Wilshire

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Mr. Henry Jones
Chairman of the Investment Committee
California Public Employees' Retirement System
400 P Street, Suite 3492
Sacramento, CA 95814

Re: Consultant Review of Global Equity Program

Dear Mr. Jones:

Wilshire has conducted its comprehensive annual review of the CalPERS Global Equity (GE) Program. The program has continued to evolve over the past several years and is now keenly focused on a primary philosophy of efficiency and synergy. The GE team has a mandate to deliver the global equity market beta (as represented by the CalPERS Custom FTSE benchmark), plus a targeted excess return of approximately 15 basis points (bps) with a risk budget of 0 to 50 bps of tracking error annually. Despite a difficult 2014-2015 fiscal year where the GE portfolio trailed its benchmark by 31bps, the chart below in Exhibit 1, demonstrates that realized returns in recent years have exceeded the 15 bps relative return target (black line) while staying well within the allocated risk budget (blue line). This is in contrast to the elevated tracking error levels and significantly negative excess returns experienced during the global financial crisis.

Exhibit 1

Given the GE Program's tracking error mandate of 0 to 50 bps, 65% of assets under management (AUM) are managed within low tracking error (i.e. less than 50 basis points of TE), index-oriented strategies. The remaining 35% of the GE portfolio is allocated to traditional active, alternative beta, activist and emerging manager strategies with varying levels of tracking error or risk due to actively managing security or derivative exposure versus the benchmark, hereafter defined as "active risk." As summarized in the following table, nearly 85% of the portfolio is internally managed.

Managed	Index Oriented	Active: Traditional	Active: Alt Beta	Active: Activist	Active: Emerging Managers	Total
Internally	65%	8%	9%	0%	0%	83%
Externally	0%	10%	4%	2%	2%	17%
Total	65%	19%	13%	2%	2%	100%

As we noted last year, CalPERS operates the largest internally managed global equity program in the country; as of 2014, the top 200 U.S. defined benefit plans managed $405.2 billion[1] in equity assets internally of which the CalPERS GE Program represents 34%. The

[1]Pensions&Investments, February 9, 2015.

CalPERS Global Equity Program is a fully functioning asset management entity that manages a variety of active and index-oriented strategies. Few of the index-oriented strategies follow pure index-replication principles, but rather are enhanced by active decisions presented by market events such as corporate actions, rebalancing/trading views and other pricing anomalies. Many of these enhancements are similar to strategies employed by institutional index fund managers. Global Equity also manages, and is interested in expanding, structural advantage programs that include derivatives-based and other sophisticated strategies unique to an entity the size of CalPERS. Examples of these structural programs include synthetic lending, capturing illiquidity premia and volatility harvesting. Global equity also implements traditional active strategies that focus on factor positioning and alternative beta, (i.e. momentum, value, size and quality factors), and identification of managers with unique sources of expected alpha (skill) for use in the portfolio. All of these active programs and strategies are managed within the context of the 50 basis point tracking error limit, and currently represent approximately 15 – 20 basis points of predicted tracking error as estimated by the CalPERS internal risk system. Wilshire's analysis measures 14 bps of realized tracking error during fiscal year 2014-2015.

Vision and Organization

The Global Equity team oversees 46 strategies within the PERF (23 of which are internally managed) that are continuously evaluated to determine if they individually and collectively can be expected to add value on a long-term basis. The evaluation framework must satisfactorily answer three questions:

- Does the strategy holistically fit into the GE Program?
- What is the strategy's risk profile?
- How does the strategy fit into the fee philosophy?

This strategy justification process is endemic to the culture of the Global Equity team and permeates their mission and philosophy. The team actively reduces or eliminates exposure to strategies that cannot be justified according to this framework. We view the ongoing rationalization of strategies to be a very positive contributor to maintaining a disciplined holistic investment program.

As we discussed in last year's review, there are two primary committees that comprise the due diligence apparatus within Global Equity: the Investment Review Committee (IRC) and the Global Equity Capital Allocation Committee (GECAC). A more complete discussion of these committees and their functional processes may be found in the Appendix.

Due Diligence and Risk Management

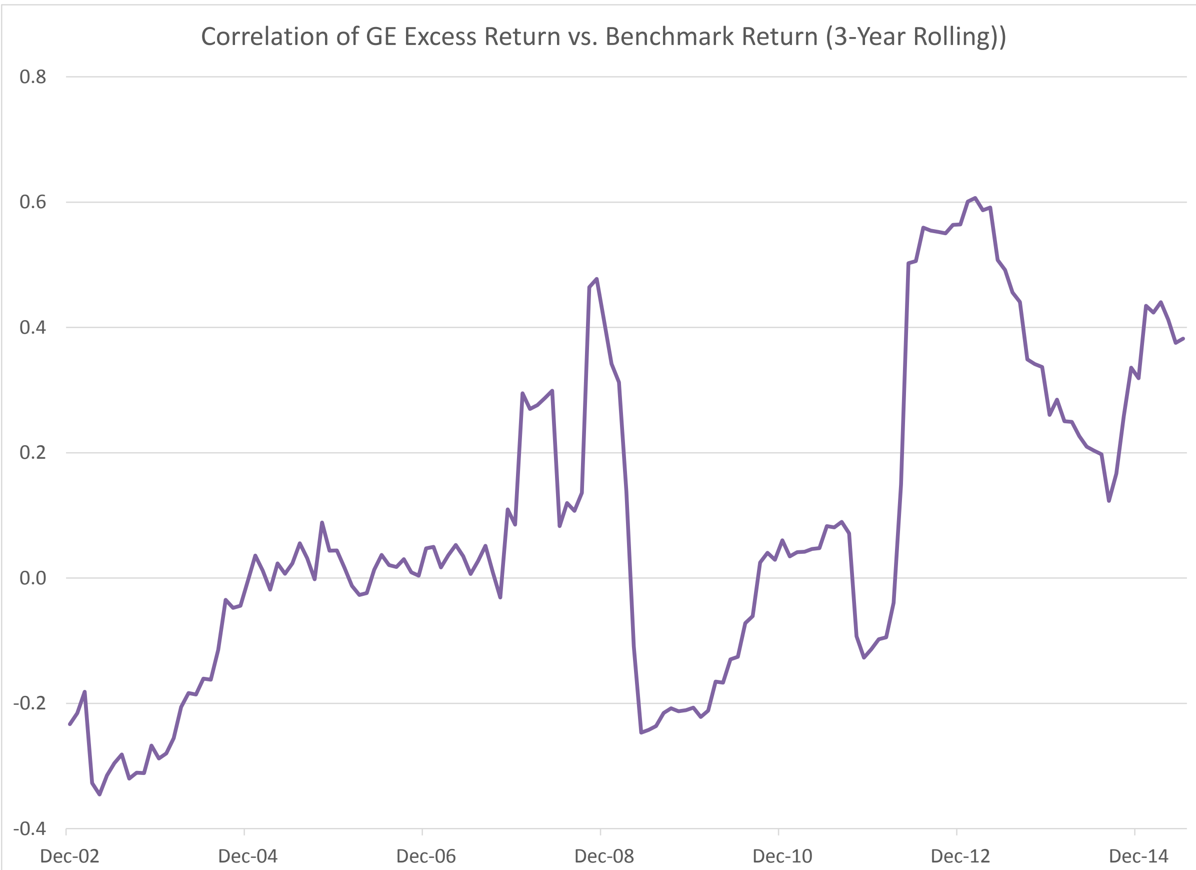
The depth of due diligence and attention to risk is very apparent and sufficiently rigorous in all levels of decision making and is designed to prevent attachment to any single strategy or firm. During last year's review we identified one potential area of improvement that the team was looking to address regarding the underlying process for considering the termination of managers and/or strategies. A "traffic light" system of green, yellow, red has been developed to monitor managers using both a qualitative and quantitative assessment process. This rating system provides a quarterly view and enhances the ongoing rationalization process of managers and strategies.

The risk reporting process for Global Equity regularly evolves and provides a meaningful feedback loop at the factor, strategy, manager and total portfolio levels. The reports are utilized throughout the due diligence and research process, allowing Staff to leverage the reports' informational value throughout the Global Equity program. The team's continued expansion of its risk reporting package and commitment to building on these capabilities is impressive.

In support of the ongoing effort to streamline the portfolio, the Global Equity team is continuing to graduate emerging managers in 2015. In its review of emerging managers, staff is consistent in its deployment of the rigorous process noted above when determining which managers should transition to a more significant role within the portfolio. The "traffic light" monitoring and evaluation tool described above, along with the strategy justification process conducted through the IRC, ensures that every strategy has earned its role within the portfolio. Additionally, with the change earlier this year to expand the universe for the focus list portfolio to all stocks managed by the Global Equity fund, current activist manager strategies are being evaluated in recognition of the considerable resources and experience of the CalPERS internal Global Governance team. It should be noted that the external activist managers bring specialized expertise in company turnaround events that may not exist within the Global Governance team and have previously been used as a source of ideas for the focus list. However, these managers have also been responsible for enhancing return volatility/active risk relative to the benchmark and typically charge higher management fees than traditional active strategies.

As risk management research and reporting has become a more integrated component of the portfolio management process, the experience gained from the 2008 market environment has highlighted the importance of down-side risk protection for the Global Equity portfolio and how volatility contributes to the overall risk profile of the PERF. Albeit at the margins, the portfolio is making greater use of low-volatility and other alternative weighting strategies in an effort to change the risk profile of the program. The licensing of intellectual capital from investment management firms and other strategic partners is a cost-effective way to employ these quantitative strategies without paying additional fees for implementation and capitalizing on the unique skills and capacity of the Global Equity investment team. However, the greater use of factor tilts (i.e. alternative beta) within the program's active risk budget has the potential of carrying increased correlation to the general return pattern of global equity markets, thus possibly contributing to negative returns during market sell-offs. Alternative Beta is defined as a deviation (or tilting) of factor weights relative to a market capitalization weighted index. The excess return profile of the GE Program is, intentionally, heavily influenced by the active decision to weight these betas (i.e. systematic factors) differently than the benchmark. Exhibit 2, below, provides a historical view of the relationship between the GE portfolio's excess returns versus the returns of its policy benchmark.

Exhibit 2



By design, there is a limited amount of risk reduction that is achievable with the Statement of Investment Policy for Global Equity dictating a target range of 0-50 basis points of relative risk (tracking error). Any further significant risk reduction would require a material deviation from the characteristics of the market cap weighted Global Equity benchmark. Since Global Equity is the largest single contributor to total fund volatility, Wilshire believes that any sizeable reduction in the total volatility associated with the asset class will require a review of its strategic role in the CalPERS portfolio. As the Board of Administration evaluates a risk mitigation strategy longer term, staff is conducting research into more risk-efficient ways to invest the Global Equity portfolio, but meaningful changes are not possible with the current tracking error range and a capitalization weighted benchmark.

Portfolio Implementation

The Portfolio Implementation function is primarily responsible for portfolio trading including rebalancing and transition management. As referenced above, the Global Equity program has been moving more and more strategies away from external managers to internally managed portfolios by licensing intellectual capital. It is important to note that it is the implementation team that serves as the infrastructure for managing these assets. While the Global Equity team has made significant investments in sophisticated, customized trading systems in the past two years which allow traders to implement internal strategies in combination with best execution trading practices, at present, the transition management and equitization functions are not part of this customized trading capability. The Portfolio Implementation team hopes to build from the efficiency gains realized by the successful implementation of the ARTEMIS platform for the Affiliate Funds (more on this to follow in the Affiliated Investment Program section below).

Implementation of an expanded trading capability should also serve to increase capacity for the Global Equity program to continue to migrate investment strategies that can be managed in-house more cost effectively. However, since all internally managed strategies (even those with index-like returns) carry implementation and operational risk, it is important for CalPERS to continue to invest in technology and human capital in order to properly support program implementation through its growth in internally managed strategies. During this past fiscal year, the Global Equity team completed two significant technology projects – PM2 and ARTEMIS – that significantly improved the level of automation within the Global Equity program. As more cross-program investment strategies are implemented, the CIO and COIO teams will require additional resources and technology investment to effectively manage the enhanced complexity. If the IC continues to support the strategic direction being implemented by INVO, then budgetary resources should be made available now to invest in expanded trading platforms.

As the IC has recently been made aware, INVO recognizes the need to centralize certain operational and trading functions occurring within various programs. Trading that occurs within liquid markets, securities with narrow bid/ask spreads, exchange-traded and cleared securities, and trades with shorter settlement periods have been identified as candidates for this centralized platform. This Execution Services platform will physically reside between the Global Fixed Income and Global Equity platforms and will be supervised by the COIO. The Senior Portfolio Manager from GE, who is responsible for implementation, is expected to manage this functional effort. The Execution Services initiative, continued expansion of internally managed assets, and complexity of the investment management processes require continued attention and investment to manage the risk that the GE program does not outpace the capabilities of the current technology infrastructure.

Affiliated Investment Program

The Affiliated Investment Program (AIP), operates within the Global Equity program. The team has recently completed asset allocation reviews for the CERBT, JRS, JRS II, LRS and LTC. Impressively, the team has also overseen the successful specification, development and implementation of a customized solution for trading across the various portfolios that support the individual product line-ups in each of the Affiliate Funds. The ARTEMIS trading platform was implemented on time and within budget and has eliminated the manual trading processes that hampered productivity of staff. This new system has freed up sufficient time for staff to be more strategic in managing the program and will serve as a model for an expanded roll-out throughout the Global Equity Portfolio Implementation process. All members of staff involved in this effort should be commended for their contributions to this very successful and scalable system deployment.

Other accomplishments include, the transition of the Supplemental Income Plans and Healthcare plans to SSGA for the allocations to equities and REITs. The Legislators' Retirement System (LRS), Judges Retirement System (JRS) and JRS II continue to purchase units in PERF portfolios. Staff also terminated the Peace Officers' & Firefighters' fund (POFF) as directed by legislation and participated in the Treasury Management project.

Sustainable Investment

Global Equity staff have developed Sustainable Investment Practice Guidelines to direct investment activities that support Investment Beliefs #2, #4, #7 and #9. These Guidelines support the wider efforts of the Sustainable Investments Committee that is comprised of staff from each INVO Program area.

The Guidelines, which are drawn from the United Nations Principles for Responsible Investments (UNPRI) and Global Governance Principles, provide a framework for understanding the potential risks and investment opportunities presented by Environmental, Social, and Governance (ESG) criteria. Importantly, the Guidelines assist staff in the attribution of currently identified factors to future investment performance through issue prioritization, screening and the execution of engagement decisions for internally managed strategies and for selection and monitoring purposes for external managers. Staff continues to make enhancements to this framework while being vigilant of the role of Global Equity within the total fund by carefully balancing industry forecasted return and risk assumptions for ESG with practical implementation that reflects current market conditions.

Investment Beliefs

It is evident from interviews with Global Equity Staff that the adoption of the CalPERS' Investment Beliefs is widespread. This year's review notes even greater maturity in their incorporation into the investment process. The focus on efficiency and strategy justification reflects an awareness of the risk/reward relationship, the multi-faceted nature of risk and the impact of costs on the ultimate performance of the PERF. The strategic goals of the Global Equity program also recognize the long-term horizon of the investment portfolio and a responsibility to manage the portfolio to achieve the PERF's investment objectives and ensure sustainability.

Conclusion

The CalPERS Global Equity Program has provided consistent outperformance versus its benchmark over the past three years while continuing to improve the overall risk profile of the portfolio. Last year's underperformance of 0.31% is largely attributable to external activist managers. The program is supported by a team and resources that are united in the common goal of streamlining the global investment portfolio by reducing the number of strategies and pursuing a fee philosophy that is aligned with CalPERS' Investment Beliefs. The Global Equity Program continues to add value to the PERF. CalPERS should continue to invest in technology to support the growing responsibilities of a large internal asset management program. Global Equity fosters a creative investment environment with a strong focus on risk management not only for the equity portfolio but with a focus on how the equity portfolio can be managed to help achieve the shared long-term goals of CalPERS.

Sincerely,

Organization (0-100)

SCORE: 71	COMMENTS:
Ownership/Incentives (0-30) Direct Ownership/Phantom Stock Profit Sharing Performance Bonus Depth of Incentives Score: 10	Compensation is salary plus incentive-based bonus. No profit sharing, phantom stock or direct ownership is available, in contrast to most private sector investment managers. As INVO looks to create a holistic investment environment across Programs, a greater portion of incentive-based compensation should be aligned with the success of the Total Fund.
Team (0-25) Communication Role of Manager, Research, and Operations Longevity of Team Score: 23	Management of team is aligned with CalPERS' mission and philosophy. The team has made great strides in risk reporting and integrating a risk focus into the management process. The IRC and GECAC promote information sharing across functional areas and create a positive, productive, and disciplined environment for research.
Quality of Key Professionals (0-15) Experience Quality of Leadership Quality of Education Score: 15	Managing Investment Director (MID) exhibits strong leadership skills and commitment to improving team and organization. Education and experience level of the investment and trading staff is strong and compares well to external investment management organizations. The team appears to work well together and promotes a culture of creativity and respect.
Turnover of Senior Professionals (0-15) Low (<10%), Medium (<20%), High (>20%) Score: 8	Staff turnover for CalPERS has been fairly stable over the past two years. There are currently 6 open positions. However, the senior management team is strong and stable. The MID operates a "One Team, One Mission" culture which has created a cohesive culture and further streamlined the management structure of the program. The increased focus on structural advantage programs, alternative beta and traditional active strategies will require stability and experienced resources for this team. Additionally, continued investment in technology to support experienced investment professionals will be needed to ensure the ongoing success of the program. The hiring process continues to be cumbersome and time-consuming.

Commitment to Improvement (0-15)
Clear Mission
Re-investment
Process Enhance

Score: 15

The MID, Investment Directors, Investment Managers all demonstrate a commitment to reducing complexity and justification of strategies. This strategy awareness is pervasive through the culture and positive to the forward momentum currently present in the overall management process.

Philosophy/Process (0-100)

SCORE: 97

COMMENTS:

Market Anomaly/Inefficiency (0-40)
Permanent or Temporary
Clear Identification
Where and How Add Value
Empirical or Academic Evidence to Support

Score: 40

The Global Equity portfolio strategy is to deliver a global market return plus approximately 15 basis points given a 0 to 50 basis point risk budget. The IRC's role in assessing strategy eligibility and the GECAC's risk-controlled approach to allocating capital across strategies ensures an appropriate pursuit of investment objectives.

Information (0-15)
Unique Sources, Unique Process

Score: 15

Highest score given as these are generally index-oriented portfolios that have met or exceeded their mandates. The IRC's focus on assessing eligible strategies for their potential to deliver unique value to the total fund provides the opportunity to identify informational advantages. Future internally-managed strategies that seek to exploit inefficiencies or information advantage may receive a different score.

Buy/Sell Discipline (0-15)
Disciplined/Structured Process
Quantitative and Qualitative Inputs

Score: 13

High score given as many of the internally managed strategies are generally index-oriented portfolios that have met their mandates. The interaction between the IRC and GECAC bolsters discipline at the strategy level. Future internally-managed active strategies that seek to exploit inefficiencies or information advantage may receive a different score. The sell discipline led to the reduction of manager relationships within a more streamlined program.

Portfolio Construction (0-15)
Benchmark Orientation
Risk Controls
Ongoing Monitoring

Score: 15

Highest score given as these are generally index-oriented portfolios that have met or exceeded their mandates. The GECAC's access to a rich set of risk reports enables adherence to desired risk levels and position sizing. The process is designed to minimize the impact of unintended exposures.

Quality Control (0-15)
- Return Dispersion
- Performance Attribution
- Performance Consistency
- Style Drift

Score: 14

Tracking error on all portfolios is reviewed monthly, and discretion is given to Staff to add modest amounts of value only if clear skill is demonstrated. Portfolios managed as pure index funds have had almost no tracking error. Expansion of additional active strategies requires more investment of staff and technology for Portfolio Implementation team.

Resources (0-100)

SCORE: 92

COMMENTS:

Research (Alpha Generation) (0-40)
- Appropriate for Product Style
- Conducted Internally/Externally
- Quantitative/Qualitative
- Sufficient Databases and Models for Research
- How are Research Capabilities Enhanced

Score: 40

These are largely index-oriented portfolios, and Staff receives all data feeds that are required to maintain them in line with published indices. Small amounts of value may be added through the utilization of additional quantitative information from several investment banks. Licensing of intellectual capital is a productive and creative use of resources to supplement research efforts.

Information/Systems Management (0-15)
- Ability to Manage Large Flows of Data
- Appropriate Systems for Research and Management

Score: 13

The organization has recognized the importance of data integrity and has changed the relationship with the custodian to improve data. In addition, improvements to the portfolio construction and trading systems have been implemented, though not all anticipated efficiency gains have been realized from the recent enhancements to the trading platform. The PM2 system implementation did not include functionality for transition and equitization. Staff plans to use the ARTEMIS platform to address remaining functionality. ARTEMIS was successfully implemented by the team overseeing Affiliate Funds which will serve as a model for PERF.

Marketing/Administration/Client Service (0-15)
- Dedicated and Knowledgeable Group
- Quality of Materials/Presentations of RFPs
- Responsiveness
- Measuring Client Satisfaction

Score: 14

Since marketing and client service are not involved, unlike external sources for such a strategy, full resources of portfolio managers will be devoted to CalPERS, as the portfolio managers will not have to travel to service other clients or market to prospects. End client (Investment Committee) has regular meetings that usually require MID and some ID attendance, but team is able to continue to operate in their absence.

Trading (0-30)
- Turnover Relative to Process
- Sophistication of Trading Process
- Measurement of Trading Costs
- Soft Dollars in Client Interest

Affiliate Funds Score: 30

PERF Score: 25

Total Score: 25

CalPERS' trading room is very sophisticated, was constructed in recent years, and has subscriptions to all of the requisite trading data resources, i.e. Bloomberg, Instinet, ITG, WM, etc. Part of the underpinning of the value-added strategies resides in effective trading, and there have been few significant trading issues that should impact the execution of the strategy. Though there is sufficient back-up and separation of responsibilities in the trading function, it should be noted that the extensive use of internal implementation makes it critical to keep this area well-resourced going forward. The implementation of the ARTEMIS System for the Affiliate Funds has created scale and efficiency across the platform. Future implementation by PERF of the ARTEMIS System would fortify current processes for transition and equitization. Staff uses at least two systems for monitoring transaction costs, and scores well under both systems. CalPERS does not use soft dollars. Staff has developed a process for the broker selection process. The process is merit-based but sufficiently transparent to prevent the network from being dominated by large, established firms. The broker list has been narrowed to 25 firms and each firm offers an information network that is additive to the portfolio implementation team and is reviewed periodically for both efficiency of execution, quality of information and fees.

Discussion

Wilshire Scores 2009-2015

	2015	2014	2013	2012	2011	2010	2009
Organization	71	70	66	64	62	57	55
Philsophy/Process	97	97	100	100	100	100	100
Resources	92	93	92	92	91	91	89
Total Points	260	260	258	256	253	248	244
Total Percent	87%	87%	86%	85%	84%	83%	81%

Wilshire gives the Global Equity Program a score of 260 out of 300 possible points or 87%. This score has steadily improved over the past several years and is the same as last year's score. The scores show a steady improvement over seven years in the organization category. The team has received a lower score for quality control and portfolio implementation to reflect that the team requires additional resources to complete the buildout of the trading platform in order to support the additional operational risk that comes with managing the portfolio more actively. Organizational issues are improving but will continue to be a drag on scoring due to the constraints on compensation and the management of human capital. The Global Equity Program has created a strong culture that emphasizes a "team" approach that builds on individual skills to achieve shared investment goals and objectives.

Appendix

Global Equity Capital Allocation Committee and Investment Review Committee

The Global Equity investment program is organized by three functional areas that are integrated by populating two decision-making committees with members of each functional area. These committees – the Investment Review Committee (IRC) and the Global Equity Capital Allocation Committee (GECAC) - also contain members from outside of Global Equity and serve to provide an external viewpoint into the process and communicate the outcome of committee meetings to their particular program Managing Investment Directors. A potentially positive byproduct of this integration is the creation of additional communication channels that can move the decision focus from a Global Equity-only orientation to a more total fund perspective that can benefit CalPERS as a whole.

Because of their importance to the overall global equity program, below we review each functional area separately. However, it should be noted that while we review the roles of the IRC and GECAC within a particular functional area, in practice they operate across functional lines.

Portfolio Evolution and Strategy Analysis

The Portfolio Evolution and Strategy Analysis function is responsible for due diligence of investment strategies and monitoring of all current external and internal allocations. This area is the primary research function of the Global Equity program. As the program has moved more strategies into the internal management process the team is seeking to capitalize on the scale and resources of the program by licensing intellectual capital from outside advisors and bringing the implementation of these strategies in house in order to be managed less expensively. While strategy ideas can come from anywhere within the organization, it is through the IRC where strategies are assessed for eligibility for inclusion within the portfolio. To be eligible, the IRC looks for strategies that bring some form of unique value to the portfolio, such as intellectual capital or unique exposures. The team has cultivated important strategic relationships to bolster internal research and continues to seek relationships that can enhance the depth and experience of the team.

Portfolio Structuring and Strategy Development

The Portfolio Structuring and Strategy Development function focuses on portfolio construction by allocating to strategies approved by the Global Equity Capital Allocation Committee and on monitoring risk factors underlying the individual allocations and the total equity portfolio in aggregate. The interaction between the IRC, which is responsible for assessing strategy eligibility, and the GECAC, which determines strategy inclusion and sizing, imposes an important discipline into the investment program that helps protect the portfolio from growing overly attached to a strategy that is not adding value to the overall program. This function is also responsible for portfolio analysis and attribution which includes a risk monitoring dashboard that highlights active tilts and contributions to risk by individual factors identified by multiple risk management systems and customized to highlight key drivers of risk and return.

Portfolio Implementation

As discussed within the Portfolio Implementation section of this letter.