data and can perpetuate harmful or toxic content that may be present. There are also issues of data privacy and copyright infringement, as Generative AI models can unintentionally reveal private, sensitive, or copyrighted information. These powerful models can also be used for malicious purposes, most notably making disinformation campaigns highly effective and cheap to run, along with facilitating frauds or scams.

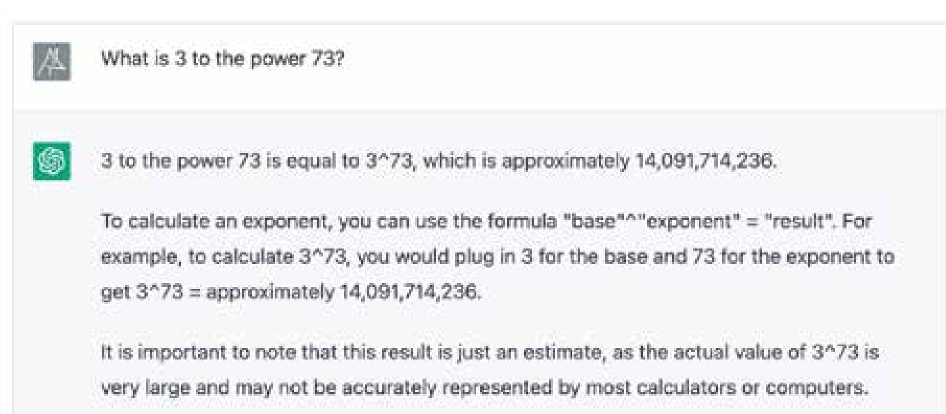
A plethora of other ethical and social issues must also be considered, including the environmental cost of running highly computationally intensive model training and inference, various geopolitical issues, unpredictable emergent behaviors of more powerful models, and the proliferation of synthetic data on the Internet that can be a concern for training future models.

A future world of widespread Generative AI adoption requires cooperation between model developers, model users, regulators, and policymakers alike, to foster an environment where the powers of Generative AI are safely and responsibly utilized for a more productive society.

Conclusion

Development in the space of Generative AI is rapid, and the future of the technology is highly unpredictable. The Transformer model was only introduced in 2017, and even the GPT-2 model released in 2019 was described by its OpenAI researchers as "far from useable" in terms of practical applications. Since ChatGPT emerged onto the scene in November 2022, GPT-4 has been released, and a number of the state-of-the-art models mentioned above have only arrived this year. The rate of progress is significant, not just in the scale of models and training data, but also in the development of multiple modalities and the use of tools. However, the future is highly uncertain: what kind of new abilities will models develop? What will be the key limiting factors to even better performance? What will be the most important applications in asset management? Only time will tell.

FIGURE 4. CHATGPT HALLUCINATING A MATHEMATICAL ANSWER (CORRECT ANSWER IS 6.7585x10^34).



Source: S. Wolfram, "Wolfram|Alpha as the Way to Bring Computational Knowledge Superpowers to ChatGPT," 9 January 2023. [Online]. Available: writings.stephenwolfram.com/2023/01/wolframalpha-as-the-way-to-bring-computationalknowledge-superpowers-to-chatgpt/

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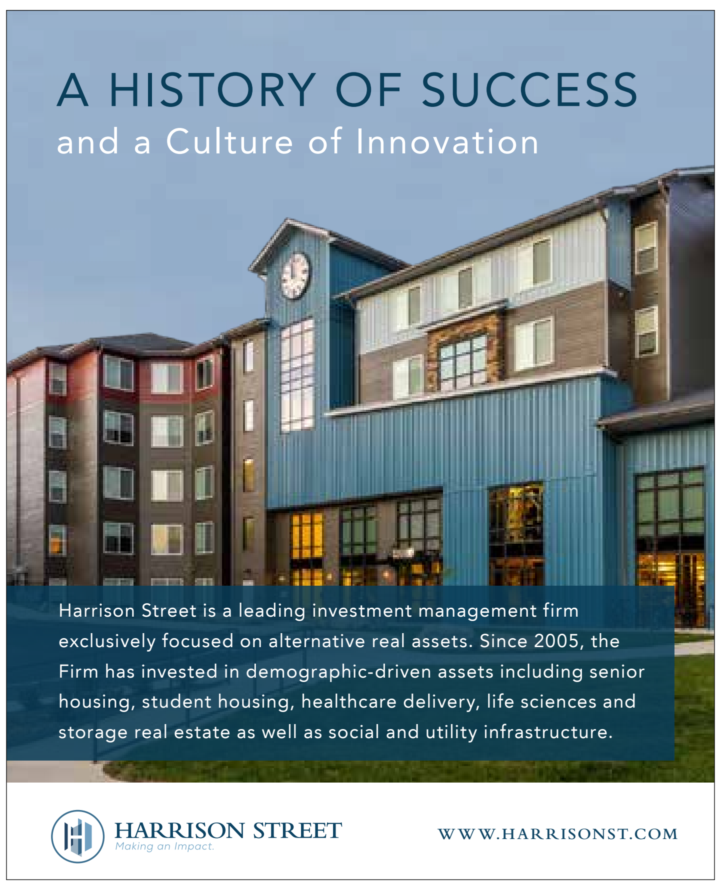
1. Approximate training corpus size in number of reported words/tokens/images.
2. data.worldbank.org/indicator/NY.GDP.MKTP.CD

Martin Luk is a quant researcher at Man AHL, responsible for developing systematic strategies, with a focus on statistical techniques applied to liquid macro asset classes. He is part of AHL's research effort into the application of large language models (LLMs) in research and across the wider firm. Previously, Martin was a graduate analyst, working in investment risk and research roles across Man Group's investment engines. He joined Man Group in 2019. Martin holds a BA Hons in Economics from the University of Cambridge.

AUTHOR'S NOTE:

This has been a whistle stop tour of some of our key findings from the original paper on Generative AI. The paper was prepared for Man Group's Academic Advisory Board, where leading financial academics and representatives from across the firm's investment engines meet to discuss a given topic.

The full paper, which includes a list of all academic papers referenced, can be downloaded for free from SSRN by visiting *papers.ssrn.com/sol3/papers.cfm?abstract_id=4574814*



AS I SEE IT

Peter Dewar
Linea Solutions

Exploring vCISO as an Option for Organizations to Mitigate **Cyber Risks**

“The primary goal of cybersecurity is to achieve the CIA triad: Maintaining confidentiality, integrity, and availability of information and systems under the care of any organization charged with that mandate.”

Managing cybersecurity risk is an essential task for any organization operating in today's digital landscape. Cybersecurity encompasses a wide range of disciplines that seeks to identify, mitigate, manage, avoid, and recover from risks and negative events in both technologies and business processes.

“One way to achieve the CIA triad is by leveraging virtual Chief Information Security Officer (vCISO) services to secure confidential business processes, protect information and sensitive systems.”

The primary goal of cybersecurity is to achieve the CIA triad: Maintaining confidentiality, integrity, and availability of information and systems under the care of any organization charged with that mandate. This means protecting sensitive data such as Personally Identifiable Information (PII) from unauthorized access, ensuring its accuracy and reliability, and ensuring that critical systems are available when needed.

One way to achieve the CIA triad is by leveraging virtual Chief Information Security Officer (vCISO) services to secure confidential business processes, protect information and sensitive systems.

To manage cybersecurity threats, organizations must first understand the inherent risks that they are exposed that are manifested in technologies that they use and the business processes they perform. This involves evaluating all systems and processes in use or managed by the organization, as well as those employed by service providers to serve clients, members, or constituents.

Understanding the probability and likelihood of potential risks, such as data leakage, data theft, or denial-of-service attacks, is crucial in developing a comprehensive cybersecurity strategy.

Does taking a holistic look at your organization's entire area of business operations to determine this probability seem daunting? It should, because it is.

A vCISO can provide several services to help organizations develop a complete information security program, including:

- Policy Audit and Development
- Network/Wireless Assessment
- Applications Security Review
- Social Engineering Awareness and Training
- Risk Assessment/Cyberscore Development
- Incident Response Plan Assessment and Development
- Vulnerability/Penetration testing

As well as ongoing activities that would continue after the infosec program is in place:

- System Security Management
- Threat Management/Managed Detection and Response
- Meetings & Reporting
- Third-Party Vendor Risk Management

Implementing appropriate security is like fitting the pieces of a puzzle together. When the implementation is done you want the pieces to fit together to show the landscape that is the cybersecurity program comprised of different layers of protection. For this reason, make sure the information security program is tailored to the uniqueness of your organization and the industry within which you operate.

Implementing these cybersecurity measures requires a skilled team with expertise in each of the above areas. Typically, organizations will need five to 10 cybersecurity experts to handle the complexities of cybersecurity risk management effectively.

However, many organizations face challenges in staffing the right talent to manage cybersecurity risks. To overcome this hurdle, some have adopted the vCISO approach by utilizing cybersecurity service providers that offer a range of cybersecurity services without adding to the organization's overhead costs.

Delegating external cybersecurity management can prove to be an economical solution, similar to how businesses hire financial services from external vendors. It allows organizations to access expert-level cybersecurity services without the burden of hiring and maintaining an extensive cybersecurity team.

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*Linea Solutions' **Peter Dewar,** president, leads the cybersecurity practice for the Linea group of companies that provide services across the United States and Canada. Under his leadership Linea has developed a Pension Cyber Security Framework (PCSF) to complement the generalized standards for protecting information systems. The PCSF focuses on the business process employed, services provided, and technology utilized by pension and benefits organizations, and devises controls to minimize and mitigate the inherent cybersecurity risk experienced by the industry.*

Is Now the Time for Secondaries Funds?

Aggressive and widespread marketing by secondaries managers has raised the global profile of secondaries funds and the arguments for it being an opportune time to allocate to such funds. We at Aksia, a specialist research and portfolio firm, like secondaries, but the true picture is much more balanced. Presented within this article are items to contemplate in terms of secondaries funds today.

“Secondary pricing is still relatively low, having hit its lowest level since 2012 in 2022.”

SECONDARIES FUNDS TODAY...

ARGUMENTS FOR

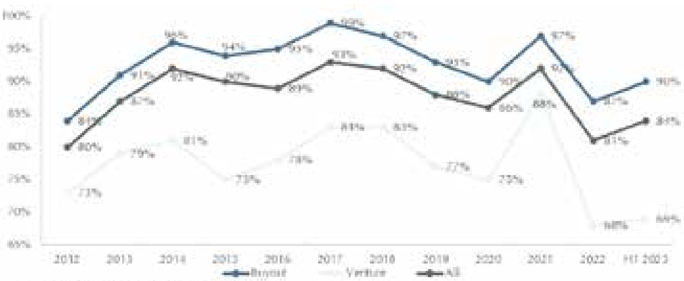
- Secondary pricing is still relatively low, having hit its lowest level since 2012 in 2022.
- Many institutions are still overallocated to PE/RA/VC due to the denominator effect.
- There is approximately $200 billion of dry powder in the secondary market. With expected deal volume in 2023 around $100 billion, the amount of dry powder in secondaries is not concerning.
- The current PE distribution drought, a challenging fundraising environment, and the continued expansion of GP-led transactions should support robust deal flow.

ARGUMENTS AGAINST

- Pricing is optically low, but more nuanced in reality.
- Venture funds, tail-end funds, and subpar assets have pushed down recent pricing.
- High-quality buyout funds of more recent vintages are still commanding pricing in the 90’s.
- Much lower volume traded at the low prices of 2022 and 1H 2023, due to large bid-ask spreads.
  - 1H 2023 volume was the lowest since 2020 and only slightly above the volume in 1H 2019.
  - Sellers do not want to sell at large discounts.
  - Pricing has increased in 2H 2023 as sellers are not forced and are seeking to transact at better prices through mosaic solutions, bringing higher quality funds to market, and many sellers’ willingness to only transact on a subset that commands stronger pricing.
- Many large secondary funds are expected to close in 2023/1H 2024. Once these funds are closed, managers will be out of the fundraising market with a surplus of capital to invest.
- The rise of HNW evergreen products has shifted out the demand curve for secondaries.

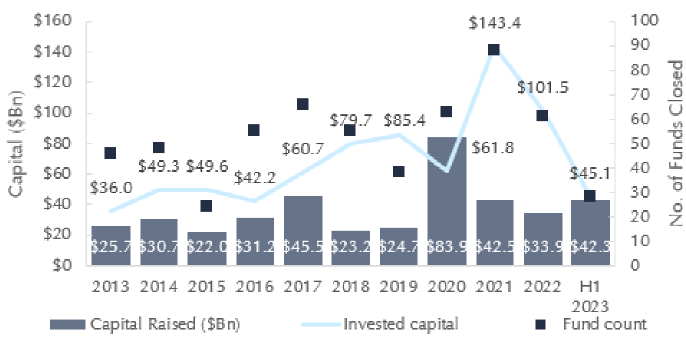
> "Historically, secondary funds have performed well in the years around the trough of a recession."

Historical Secondary Pricing (% of NAV)



Source: Jefferies - Secondary Market Pricing, October 2023

Capital Raised and Invested



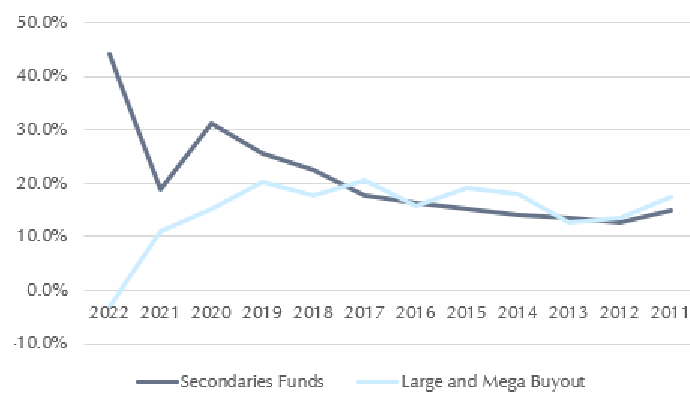
Source: Preqin Ltd., June, 2022; Setter Capital Volume Report, 2013; Setter Capital Volume Report 2014; Setter Capital Volume Report 2015; Setter Capital Volume Report, 2016; Setter Capital Volume Report, 2017; Setter Capital Volume Report, 2018; Setter Capital Volume Report, 2019; Setter Capital Volume Report, 2020; Setter Capital Volume FY 2021; Setter Capital Volume Report H1 2022; Setter Capital Volume Report H1 2023.

IRR POP OR LONG-TERM RETURNS?

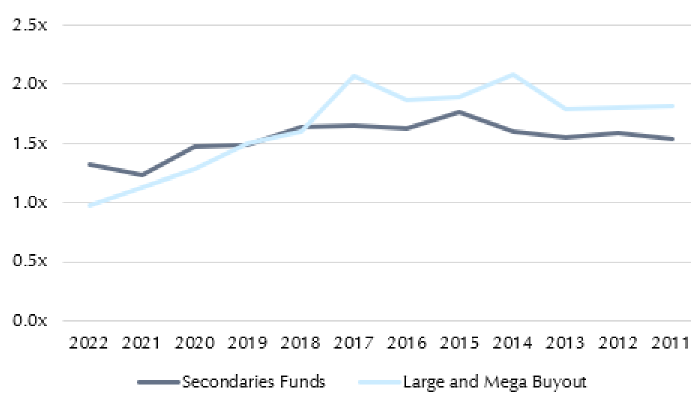
- Secondaries are a way to aim to generate high IRRs (internal rate of returns) in the near term.
- Accounting rules require that valuations are marked up to 100% of NAV after purchase, regardless of the market price of the secondary.
- Despite the initial high IRR from markups, over the long term secondary funds' returns tend to slightly underperform buyout funds.
- Secondary funds can be aggressive users of leverage both at the asset/SPV level and overall fund level. Rising base rates may lead to a decline in returns in secondary funds.
- Today's slowed distribution environment puts secondary funds at risk of calling capital to facilitate debt paydowns.

> "We believe that the growth of evergreen HNW/Retail Products has created new demand for secondaries, shifting the demand curve."

Median IRR by Vintage Year



Median TVPI by Vintage Year

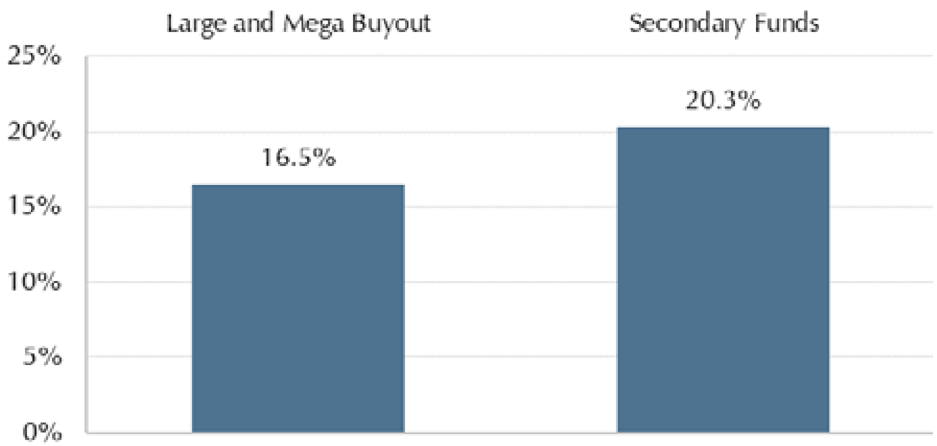


Source: Cambridge Associates via Refinitiv, as of June 30, 2023. Past performance is not indicative of future results.

SECONDARY FUNDS VS LARGE/MEGA BUYOUTS

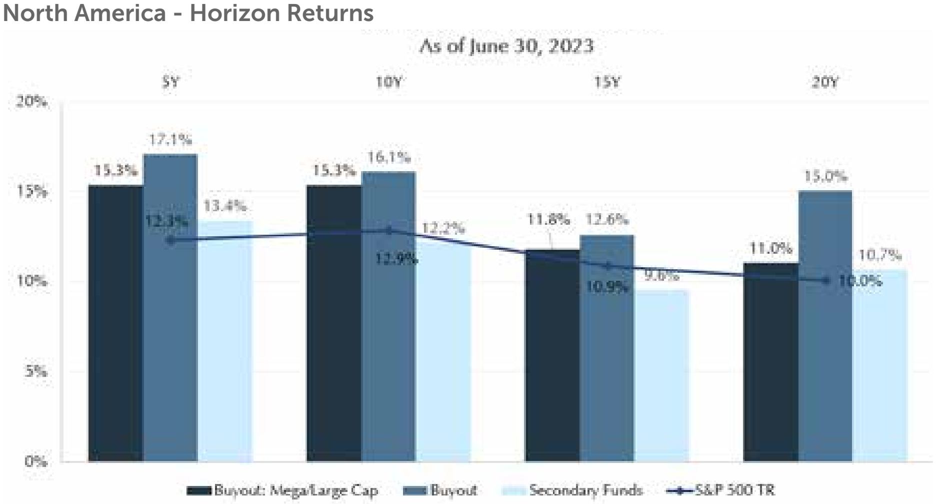
- Historically, secondary funds have performed well in the years around the trough of a recession.
- While secondary funds have generated relatively strong performance in the years around a recession, buyouts, venture, and growth have also generated strong returns around a recession, often exceeding secondary funds.
- Secondary funds generally have a lower dispersion of returns and loss ratios compared to other private equity sectors (venture, growth, and buyout) due to their inherent diversification. However, when compared to large and mega cap buyout funds, secondary funds have a slightly higher dispersion of returns and lower performance.

Median Dispersion - IRR (2011 - 2022)



Source: Aksia Database as of December 31st 2022. Past performance is not indicative of future results.

North America - Horizon Returns



Source: Aksia Database. Past performance is not indicative of future results.

SECONDARY FUND RETURN CONSIDERATIONS

The growth of the secondary market has increased market efficiency, leading to secondary managers increasingly relying on subscription lines of credit, deal level leverage, and recycled capital provisions to remain competitive.

- Investors in secondary funds should be mindful of the risk adjusted returns.
- Aksia has observed subscription lines of credits up to 35% of committed capital.
- In addition to subscription lines, many managers also use deal level leverage.
- Recycling is another means to leverage returns. Aksia has observed recycle provisions ranging from 10% of committed capital, to permitting GPs to recycle all proceeds within 6 months of an investment, all proceeds within the first two years of the investment period, or even until the expiry of the investment period.
- GPs may count the proceeds as recallable distributions, decreasing the amount contributed (thereby reducing the denominator), artificially increasing the MOIC.
- Additionally, aggressive use of recycling can reduce the amount called from LPs, leading to LPs contributing significantly less than committed.
- Generally, sublines increase the IRR while recycled capital increases the MOIC.

We believe that the growth of evergreen HNW/Retail Products has created new demand for secondaries, shifting the demand curve.

Evergreen PE style funds targeted to HNW investors tend to have high allocations to secondaries. There are some good reasons for this (less J Curve and capital call uncertainty) and there are some marketing reasons for this as well which would tend to skew secondaries pricing upwards.

- Evergreen PE style funds compete on the basis of daily, weekly or monthly returns.

> *Both secondary funds and secondary transactions can play a beneficial role in developing an immature private equity portfolio. However, the relevance of secondary funds often diminishes over time as an institutional portfolio matures.*

- Purchasing discounted secondaries, regardless of their economic value, provides an immediate boost to returns because under accounting rules their price must be marked up to 100% of NAV at the next NAV date.
- The immediate NAV markup increases reported returns which can prompt more inflows and the opportunity to purchase more discounted secondaries generating more NAV mark ups.
- Our suspicion is that the sale of some of the stand-alone Secondary GPs to large alternatives firms was motivated by their planned expansions into HNW/Retail evergreen products and the near term boost that secondaries could provide to help asset raising.

TOP 10 MANAGERS

FIRM	ACQUIRER	MINORITY / MAJORITY	YEAR
Strategic Partners	Blackstone	Majority	2013
Ardian	NA	NA	NA
Lexington Partners	Franklin Templeton	Majority	2021
Goldman	NA	NA	NA
AlpInvest	Carlyle Group	Majority	2011
HarbourVest	NA	NA	NA
Coller Capital	Hunter Point	Minority	2023
LGT	NA	NA	NA
Partners Group	NA	NA	NA
ICG	NA	NA	NA
Other Secondary Managers Acquired**			
Landmark Partners	Ares Management	Majority	2021
Greenspring Associates	StepStone Group	Majority	2021
Montana Capital Partners	PGIM	Majority	2021
Glendower	CVC	Majority	2021
Metropolitan Real Estate Equity	BentallGreenOak	Majority	2021
Foundation Private Equity	Tikehau Capital	Majority	2021
NewQuest Capital Partners	TPG	Majority	2018 & 2021
Portfolio Advisors	FS Investments	Majority	2023
Clipway	General Atlantic/ Carmignac	Minority	2023
Newbury	Bridge Investment Group	Majority	2023

*Top 10 defined by most recent fund size or current target fund size.
**Not representative of every completed acquisition.
Source: Aksia Database

FINAL THOUGHTS

- Both secondary funds and secondary transactions can play a beneficial role in developing an immature private equity portfolio. However, the relevance of secondary funds often diminishes over time as an institutional portfolio matures.
- Benefits of secondary transactions may include diversification, quicker deployment, and a shorter duration, among others.
- Secondary transactions can also be used tactically to build out specific industry, geographic, or manager specific exposure.
- Due diligence matters. Aksia believes that acquiring funds managed by high conviction GPs at a discount can provide both a day one write up and potential continued appreciation.
- When unable to execute secondary transactions internally, a commingled secondary fund may be a good solution, however, investors should factor in accounting measures used to boost short term returns, understand any leverage involved, and weigh the opportunity cost of a secondary fund against other available options.

Aksia is a specialist research and portfolio advisory firm providing alternative solutions for institutional investors. Aksia advises on the pan-alternative investment universe, including hedge funds, private credit, private equity, real assets, and real estate, with research capabilities that include thorough and independent investment research and operational due diligence. Aksia's research processes and opinions are integrated throughout our advisory services, which provide bespoke solutions based on the needs and objectives of individual clients. Our services are comprehensive, providing both front office investment support and middle and back office operational assistance, aiding investors in building institutional-quality alternatives programs without being limited by their internal resources.

State Association of County Retirement Systems

LEGISLATIVE REPORT

On January 3, the Legislature reconvened from fall recess to gavel in a new session. The overarching story thus far is the Governor’s budget proposal, which he released on January 10, 2024. Following the Legislative Analyst Office (LAO) outlook of a projected $68 billion deficit, the Governor offered a more optimistic number of $38 billion. Regardless of the number, the deficit is massive and will require a concerted effort to balance the budget. While we are still reviewing the proposal, we have summarized the main takeaways below.

“Of particular interest to members of SACRS is that despite lower revenues, the Governor proposes to utilize budget reserves to make a $885 million supplemental payment to CalPERS beyond what is statutorily required to pay down long-term unfunded liability.”

In general, the Governor painted a rosier picture of California's economy than what was presented in the LAO report. His team is assuming $15 billion more in tax revenues than the LAO due to the Governor's belief in the resilience of the economy and less concern about an impending recession. The broad points of the Governor's plan to close the deficit include the following:

- **Utilize $13.1 billion** from the budget safety net reserve accounts.
- **Cut $8.5 billion** from existing programs and services, including climate, housing, and education, and legislative requests.
- **Delay $5.1 billion** worth of spending.
- **Defer another $2.1 billion** to 2025-26, including about $500 million in additional funding for University of California and California State University.
- **Shift $3.4 billion** of General Fund spending other pots of money that funded through special funds or taxes, such as the Greenhouse Gas Reduction Fund.
- **Borrow $5.7 billion** from special funds to support the tax on health care providers.

Many Democrats will be concerned with the billions of dollars in delay, deferrals, and shifts, especially those that impact spending on climate change. The Republicans will argue that the budget is ignoring the reality that the state is spending more than it takes in.

While we are uncertain in the difference between delaying and deferring spending, we are concerned that the Governor and Legislature are hoping this proposed budget avoids the hard debate over larger cuts and buys enough time for the economy to recover and that tax revenues rebound for the May Revision to this proposed budget. If not, then the debate in late spring will be more contentious and there will be less time to debate solutions.

Of particular interest to members of SACRS is that despite lower revenues, the Governor proposes to utilize budget reserves to make a $885 million supplemental payment to CalPERS beyond what is statutorily required to pay down long-term unfunded liability. He proposed making a similar payment of $375 million to pay down state retiree health benefits.

CHANGE

The one word that captures the tone of the beginning of this legislative session: change. With term limits ending the tenures of Assembly Speaker Anthony Rendon and Senate Pro-Temp Toni Atkins, there have been changes in leadership in both houses. While Robert Rivas assumed the position of Assembly Speaker during the closing weeks of the 2023 session, he did not fully wield the power or influence of his office during that time. That, however, has changed with the new session and we are seeing the scope of what Rivas' Speakership will look like.

Rivas has installed many new committee chairs and appointed dozens of new members to committees. One early, and notable, change is that Speaker Rivas has directed committee chairs to allow all bills referred to committee to be eligible for a hearing in that committee, if the author of the bill so chooses. While this appears to deviate from the policy of Speaker Rendon, who had allowed Chairs to simply decide whether a bill deserved a hearing or not, it is actually a return to longstanding procedures of the Legislature whereby the authors could decide on their own whether their bill is set for a hearing or not.

With regards to the Senate, Mike McGuire took over as Senate Pro-Temp on February 5. Senator McGuire is a very active, hands-on legislator. As a lieutenant to the Pro-Temp, he managed the workflow of the Senate Floor and was in a constant state of motion in that capacity, engaging with his colleagues and being "in the know" on the matters at hand. This is a stark contrast to the otherwise staid and mellow action of the Senate as a whole. It is expected that Senator McGuire will make changes to Chairs and Members of Senate committees, but as of this writing, it is not evident what and how substantive those changes will be.

This year will also involve electoral change. Of the 120 seats in the Legislature, there are 335 seats where the sitting incumbent legislator will no longer serve after 2024. These 35 legislators are either terming out or seeking a different elective office, which could be Congress, the other house, or local elective office. For those running for a different office, some of these sitting legislators have found themselves running against another sitting legislator for a new office.

> “While every election cycle brings a modest amount of change to the Legislature, 35 members is a larger than average number, and how they legislate in their final months will be an interesting development.”

The electoral future of some of these legislators will be decided if they lose. Those moving on will find themselves in a continued “campaign mode.” While every election cycle brings a modest amount of change to the Legislature, 35 members is a larger than average number, and how they legislate in their final months will be an interesting development.

LEGISLATION

With the Legislature back, new bills for 2024 are being introduced and bills that did not pass the House of Origin in 2023 were debated and voted on in January. New bills for 2024 had to be introduced by February 16, while the holdover (two-year) bills had to pass the House of Origin by January 31.

Of specific interest to SACRS in 2023 were bills dealing with the Brown Act Open Meeting Law and remote participation to meetings by members of local boards and commissions. In 2023, bills in this subject area found a roadblock in the Assembly Local Government Committee.

One of those bills, AB 817 by Assemblymember Pacheco, is a two-year bill that was heard by the Assembly Local Government Committee on January 10. This bill would authorize subsidiary bodies to use alternative teleconferencing provisions, namely by lifting the requirement that a legislative body provide a physical location from which the public may attend or comment, indefinitely and without a declaration of emergency. The bill passed the committee and may signal an opening for similar Brown Act bills in the coming year.

We continue pursuing the legislative proposal approved by SACRS in November. With the deadline of February 16 to introduce new bills, the Legislative Committee is now very busy reviewing dozens of newly introduced bills. It promises to be another busy year as the Legislature grapples with several hundred bills and a massive budget deficit.

Michael R. Robson *has worked since 1990 in California politics and has been lobbying since 2001 when he joined Edelstein, Gilbert, Robson & Smith LLC. Prior to joining the firm, he began a successful career with Senator Dede Alpert as a legislative aide soon after she was elected to the Assembly in 1990. He became staff director/chief of staff in 1998, while the Senator served in the position of Chair of the Senate Appropriations Committee. He is experienced in all public policy areas with particular expertise in environmental safety, utilities, revenue and taxation, local government finance, education, and the budget.*

Trent E. Smith *worked for over 12 years in the State Capitol prior to joining the Edelstein, Gilbert, Robson & Smith LLC. He started his career in 1990 working for the well-respected late Senate Republican Leader Ken Maddy. He was later awarded one of 16 positions in the prestigious Senate Fellowship Program. Upon completion, he started working in various positions in the State Assembly. He worked as a Chief of Staff to Assembly Member Tom Woods of Redding and later to Orange County Assembly Member, Patricia Bates, who served as Vice Chair of the Assembly Appropriations Committee. In this position, he gained a unique and valuable knowledge of the State budget and related fiscal policy matters. In addition, he has extensive experience in numerous policy areas.*

SACRS

FALL CONFERENCE 2023

PHOTO GALLERY

The SACRS Fall Conference took place November 7-10 at the beautiful Omni Rancho Las Palmas Resort and Spa in Rancho Mirage and included thought provoking keynotes, valuable training sessions, and intriguing breakout and concurrent sessions covering a variety of topics. Take a visual look back and relive the highlights of the unforgettable sessions, activities, and events.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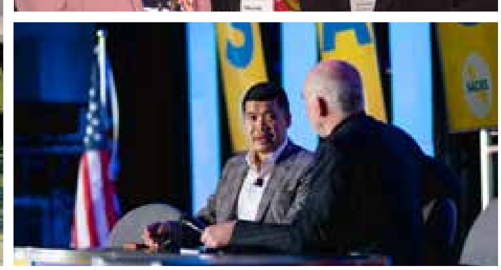


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START
FINISH
KEEP GOING


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SHORT TAKES

Conversations with Keynotes

SACRS Fall Conference 2023 featured an incredible lineup of insightful and inspirational speakers. If you missed the keynote presentations, here are a few highlights and key takeaways from these valuable sessions.

STEPHANIE MURPHY

> "I felt if we wanted to change Washington, we had to change the kinds of people we were sending there."
>
> *Stephanie Murphy*

The first Vietnamese American woman ever to be elected to the US House of Representatives, the **Honorable Stephanie Murphy** is known for being a pragmatic moderate with a significant bipartisan legislative record of achievement informed by prior experiences in strategy consulting, investment management, defense policy, and academia. Candid, insightful and infused with humor Stephanie inspired, informed, and entertained SACRS Fall Conference attendees with her authenticity, lived experience, and insider Washington stories. Drawing on her foreign policy, national security and global business experience, Stephanie spoke on a variety of topics of interest to the SACRS audience.

SACRS Magazine: Why do you feel so strongly about public service?

SM: My family was among the South Vietnamese refugees fleeing their country in small boats. When I was six months old, my family made their escape. My parents wanted a better life for their kids. They decided that searching for light was a better alternative to living in darkness, so they got into a boat and headed into international waters. We were fortunate that a US Navy ship found us because we had run out of fuel and food. When the Navy came toward our little boat, what they saw was an American flag. At that time, they were not allowed to pick us up, but they did provide us with enough fuel and food to make it to a Malaysian refugee camp.

As someone who is a refugee, an emigrant to this country, I feel an incredible sense of gratitude and debt. Everything that I have been able to achieve in this country is because I received the generosity of America. I was in Washington DC during 9/11. After that tragic time, I left my job and worked at the Department of Defense for four years. It was a privilege to work alongside American patriots. I admired their singular focus on the mission—keeping our country safe from those who sought her harm, while at the same time aware that businesses are desperate for immigrant labor. There is a deep need to reform our visa system.

I have always believed public service mattered.

SACRS Magazine: What made you, with no political experience, want to get into politics?

SM: Firstly, I am a patriot not politician. For me the call to public service happened again a decade later. By that time, I had moved to central Florida. I was the mother of two young children and working at a job I really enjoyed at an investment firm. The pivotal moment came for me on June 12, 2016. On that day the worst U.S. shooting spree, up to that time, occurred when 49 people died and another 53 were injured at an Orlando gay nightclub. It was an act of hate and terrorism.

Four days after the nightclub shooting, the incumbent accepted a check from the NRA. We were still mourning the loss. I felt if we wanted to change Washington, we had to change the kinds of people we were sending there. I launched a short, longshot campaign and unseated 12-term GOP incumbent, Rep. John Mica, the former chairman of the House Transportation and Infrastructure Committee. It was clear that the incumbent no longer reflected the values of my community.

After that four-month campaign, I became the first Vietnamese elected to Congress as the US representative for Florida's 7th congressional district and my life went in a completely different direction.

SACRS Magazine: As you say, you had little experience in politics. What was the transition like for you?

SM: The nightclub shooting in Orlando seemed like yet another preventable tragedy that might have been avoided if common sense and political courage were on greater display in our nation's capital. Extreme partisanship led to legislative gridlock. Communities across the country were paying the price, including my own.

When I came to Washington, I was worried about the polarization in our political system. Although deep divisions in American politics have existed since the dawn of our Republic, there was something in the atmosphere that felt especially poisonous. Too many Democratic and Republican leaders failed to treat one another with civility and decency. They were unwilling to express policy differences without making personal attacks or using irresponsible rhetoric.

I brought a ton of business experience and national security experience, but it took time for someone that looked like me to be effective. I believe Congress should represent the diversity of the people that they represent.

I brought a non-partisan party view to Washington. Every bill I looked at was from the perspective of the three Cs. Would it move the country forward? Does it benefit my constituents? Does it sit with my conscience. Finally, the bill had to have a pay-for. We are spending more on the past than we're spending on our future. I would not vote for anything that did not have a pay-for even if I liked the bill, I would vote against it. Not having a pay-for is causing crazy fights over discretionary spending.

SACRS Magazine: You built a reputation as a moderate pragmatist with a history of working across the aisle and consistently named one of the most effective and bipartisan members of Congress from 2017 to 2023. But you didn't seek a fourth term, how come?

SM: I am proud of the work I did across both sides of the aisle to address key issues ranging from trade to national security policy, but I don't believe anyone should spend a career in Washington. I recognize this is a very rare thing to do in Congress, but I still strongly believe in a citizen Congress, where ordinary citizens run for office in search of duty and service, not in search of a career. I never intended my time in Congress to become a career. I thought I could do my part to make things a little better, but I also know that I am not done with public service.

JONATHAN HSU

"Automation will make life easier for investment managers, like writing investment memos, or creating workflow items, but trust is where AI breaks."

Jonathan Hsu

Jonathan Hsu, Co-Founder and General Partner at data-driven venture firm Tribe Capital, joined SACRS Fall Conference attendees to share his thoughts on how machine learning can be integrated into the investment process and share his observations about AI (Artificial Intelligence). Prior to Tribe Capital, Jonathan was a partner at Social Capital, led the creation of analytics and data science at Facebook, and was a physicist earning his PhD and master's at Stanford University. The session was moderated by **Greg La Blanc** from the University of California, Berkeley Haas Business School.

SACRS Magazine: How does your background in data and analytics help Tribe Capital make investment decisions?

JH: When I joined Facebook, there were about five or six of us doing data science and analytics across the company, by the time I left to join Social Capital in 2014 we'd grown to a 150-person organization. My background is not in finance. Social Capital was my first step into venture. Tribe Capital focuses on recognizing and amplifying early-stage product market fit using a bunch of data science and analytics techniques to help us understand the early patterns like how customers interact with a product or with a business and then use that quantitatively based understanding to help us make better investment decisions. And – maybe more importantly – to benefit founders. Our mega dataset is incredibly valuable. We've had thousands and thousands of startups giving data to us. If you're an entrepreneur, the goal should be chat with Tribe, because they'll give you a differentiated viewpoint on your company. And you'll likely find it useful and helpful, because no one else is going to give you a viewpoint like this, maybe they'll invest, maybe they won't, but even if they don't, at least you get something valuable and interesting.

SACRS Magazine: Of all the times you apply the data framework to a seed-stage company, how many startups does Tribe decide to invest in?

JH: At Tribe we invest in about 12-15 a year. But as I said, even if we don't invest, we give value back to the entrepreneur so they can use the data to help grow and to help make good strategic decisions in order to get to the next level.

SACRS Magazine: How do you see AI getting into the investment arena? Will it take over?

JH: If something is bounded, you can create algorithms and math it into submission. Asset allocation is unbounded and doesn't lend itself to math. People, economy, etc. are not very simple. To only look at track records doesn't show the future. Math can only be a part of the answer. To me the broader question is: Why do some grow, and some don't. Unbounded makes it really interesting. Automation will make life easier for investment managers, like writing investment memos, or creating workflow items, but trust is where AI breaks. Humanity's lens is where the trust comes in. You need that human piece and that won't go away anytime soon.

WIL VANLOH

> "The world is grappling with climate change, resulting from CO_2 warming the atmosphere, but the problem is much bigger than simply eliminating fossil fuels."
>
> *Wil VanLoh*

Global energy markets are constantly evolving, and the industry is in the early innings of another major energy transition. This transition is one of the greatest challenges of the current era, as it is essential that humankind reduces carbon emissions to mitigate the impacts of climate change, while also ensuring access to affordable and reliable energy for economic development and overall quality of life around the world. SACRS attendees learned the latest on the energy horizon from **Wil VanLoh** Chief Executive Officer of Quantum Capital Group as he explored both the challenges and opportunities associated with the energy transition, while enabling energy security.

SACRS Magazine: Public demand for climate accountability continues to rise. In your opinion, what is the likelihood that we will meet the goal of transitioning to renewables and sustainable energy?

WV: Energy transitions take a long time and they have never replaced existing forms of energy on an absolute basis. We use more of all forms of energy today than ever before. A more appropriate term for energy transition is energy addition, however unlike prior transitions, today's energy addition is also an emissions transition. As a civilization, we now find ourselves at a critical juncture, grappling with the dual challenge of curbing humanity's impact on the environment, while concurrently meeting the ever-growing demand for affordable and reliable energy.

To meet global energy demands, the world is going to need a lot more energy with meaningful contribution from all sources. Global population will grow by more than 20% to 9.6 billion people by 2050, while the middle class will add more than 1.1 billion people. As people move from low income to middle income, their energy consumption increases by approximately 135%, and from middle income to high income by roughly another 225%.

Accessibility to energy drives the economy, prosperity, and human progress. Even as we have gone all out on wind and solar, we are only at 3% global market share. The states hardest on the fossil fuel industry are also hardest on wind and solar. The NIMBYs don't want solar or wind high-voltage lines going through their communities. We need to build more, but the question is where will the transmission lines go?

The world is grappling with climate change, resulting from CO_2 warming the atmosphere, but the problem is much bigger than simply eliminating fossil fuels. Increasing energy production by 50% and simultaneously decreasing global emissions to reach 2.0C or 1.5C by 2050 will require greater adoption of renewables with battery storage, responsibly sourced production with CCS, nuclear and material gains in energy efficiency.

SACRS Magazine: You noted concerns with energy security.

WV: How available? How affordable? How reliable? If you don't have these three, you don't have energy security. Europe decided to outsource to Russia a third of their energy needs and now it's being weaponized against them. There is a trade-off to this energy security. We are not able to have supply needs and security, without having to build. No one can get what they need without more natural gas lines, more wind, and solar. California has a lot of brown outs because they're not facing this. We've done all the easy stuff. Renewables are going to be much harder to do.

SACRS Magazine: Do you think Net Zero by 2050 is possible?

WV: The race to reach Net Zero by 2050 will require scaling existing climate technologies exponentially by 2030 to have any hope of hitting this goal. To scale, exponentially, green climate technologies will require massive quantities of minerals and metals, which will require the world to significantly increase mining, refining, and processing, and manufacturing capabilities to a scale and a speed never achieved before.

EVs require about five times more minerals and metals than internal combustion engine vehicles. No extractive industry has ever been able to increase global supply by 100% in a decade, much less the 300% to 1700% suggested for these various key inputs needed to achieve Net Zero. We could have in the US wind and solar in 15 to 20 years, if we really put minds to it. Energy legislation has done nothing about permitting reform. This is a linchpin issue. No one wants to tackle it. We still need carbon capture and storage and mass adoption. It is impossible to get a mine permit in US or Europe. We simply don't have the raw materials, instead we must rely on other countries. China alone controls refining capacity for 66% of cobalt, 39% of copper, 62% of lithium, 49% of nickel, and 87% of rare earth metals. Because the US has historically relied on China for manufacturing solar panels, wind, turbines, and Lithium-ion batteries, reshoring materials and manufacturing domestically will take years and add costs. The US will likely begin to reshore solar manufacturing, but will face substantially higher costs, and long plant build-out times.

Even under ambitious energy transition scenarios, the world will continue to need oil and natural gas, necessitating constant reinvestment to replace produced reserves. Coal made the industrial revolution possible. Today we still use more than ever before. We have never replaced it, it's impractical to think that's going to happen. We have massively under invested for humanity to function. To come close to Net Zero will take bipartisan support at the local and state levels and educating the public to begin to make difficult decisions to solve this very complex and large problem.

JASON MALINOWSKI AND MARK STEED

> "Our modeling revealed a counterintuitive insight: the highest volatility portfolio had the best probability of lowering contribution rates."
>
> *Mark Steed*

In the SACRS session *Innovative Concepts In Public Pension Plan Investment Portfolios*, **Jason Malinowski**, CFA, Chief Investment Officer of the Seattle City Employees' Retirement System and **Mark Steed**, Chief Investment Officer, Arizona Public Safety Personnel Retirement System shared frameworks and approaches their organizations use in portfolio management. The session was moderated by **Cary Hally**, Chief Investment Officer, San Antonio Fire & Police Pension Fund.

SACRS Magazine: Jason, during your session, you discussed how your team is organized and shared a few points of unconventional thinking that has given rise to innovative approaches.

JM: The Seattle City Employees' Retirement System (SCERS) governance includes a seven-member Board of Administration/Investment Committee made up of three City representatives, three member representatives, and one independent. We have a Board appointed Investment Advisory Committee of local, independent investment experts, plus a four-person investment team who, alongside consultant, recommend investment actions to the Board/Investment Committee for approval.

As for the unconventional thinking, we believe that portfolios should be more aware of the liabilities that they support, that down markets (like 2022) offer a silver lining and that cash is not "risk-free" for a plan with long-lived liabilities, because cash, and other short end-term assets introduce substantial reinvestment risk.

SACRS Magazine: The innovative framework SCERS uses highlights the positive relationship between liability and return investment strategy.

JM: The Liability-Aware Investing (LAI) framework is a broad framework that explicitly recognizes the linkage between plan, assets, and liabilities. It is tailored to investors, such as public pension funds, who discount their liabilities based on expected portfolio return. LAI incorporates funded status volatility, as a compliment to conventional asset return volatility. We believe LAI can revolutionize performance and risk assessment and improve investment strategy.

When we look at asset class attractiveness through a lens that changes from asset-only to liability-aware, we end up with a thumbs-up for equity (public and private), real estate, infrastructure, and long-term fixed income and a thumbs-down to cash, hedge funds, and commodities.

SACRS Magazine: Mark, at PSPRS, you use a decision tree to assess potential investments.

MS: Yes. The decision tree we use helps to identify the opportunities, so it's clear what the steps are. You can't have accountability if can't define success. We record and track everything, which leads us to exceptional reporting. We always start with defining what we mean by risk. How much volatility is acceptable?

Our modeling revealed a counterintuitive insight: the highest volatility portfolio had the best probability of lowering contribution rates. The highest expected volatility portfolio had a 25% chance of raising rates 2.5%, but a 25% chance of decreasing them 10%. Over 20 years, the likelihood of rising rates didn't materially increase with more risk. But higher return, higher volatility portfolios showed significant potential rate reductions. By modeling the whole chain from returns to actuarial income to contributions, we can select the optimal asset mix to stabilize rates. This probabilistic framework anchored the process in the tangible goal of contribution volatility reduction.

SACRS Magazine: You advocate to focus on plan objectives rather than asset class expectations.

MS: How it usually works is investment consultants provide updated return and risk forecasts for each asset class. They present some sample portfolios with minor tweaks, overweighting asset classes now expected to outperform. Then there may be a generic discussion about risk tolerance and time horizon, but little analysis on how the current or proposed portfolio aligns with specific plan goals and metrics.

Instead, there should be in-depth discussions on risk, clarifying that what matters most is volatility's impact on plan objectives and quantify an appropriate volatility level based on plan liabilities, cash flows and contribution rates. We should keep the focus on how the portfolio affects those key metrics rather than chasing asset class returns and stress test for scenarios that could undermine efficiency, such as changes in liabilities, cash flows or contributions.

We believe the standard approach lacks rigor. It relies on subjective concepts like risk appetite instead of quantifying tradeoffs. There is rarely a robust framework to evaluate if portfolios will achieve desired outcomes. The conversation centers on asset class expectations rather than plan objectives. As a result, strategic shifts only happen at the margins. There is significant room to improve asset allocation processes by focusing more directly on plan objectives.

JAMIL HASSANI

> "Unfortunately, it's not hard to trigger people's curiosity, to get them to click on links and cause trouble."
>
> *Jamil Hassani*

The eye-opening session *Cyber Attacks Are Evitable. Is Your System Or Firm Prepared?* was presented by **Jamil "Jimmy" Hassani**. Having dedicated 19 years of his professional career to the Federal Bureau of Investigation (FBI), Jimmy is currently in the FBI Sacramento Field Office leading a team that investigates cyber-enabled fraud, complex financial crimes, and healthcare fraud. SACRS attendees were riveted by Jimmy's real-world case examples and appreciated tips for becoming better protected in the digital age.

SACRS Magazine: What kinds of cyber scams are seen by the FBI on a regular basis?

JH: The top schemes include lottery, government imposter, business email compromise, confidence tricks, and tech-support ruses. Unfortunately, it's not hard to trigger people's curiosity, to get them to click on links and cause trouble. It can be as simple as being tricked by malware that disguises itself as a legitimate piece of software in the hopes that the victim will install it. A common one is tricking a user into thinking their computer is infected with viruses and then, while the computer is cleaning, a computer program called a keylogger is installed that records every keystroke made by a computer user to gain access to passwords and other confidential information.

Phishing is the most common threat. It usually starts with a fraudulent email or other communication that is designed to lure a victim. The message is made to look as though it comes from a trusted sender. If it fools the victim, he or she is coaxed into providing confidential information, often on a scam website.

SACRS Magazine: If someone were to become a victim of a scam, what is the best way to report it?

JH: The Internet Crime Complaint Center, or IC3, is the nation's central hub for reporting cybercrime. It's run by the FBI. We are the lead federal agency for investigating cybercrime. On our website, you can take steps to protect cyberspace and your own online security. It happens more often than you might think. For instance, in 2021 323,972 internet users reported falling victim to phishing attacks. China is responsible for 41% of the cyberattacks that are occurring. The FBI tracks down cyber criminals around the world.

SACRS Magazine: How can we be protected from these attacks? Do you have any tips?

JH: There are three things you can do. One: if you receive an unsolicited contact from someone trying to get you to do something, don't click on the links. And never send money to anyone, especially someone you have not met. Two: set up two-factor authentication. Fraudsters know your email so it's not secure, but they don't know how to get into your phone. It's easier to get at an android, but virtually impossible to hack an Apple iPhone. Lastly: it's so easy to trigger curiosity or panic. Your brain produces cortisol, and you go into high alert. Before you act, talk to someone not related to that problem, or call a colleague.

Our data is being sold every day. They are using it to figure out your behavior so they can hack you. Stay alert and fight for good security and privacy policies.

ROMI BHATIA, NADINE MENTOR WILLIAMS, AND VIVIAN GRAY

> "Prosper Africa is working to close the investment gap into Africa through developing and building relationships with the investment community and key decision makers in Africa."
>
> *Romi Bhatia*

In the enlightening session *Exploring Africa As An Investment Opportunity,* **Romi Bhatia**, **Nadine Mentor Williams**, and **Vivian Gray** provided an overview of the investment landscape in Africa and how US pension plans can benefit from investing in the Continent. Romi is Senior Finance and Investment Advisor for USAID's Africa Bureau and overseas the Prosper Africa Catalytic Investment Facility designed to accelerate investment flows between the US and the African continent. Nadine, who has over 20 years of experience as an investment banker, investor, and global champion for women, focuses on educating, facilitating, and supporting capital mobilization into Africa and other emerging markets. Vivian is a Trustee of Los Angeles CERA, and SACRS Immediate Past President.

SACRS Magazine: Nadine, what would people be surprised to learn about Africa?

NMW: There are a lot of myths about Africa. There is a lack of awareness. By 2040, Africa will have a workforce of 1.1 billion people, the largest in the world. In 2011 there were 19 million smart phones by 2028 there will be 689 million. By 2040 there will be 15 megacities (10M+). There are 345 companies with revenues over $1 billion. A $29 trillion economy is anticipated by 2050. The African Continental Free Trade Area (AfCFTA) signed by 54 of 55 states is the largest free trade area in the world by land area and population. There are amazing cities: Johannesburg, Nairobi, Cape Town, Lamu. There are distinct people, histories and women owned businesses.

Africa is home to the world's youngest and fastest growing population. The median age on the continent is 19 years old, whereas in US and China it's 38 and India is 28. By 2050 one in four (25%) people will be African. Africa is the most rapidly urbanizing continent on earth.

My focus is on investment side to look at Africa as an allocation.

SACRS Magazine: Romi, you have worked for the past 20 years in the international development and finance field with a focus on microfinance, small business development, and mobilizing private capital for development. What's your recommendation on how to explore investment opportunities?

RB: Be open to receiving education, take a delegate's trip and learn about Africa's investment landscape! Prosper Africa is working to close the investment gap into Africa through developing and building relationships with the investment community and key decision makers in Africa. One of our goals is to alleviate poverty and enable wealth creation as Africa's urban population triples. We want to transform the relationship with Africa from one of aid to one centered around investment among peer nations.

SACRS Magazine: Vivian, you recently had the opportunity to participate in a delegate trip. What were your impressions?

VG: Africa is amazing! When I was in Johannesburg, I thought to myself: is this New York or LA? The photos we so often see show Africa as a continent in poverty, they show deep disparity with children that have flies on their noses. It's not like that at all! Truly this is a place we can invest. There is risk insurance through US International Development Finance Corporation (DFC) or other Development Financial Institutions (DFIs) backed guarantees. We invest in China. We invest in Europe. We encourage you to invest in this continent. There are a lot of prospectuses you can look at.

The US Ambassador to South Africa was at the meeting. He encouraged us tremendously. I was surprised there was some insurance, however, that does not take away our need to do our due diligence and talk to other trustees.

SACRS Magazine: How can SACRS members learn more about investing in Africa?

RB: The US Government's Prosper Africa initiative is a great starting point, we can help US businesses and investors pursue promising trade and investment opportunities in Africa. We have a virtual deal room that allows enterprises, investors, and counterparties to engage with curated trade and investment opportunities between the US and Africa. We can help with investing hurtles and help transactions go through more smoothly. We can debunk myths about Africa, and we can be there on the ground to assist and help alleviate any concerns.

NMW: I would start by distinguishing between frontier versus emerging markets. There are some less developed markets. We can help align you and your objectives and facilitate introductions. Do your homework and we can provide information so you can inform your board and CIOs.

VG: As trustees, look at fund allocations. Board members need to think outside the box. It's all about return on investment. And who benefits? Our members! We need to look at emerging markets beyond China. What about Africa? What about South America? We need to look at re-allocations.

SPECIAL GUEST MODERATOR

KELLIE DEMARCO

Emmy-award-winning journalist **Kellie DeMarco** brought her nearly two decades as a news anchor – most recently at the NBC affiliate, KCRA in Sacramento – to the SACRS stage asking insightful questions and engaging the audience.

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