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 annual review of the CalPERS Global Equity (GE) Program. In addition to implementing and managing the PERF's global equity allocation, the GE Program encompasses management of the Affiliate Investment Programs as well as the recently established Execution Services & Strategy (ESS) cross-asset class function. Our review included a combination of onsite meetings and phone discussions with key members of the global equity investment team. The comprehensive due diligence agenda covered a variety of critical functional areas including:

- Overview of GE organizational structure and governance model
- Investment strategy search process
- Portfolio opportunities and research
- Strategy analysis
- Risk and portfolio positioning
- Model development and provision
- Portfolio construction
- Affiliate Investment Programs funds and allocation management
- Execution Services & Strategy (ESS) and Trading
- Environmental, Social and Governance (ESG) integration

Overview

Wilshire believes that the Global Equity Program continues to meet its objectives of providing low cost global equity beta and plays the role of providing strategic exposure to global growth and the equity risk premium. Staff has also managed to add modest excess returns over both short and medium-term periods while adhering to a tight risk budget.

While the Global Equity Program is successfully implementing its strategic role in the CalPERS portfolio, Wilshire believes that the Investment Committee should continue to contemplate the future strategic role of the program as the PERF's characteristics (funded status, cash flow, overall risk tolerance) evolve. The continued discussions regarding Portfolio Priorities and leading up to the 2017 Asset Liability Workshop are significant and could meaningfully affect how CalPERS implements its global equity approach.

Affiliate Investment Programs

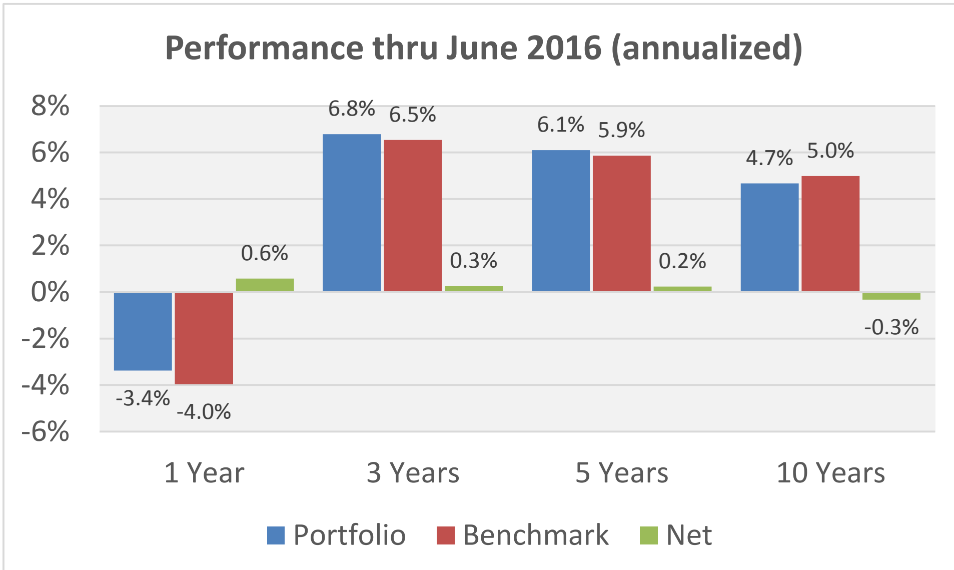
While the remaining sections of this letter focus on the GE Program's role within the PERF, our review included coverage of the Affiliated Investment Programs (AIP). As noted above, the AIP functionally operates within Global Equity even though asset classes covered as part of the investment program include global equities, fixed income, and real assets with aggregate assets exceeding $10 billion. The largest asset pools include the California Employees' Retiree Benefit Trust ($5.1 billion) and the Public Employees' Long-Term Care Fund ($4.3 billion) which is health care related. The responsibilities also include the supervision of the two Defined Contribution plans with close to $1.4 billion in participant assets.

Projects in the past year included an asset allocation study for the Health Care Fund and an Investment Policy review was completed for all of the AIPs. Additionally, Staff prepared and delivered the annual legislature report. With the AIP integrated within Global Equity there is an ability to lever insights and experiences between teams. For example, recent activities included a risk and attribution review with the Investment Strategy group. The AIPs are also involved in the continued expansion of the Artemis trading system. With an additional investment officer added to the team, AIP has several business initiatives outlined for the 2016-2017 fiscal year including system related expansions, asset allocation updates for the Defined Contribution plans as well as further integration and increased participation in the broader INVO roadmap initiatives.

Global Equity Portfolio Objectives and Performance

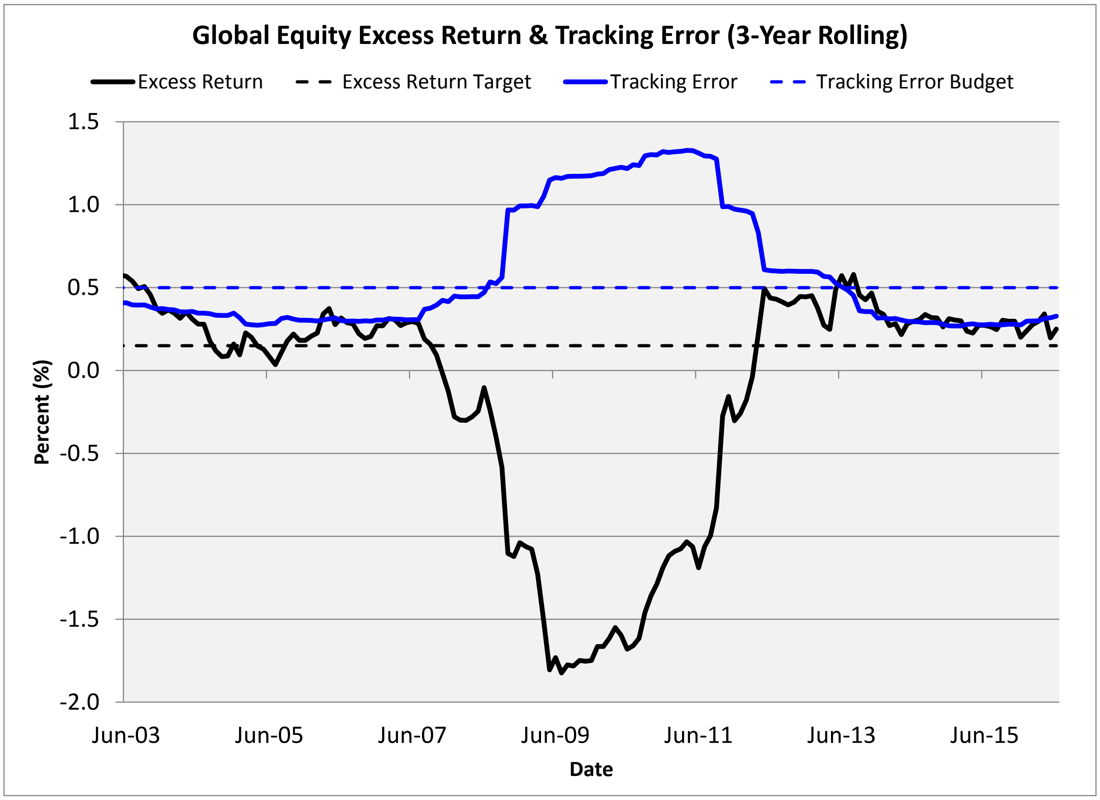
The GE team has a mandate to deliver the global equity market beta (as represented by the CalPERS Custom FTSE benchmark), plus a targeted excess return of 15 basis points (bps) with a risk budget of 0 to 50 bps of tracking error annually. Despite a difficult global market environment in the 2015-2016 fiscal year where the GE benchmark was down -4.0%, the GE portfolio delivered a positive excess return of 0.6% versus its benchmark. As the chart below demonstrates, the GE program has also exceeded its 15 bps excess return target over the past three and five years; by delivering excess returns of 0.3% and 0.2% annualized, respectively. However, the GE portfolio has not kept pace with its benchmark over the trailing ten-year period.

Exhibit 1



The three-year rolling realized excess return and tracking error figures provided in Exhibit 2 demonstrate that realized returns in recent years have consistently 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, which continue to contribute to the disappointing ten year results.

Exhibit 2



Strategy Allocation and Portfolio Structuring

As we've noted in recent years, the GE portfolio continues to evolve and has created a strategy search, research and allocation process that strives for overall program efficiency. Strategy rationalization is an important part of the GE team's philosophy and is borne out through the Program's reduction in strategy count over recent years. Given the GE Program's tracking error mandate of 0 to 50 bps, nearly 60% 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 40% 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. As summarized in the following table, nearly 80% of the portfolio is internally managed.

Exhibit 3: Strategy Allocation (as of June 2016)

		Active				
Managed	Index Oriented	Traditional	Alt Beta	Activist	Emerging Managers	Total
Internally	58.7%	8.1%	11.1%	0.0%	0.0%	77.9%
Externally	0.0%	16.4%	3.4%	0.5%	1.7%	22.1%
Total	58.7%	24.5%	14.5%	0.5%	1.7%	100.0%

As can be seen in Exhibit 4 below, portfolio strategy allocations have seen a recent shift into structured, alternative beta and traditional active strategies, which have been funded in part through the reduction of index oriented strategies and a de-emphasis of activist strategies. In aggregate, these shifts are consistent with the Program's objective of managing costs and pursuing structured risks with positive expected payoffs.

Exhibit 4: Strategy Allocation Shifts vs. June 2015

Managed	Index Oriented	Active: Traditional	Active: Alt Beta	Active: Activist	Active: Emerging Managers	Total
Internally	-6.7%	-0.3%	2.1%	0.0%	0.0%	-4.8%
Externally	0.0%	2.4%	2.8%	-1.1%	0.8%	4.8%
Total	-6.7%	2.1%	4.9%	-1.1%	0.8%	0.0%

The remainder of this report provides Wilshire thoughts, "scoring," and rationale on the Global Equity Program. Please note that Wilshire has updated our scoring format for both the Global Equity Program and the Global Fixed Income Programs as our thoughts on how to best evaluate asset managers continues to evolve.

Scoring

Wilshire rates the GE Program highly, ranking the overall Program in the third decile of other similar asset managers. Significant positives include quality of investment team, commitment to improvement and strong risk budgeting controls within the portfolio construction process, while the lack of equity ownership is a significant detractor versus peers in the asset management industry.

CalPERS Global Equity		Tier
Total Qualitative Score		**3rd**

	Wt.	Tier
Organization	**20%**	**4th**
FIRM	***50%***	**6th**
Quality and Stability of Senior Management		
Quality of Organization		
Ownership/Incentives		
TEAM	***50%***	**3rd**
Stability of Investment Professionals		
Quality of Team		
Commitment to Improvement		
Information Gathering	**20%**	**3rd**
Information Resources		
Depth of Information		
Breadth of Information		
Forecasting	**20%**	**3rd**
Clear & Intuitive Forecasting Approach		
Repeatable Process		
Strength, Clarity, and Intuitiveness of Valuation Methodology		
Forecasting Success		
Unique Forecasting Approach		
Portfolio Construction	**20%**	**2nd**
Risk Budgeting/Control		
Defined Buy/Sell Discipline		
Consistency of Portfolio Characteristics		
Implementation	**10%**	**3rd**
Resources		
Liquidity		
Compliance/Trading/Monitoring		
Attribution	**10%**	**2nd**
Depth of Attribution		
Integration of Attribution		

Tiers are based on a decile distribution with 1st Tier representing the highest score and 10th Tier the lowest score.

Organization - Firm

CalPERS does face some unique organizational risks that for-profit enterprises have greater flexibility in managing. There is a lack of long-term "ownership" which is typically seen at private sector investment organizations such as through phantom stock, direct ownership and other incentive-based compensation packages that serve as significant retention incentives. This exposes the organization to the increased risk of losing intellectual capital both at the Investment Office Senior Staff level and the senior management level within Global Equity. Ensuring that CalPERS as an organization has the tools necessary to recruit and retain qualified, diverse candidates should be a strong focus in line with Investment Belief #10 - Resources and Process. Of note, continued work regarding incentive compensation structures has increased the discretion around target ranges which can be used as an effective management tool to help differentiate between top performers and others within the senior management of the Investment Office and Global Equity team. This would provide additional support in the retention of a high quality senior management team, but would also be valuable to recruitment for open positions.

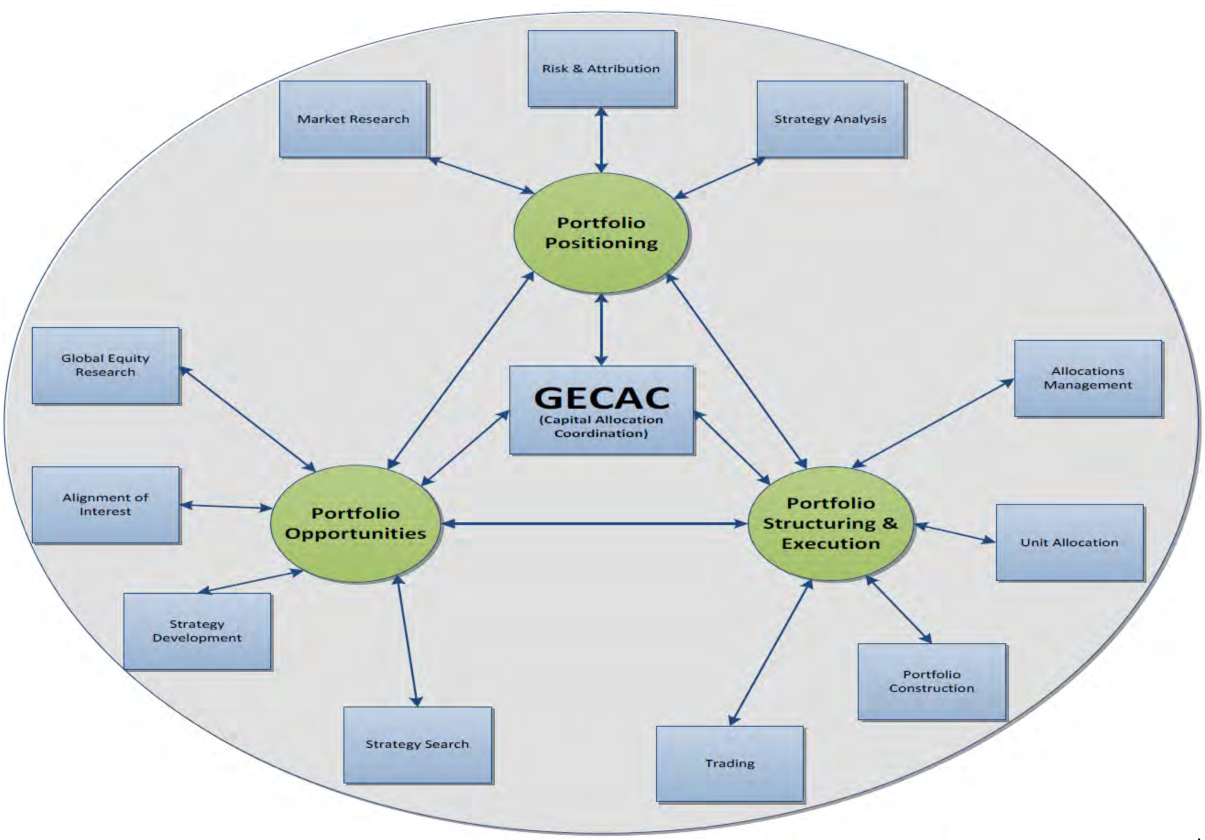
Organization - Team

The broad team structure has been consistent but there has been some senior investment team turnover at the IM and IO level including two internal transfers to Private Equity. Investment team turnover continues to be a long-term concern, especially as the employment market continues to tighten and the compensation packages offered to private sector employees become increasingly competitive. Turnover can be and is mitigated with a positive and intellectually challenging work environment and a strong sense of mission, which has allowed CalPERS to attract qualified investors. Senior management is clearly cognizant of this competitive employment landscape and Global Equity very much has a team-based structure, such that each person, including the MID, has multiple potential back-ups. Senior management also acknowledges that people are critical, and are what allow the GE team to effectuate their business. There is a strong focus on the team structure, which helps in mitigating "key person risk."

Part of the turnover in the Global Equity team has been due to members moving into positions within other INVO groups (specifically Private Equity). This cross fertilization is a benefit for the organization as a whole and allows for the retention of the institutional memory of the individuals that were members of the Global Equity team. Senior management within Global Equity is also involved in strategic discussions with other Investment Divisions and provides support and insights during asset allocation related activities which are an important project for the broader investment organization. We specifically note the significant contributions to the "Portfolio Priorities" project as one such example of the GE teams' commitment to critical fund level initiatives. These cross investment division discussions aid in the solidification of such research on the role of Global Equity within the broader investment portfolio and provide additional perspectives on the appropriateness of inclusion of new investment strategies within the Global Equity portfolio.

Even though Global Equity continues to experience turnover, excluding the internal transfers the turnover has been in line with industry averages in the past year leading to a slightly higher score. While the Global Equity team continues to look for outstanding candidates for new and open positions, compensation bands can constrain its ability to attract candidates especially with competition from both local asset management and asset owner organizations. There are currently several open positions at the IM and IO levels, which play an important role in supporting the senior team and will be crucial in maintaining the quality of personnel over the long term.

Although the broad team structure has been consistent, the decision making process for the positioning of the Global Equity portfolio that was structured through the Global Equity Capital Allocation Committee (GECAC) and the Investment Review Committee (IRC) was enhanced in the past year with three additional sub committees. The three sub committees are specifically focused on portfolio positioning, portfolio opportunities and portfolio structuring & execution. Although the functioning of these sub committees, including the composition of the committees and specific governance structure are still in their earlier development phase, the new sub-committees allow for better cross-team collaboration and additional and potentially diverse views on the quality of strategies that are under consideration by the GECAC. A focus area for the upcoming year that would improve the process would consist of the development of an enhanced governance structure that would for example outline membership, specific recommendations, voting procedures and even the impact of a potential negative recommendation or veto on strategies proposed.



At this point in the portfolio's evolution, the MID and IDs foresee the introduction of several new portfolios to the Global Equity platform. The two externally provided model portfolios, that will be managed internally, include an empirical research and emerging market equity strategy. Following the implementation of the US quality factor model portfolio, Global Equity aims to extend this approach through two internally developed & managed regional quality mandates covering developed international and emerging markets. The structure whereby externally and internally developed models are implemented internally allow Global Equity to effectively manage the portfolio at much lower cost relative to placing capital with external managers in line with Investment Belief #8 – Costs Matter. In addition to the internally managed portfolios, there are a number of external managers who provide direct investment management and act as strategic partners to provide research and insight, supplementing the work performed by Staff. Global Equity remains diligent about the number of internally and externally managed portfolios. For example, progress has been made during 2015 and continuing into 2016 to liquidate the remaining activist management approaches, but also internally managed portfolios are continuously reviewed to evaluate their role in the broader investment structure which would potentially lead to a further reduction in certain allocation or even termination of certain mandates.

The CalPERS Investment Office has created the Governance and Sustainability Sub-Committee that reports directly to the Investment Strategy Group. This group has the responsibility to design and oversee the implementation of ESG into the investment decision-making process. Senior members of Global Equity including the MID and IDs are (voting) members of the firm wide ESG working group. Given this structure, Global Equity does not have a separate, dedicated team to ESG, but instead participates in the firm wide ESG efforts. The subcommittee is responsible for performing the various activities towards integrating, engaging, and advocating for effective management of ESG risks and opportunities. Global Equities has worked diligently to integrate ESG across the total fund and across its aggregate portfolio by actively participating in cross-asset class teams and participating in the Manager Expectations pilot program.

Information & Forecasting

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 continues to expand, "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. The licensing of intellectual capital from investment management firms and other strategic partners, and internal implementation of these approaches 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.

The Strategy Development and Strategy Search functions focus on providing Global Equity with new internally and externally managed strategies to improve the available opportunity set. The primary focus of Strategy Development has been on researching 'smart beta' and 'alternative beta" approaches followed by the constructing of these strategies (Alternative Beta can be defined as a deviation (or tilting) of factor weights relative to a traditional market capitalization weighted index). Strategy search is responsible for managing the Alternative Solicitation Process which provides a very streamlined approach to obtain information from external managers that want to be considered as potential partners for Global Equity. Existing strategies are continuously evaluated to determine if they individually and collectively can be expected to add value on a long-term basis.

The IRC reviews existing and new Global Equity strategies and provides recommendations to the MID who has delegated authority to make investment decisions. The role of the IRC is to ensure a consistent, thorough and objective analysis of investment decisions and to provide input, independent advice and perspective to the MID to reach an informed decision considering multiple points of view. The following list provides examples of items considered by the IRC:

- Review and approve strategies for investment eligibility. Strategies include both external third party money managers, as well as internally managed strategies.
- Review the promotion of a manager/strategy from the Emerging Manager Program into the traditional book resulting in direct contracting for investment management services.
- Alignment of interest and negotiation considerations.
- Benchmark and eligible universe considerations.

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 including the upcoming termination of the remaining activist equity manager to be a very positive contributor to maintaining a disciplined holistic investment program.

As long-term investors, CalPERS believes that ESG factors have the same relevance to investment analysis as traditional financial criteria, which is why ESG is integrated into the investment decision-making process, and Global Equity requires their external partners to do the same. Global Equity has worked diligently to integrate ESG by actively participating in cross-asset class teams. Moreover, Global Equity has initiated an ESG Research Project aimed at identifying appropriate strategies that are accretive to the portfolio's risk-adjusted returns and long-term investment horizon.

Global Equity receives input from the ESG subcommittee referenced earlier. The subcommittee keeps the Investment Office briefed on relevant and emerging ESG issues, topics, and research but also recommends which topics to take up, table or not pursue. The subcommittee ensures a broad understanding of and support for both Global Governance and Asset Class / Total Fund agenda and activities in the ESG space.

Global Equity staff has expressed the importance of ESG analysis to their external partners, which in turn has increased the importance of ESG analysis within these external organizations. Global Equity is currently initiating an ESG research project aimed at identifying and potentially funding a low-carbon index. Staff has extensive experience implementing index portfolios and is open to the idea of extending this expertise to implement an ESG index in some form provided the data support its inclusion.

In addition to the support and insights provided by the subcommittee, Global Equity has access to data from both the MSCI's ESG platform and Sustainalytics. Both of these providers offer quantitative ESG data that provides an overall (and individual) ESG score for each portfolio on over 200 ESG indicators. Qualitative information is provided in the form of company profiles, theme and sector reports, controversies and alerts. Use of these platforms provides Global Equity with information on over 8000 global companies.

Portfolio Construction

As noted earlier, the Global Equity 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 with a risk budget of 0 to 50 bps of tracking error annually. With this tracking error range in mind, nearly 60% of assets under management are managed within low tracking error, index-oriented strategies. The remaining 40% of the 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.

As shown earlier (Exhibit 4), allocations have seen a recent shift into structured, alternative beta and traditional active strategies, which have been funded in part through the reduction of index oriented strategies and a de-emphasis of activist strategies. Overall, the portfolio construction approach balances managing costs and pursuing structured risks with positive expected payoffs. These priorities and recent portfolio shifts are consistent with Investment Belief #7 – Risk vs. Reward.

The Global Equity investment program is organized by three functional areas that are integrated by two decision-making committees and the recently instated three sub committees with members of each functional area. The committees – the Investment Review Committee (IRC) and the Global Equity Capital Allocation Committee (GECAC) – are also open to members from outside of Global Equity and can serve to provide an external viewpoint into the process and communicate the outcome of committee meetings to their particular program. This integration creates 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. As noted earlier, the "Portfolio Priorities" project also allows for significant contribution from the Global Equity team to critical fund level initiatives enabling a broader perspective.

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. The program has been successful in licensing intellectual capital from outside advisors and bringing the implementation of these strategies in house in order to be managed less expensively; even though in the past year specifically the externally managed alternative beta strategies saw an increase. While strategy ideas can come from anywhere within the organization, it is through the IRC and sub committees of the GECAC 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 an alpha dashboard, market dashboard and risk monitoring dashboard that highlight 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

The Portfolio Implementation function is primarily responsible for portfolio construction, allocations, management of index and index oriented strategies including rebalancing and trade generation. There are various internally managed portfolios through licensing intellectual capital/models from external providers and the implementation team serves as the infrastructure for managing these assets. Positioning of the GE portfolio's underlying strategy components is managed to be consistent with an overall macroeconomic view. Through these insights, Staff has the ability to adjust strategy sizing to efficiently pursue incremental returns within a projected level of tracking error.

The attention to risk is very apparent and very rigorous in all levels of decision making and is designed to prevent attachment to any single strategy or firm. This translates into the highest decile score for risk budgeting and control for Global Equity. 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. Tracking error on all portfolios is reviewed at least monthly, and discretion is given to Staff to add modest amounts of value only if clear skill is demonstrated. This process aligns well with Investment Belief #5 – Accountability as the relative performance comparisons of the individual components of the broader portfolio and decisions regarding changes in that portfolio can be measured versus an appropriate benchmark.

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 and is industry-leading versus other asset owners and even many asset management organizations. 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. Given the tracking error restrictions, it would be difficult to more extensively use low-volatility and other alternative weighting strategies in an effort to change the GE Program's risk profile. By design, there is a limited amount of absolute 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. Importantly, discussions relevant to identifying an appropriate asset class benchmark are taking place as part of the total fund's Portfolio Priorities project.

Global Equity staff identifies and measures ESG risks and opportunities found in individual portfolios and uses the information to initiate discussions with its partners to better understand the risk/reward pay-off and the justification for holding the security. Global Equity relies upon its external partners to evaluate and respond accordingly to the impact of ESG risks and opportunities in a particular investment or portfolio. Global Equity currently has negative exclusionary screens (MSCI Global Principles Screen, Tobacco, Sudan & Iran, and Gun Manufacturers) as well as positive inclusionary screens, as in the case of the HSBC strategy. Other than those examples, Global Equity does not currently screen or tilt portfolios towards or away from any sector, product, activity, or practice.

Global Equity is able to observe ESG risks across individual strategies and for the aggregate portfolio in both absolute and benchmark-relative terms. Investment staff is further able to break these measures down into the constituent environmental, social, or governance risks and view ESG metrics for each portfolio company with the best and worst performers identified. This information can be used to drive further discussions with external partners to better understand the ESG risk and opportunities in their respective portfolios. Also, staff is able to investigate ESG issues using MSCI ESG and Sustainalytics. As an example, staff was analyzing the holdings of a portfolio and noticed a very low environmental score. Staff was able to identify the specific companies that led to the low score and was then able to access ESG reports on those companies. The information from the reports served as a catalyst to discuss specific issues with portfolio management to ensure that the manager was aware of the specific risks of their holdings. Again, the purpose is not to influence external partners or force a sell, but to ensure they are aware of the specific risks and opportunities within CalPERS' portfolio. Biannually, MSCI performs additional stock screens to support the integration of the Global Principles. Stocks are screened against the Principles and if issues are identified, MSCI will flag the company and determine if the violation is egregious enough to warrant exclusion. If excluded, the security is removed from the benchmark.

The ability of staff to observe ESG risks across individual strategies and the aggregate portfolio, the ability to implement positive inclusionary screens through indexed portfolios and the insights available to initiate discussions with its partners to better understand ESG considerations rate highly relative to peers.

Implementation

CalPERS' trading operations across equity securities, derivatives, lending and currency markets through Execution Services & Strategy (ESS) functions as a centralized hub for robust execution in these markets, was constructed in recent years and is very sophisticated. The ESS platform was designed to reduce operational risk by centralizing transactions between both Global Fixed Income and Global Equity. 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. In practice, Global Fixed Income is not participating fully and Execution Services will only be handing spot currency transactions. The ESS function currently resides in the Global Equity platform under supervision of the Global Equity MID.

ESS has set as their mission that they "must take all reasonable steps to obtain the best possible result, taking into account price, costs, speed, likelihood of execution and settlement, size, nature or any other consideration relevant to the execution of the order". ESS will ensure that appropriate best execution policies are effectively implemented for the carrying out of all orders, while regularly monitoring, reviewing and disclosing their performance

In addition to 'simply' executing on trading, the team also has oversight of structural alpha opportunities such as enhanced securities lending and the implementation of the volatility harvesting strategy. 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 Global Equity team has made significant investments in sophisticated, customized trading systems in recent years, which allow Portfolio Construction and ESS more efficient management and trading of the portfolios. For example, the Charles River system is fed by external data sources such as from index provider FTSE (for 'true' index portfolios and model portfolios) and the investment book of record through the custodian. There are some limited areas of improvement such as cash equitization for example that still reside outside the Charles River system though this is outside of the control of ESS and Portfolio Construction. Even though the Charles River system is considered a leading system within the asset management industry, it currently does not have a feature to represent individual holdings that underlie derivatives.

Global Equity 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 and monitoring process. The process is merit-based but sufficiently transparent to prevent the network from being dominated by large, established firms. The broker list and ranking is different for each segment (domestic equity, international equity, derivatives and foreign exchange). For example, a total of 18 counterparties are used for domestic equity trading but futures trading is only conducted with four counterparties. Actual trading volumes with each counterparty are compared to target allocations based on the ranking and commission values paid to each counterparty are tracked. The counterparties are reviewed periodically for quality of execution, operations and additional value add.

<u>Attribution</u>

Senior Staff continues to work to further enhance the attribution capabilities within Global Equity to generate actionable information related to the drivers of portfolio risk and return. For example, the Alpha Dashboard and various risk reports provide a rich set of information providing attribution on the total portfolio level examining risk, return, regional allocations, but also for example intentional vs unintentional risks, risk factor exposures and reports that provide up to single position risk and return contributions. In addition to the overall Global Equity portfolio, monitoring sheets have been developed for all external mandates that summarize key information obtained from different internal and external data management and risk management systems (such as MSCI Barra, Factset and the internally developed risk factor model). Insights gleaned from these reports can be used in discussions with external managers. Staff has access to more detailed reports should the summary reports highlight specific issues with a manager. Stress tests are applied to assess the impact from changes in the market environment. For example, active risks and their underlying factor contributions can be evaluated to ensure that they are still in line with expectations and continue to properly reflect intended portfolio positioning.

Conclusion

The GE Program's performance since the global financial crisis – exceeding its 15 bps excess return target while staying well within tracking error ranges – serves as tangible evidence to reinforce Wilshire's strong overall qualitative evaluation rating of 3rd Tier. 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. It is evident from interviews with Global Equity Staff that the adoption of CalPERS' Investment Beliefs is widespread and endemic in the GE Program's culture. 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.

Please do not hesitate to contact us should you require anything further or have any questions.

Sincerely,