Wilshire

Steven J. Foresti
Chief Investment Officer, Wilshire Consulting

Rose Dean
Managing Director

Daniel Ingram
Vice President

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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 Execution Services & Strategy (ESS) cross-asset class function. While the ESS function has recently been moved into the Opportunistic Program, it was managed within the GE Program during the 2016-2017 fiscal year so remains part of this year's Program review. A significant structural initiative last year was the integration of Corporate Governance functions into Global Equity, including proxy voting, corporate engagement and financial markets regulations. 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 and processes including:

- GE structure and Governance Model
- Manager / Strategy Research (Investment Idea Generation)
- Strategy Analysis / Monitoring of Portfolio and Strategies
- Portfolio Construction and Capital Allocation
- Environmental, Social and Governance (ESG) integration and Corporate Governance
- Affiliate Investment Programs
- Execution Services & Strategy (ESS) and Trading

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. Though the Program has delivered very strong short-term absolute returns, it has experienced recent underperformance relative to its benchmark as Staff has expressed defensive positioning and continues to manage the portfolio well within its 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 examine the merits of refining the Program's future strategic role as the PERF's characteristics (funded status, cash flow, overall risk tolerance) evolve. Global equity has been and continues to be actively engaged in discussions regarding Portfolio Priorities that led up to the current Asset Liability Workshop and contributes by providing input and insights into global equity related matters, but also the impact on other parts of the portfolio.

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 $12 billion. The largest asset pools include the California Employees' Retiree Benefit Trust ($7.1 billion), the Public Employees' Long-Term Care Fund ($4.3 billion), which is health care related, and the Judges' Retirement System II Fund ($1.3 billion). AIP responsibilities also include the supervision of two Supplemental Income Plans (SIP) within a defined contribution platform with $1.5 billion in participant assets.

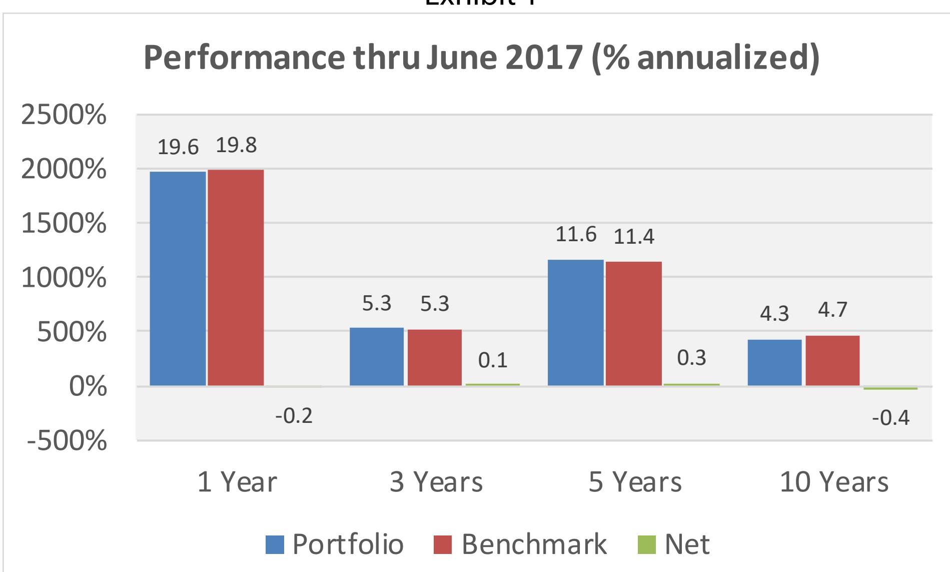
Projects in the past year included the further expansion of the Artemis trading system to GE and development of PERF requirements and product review analysis for the SIP funds. The Affiliate Trusts were further integrated via their participation on various INVO Roadmap Initiatives. Projects in the past year for the defined contribution plans included an in-depth review of the cost structure related to the plans (record keeper) as well as an analysis of different alternative fund options.

AIP has several key business initiatives planned for the 2017-2018 fiscal year including analysis and work plan development for tobacco divestment, asset allocation for SIP and remaining Affiliates (to follow the PERF's ALM cycle) and general Program support via participation in employer outreach and education. A further initiative of AIP will be to develop a work plan to further expand Artemis to other areas of the PERF.

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 up to 50 bps of tracking error annually. Despite providing strong absolute performance of 19.6%, the GE portfolio trailed its benchmark by 0.2% in the 2016-2017 fiscal year. As shown in the chart below, despite its negative excess return in the past year, the GE Program has exceeded its 15 bps excess return target over the past five fiscal years by delivering excess returns of 0.3% annualized. However, due to its poor relative performance during the Global Financial Crisis, the GE portfolio has not kept pace with its benchmark over the trailing ten-year period.

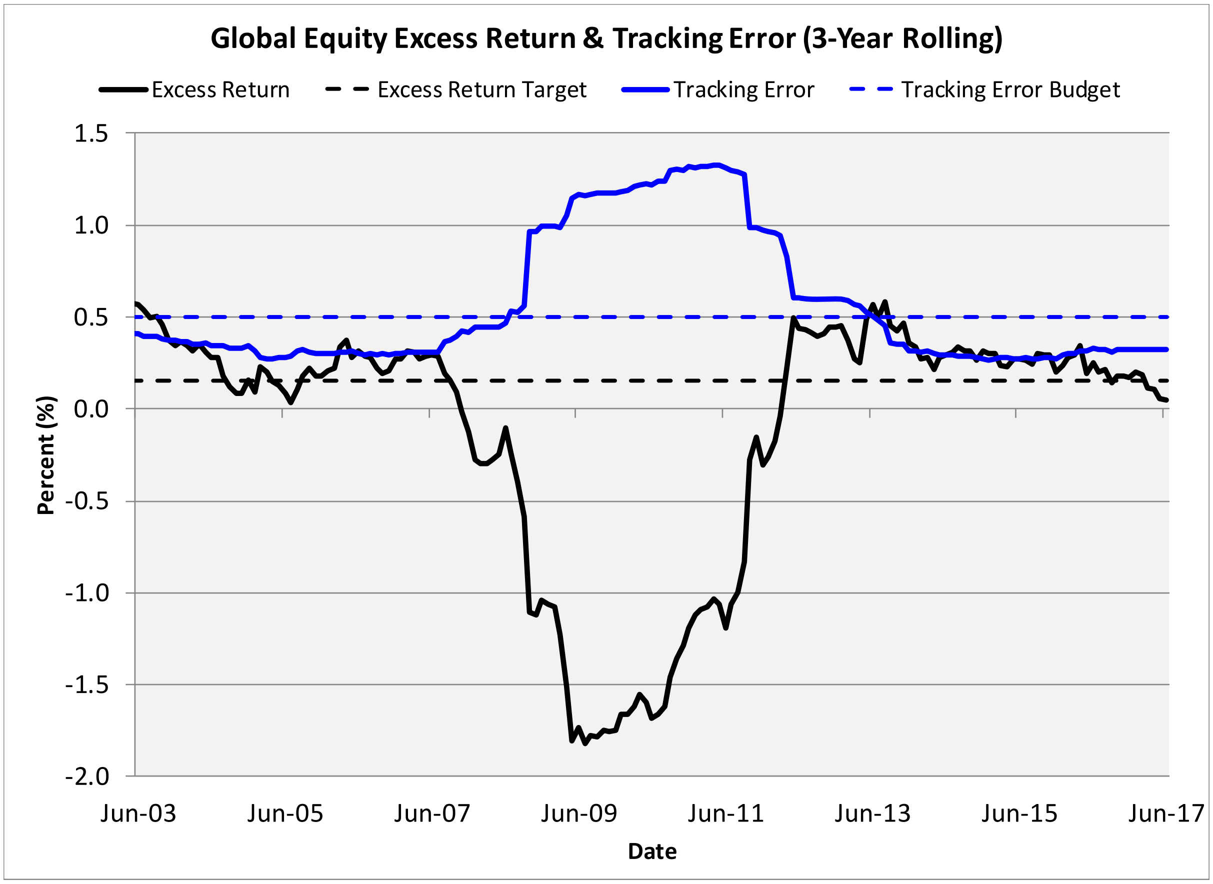
Exhibit 1



Note that, due to rounding, "Net" figures are not uniformly consistent with the differences in displayed "Portfolio" and "Benchmark" returns.

The three-year rolling realized excess return and tracking error figures provided in Exhibit 2 demonstrate that, prior to this year's decline, realized returns in recent years have consistently exceeded the 15 bps relative return target (black line). The Program continues to stay well within the allocated risk budget (blue line).

Exhibit 2



Strategy Allocation and Portfolio Structuring

As we've noted in previous years, 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, 58% 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 42% of the GE portfolio is allocated to traditional active (~26%), alternative beta (~14%) and emerging manager strategies (~2%) 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	Emerging Managers	Total
Internally	58.0%	7.6%	13.6%	0.0%	79.3%
Externally	0.0%	18.0%	0.7%	2.1%	20.7%
Total	58.0%	25.7%	14.3%	2.1%	100.0%

The remainder of this report provides Wilshire perspectives, "scoring," and rationale on the Global Equity Program.

Scoring

Wilshire rates the GE Program highly, ranking the overall Program in the second 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	**2nd**

	Weight	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%**	**2nd**
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%**	**1st**
Risk Budgeting/Control		
Defined Buy/Sell Discipline		
Consistency of Portfolio Characteristics		
Implementation	**10%**	**1st**
Resources		
Liquidity		
Compliance/Trading/Monitoring		
Attribution	**10%**	**1st**
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" opportunities such as through phantom stock, direct ownership and other incentive-based compensation packages. These long-term forms of incentives are common within private sector investment organizations and can serve as significant retention incentives. The absence of such compensation tools can expose the organization to the increased risk of losing intellectual capital at both the Investment Office Senior Staff level and the senior management level within Global Equity to asset managers and other financial institutions. 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.

Global Equity continues to emphasize diversity as an important factor in its hiring process. The team is focused on further enhancing its diversity profile in the medium to longer term through both external and internal career development initiatives to effectively cultivate future leaders within GE.

Organization: Team

The broad team structure has been consistent but there has been some investment team turnover at the mid to lower level (IM and IO) including internal transfers to, for example, the Trust Level Portfolio Management (TLPM) team. Investment team turnover remains a long-term area for attention for senior management, especially as the employment market tightens and compensation packages offered to private sector employees become increasingly competitive. Turnover can be and is mitigated with a positive and intellectually challenging work environment, deliberate active involvement of all GE team members in the investment process, and a strong sense of mission, which has allowed CalPERS to attract qualified candidates. 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 (historically Private Equity but more recently also TLPM). This cross-fertilization is a benefit to the overall organization and allows for the retention of the institutional memory of those individuals who were former members of the GE 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 that 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, as well as the recent incorporation of the Corporate Governance team which has multiple links within the broader organization.

Even though Global Equity continues to experience turnover, excluding the internal transfers the turnover has been in line with or even modestly below industry averages in the past year. While the Global Equity team continues to look for outstanding candidates for new and open positions, compensation bands 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 Investment Manager (IM) and Investment Officer (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.

In past years the decision-making process for GE portfolio positioning, which was structured through the Global Equity Capital Allocation Committee (GECAC) and the Investment Review Committee (IRC), was enhanced with the addition of three sub-committees. These sub committees are specifically focused on portfolio positioning, portfolio opportunities and portfolio structuring & execution. Their addition to the process allow for better cross-team collaboration as well as additional and potentially diverse views on the quality of strategies under consideration by the GECAC. ***Since the initial introduction of these sub-committees during the previous fiscal year, additional emphasis has been placed on an enhanced governance structure including clearly defined membership, setting of agendas, meeting frequency and specific recommendations that progress to the next phase of decision-making. Wilshire views these developments very positively, as this was an area of mild concern raised in last year's Program review.***

Following the adoption of CalPERS' 5-year ESG plan, the Corporate Governance team transitioned into the Global Equity team to deliver better ESG integration outcomes. This substantial organizational restructuring included removing the bifurcation between proxy voting, corporate engagement and financial markets regulations functions and re-organizing the Corporate Governance team based on industry-specific expertise. Wilshire views this as a positive change consistent with similar teams in investment management firms. These organizational changes should lead to more-informed and better collaborations with other investors including external asset managers. To improve the team's industry knowledge, depth of corporate engagement and breadth of proxy voting activities, three new positions have been created with the hiring process likely to be complete by the end of 2017.

The GE Corporate Governance team partners and collaborates with the Sustainable Investment effort via the proxy, research and financial markets working groups, which report into the Governance and Sustainability Subcommittee that is co-chaired by the MID for Global Equity and ID for Sustainable Investment. Since this is a newly implemented structure, it will be important to monitor through time for evidence that this process is working effectively.

Further to the adoption of the Global Equity Sustainable Investment Practice Guidelines, the GE team have integrated ESG scoring into the investment manager selection process, requiring managers to explain how they incorporate ESG into their investment process. Staff then derives an ESG score which contributes to the final ranking in determining strategy selection. As a key metric demonstrating evidence of progress, of the 22 external partners (internally and externally managed strategies) 70% currently have an ESG Policy (up from 20% the previous year). A GE working group issued a Request for Information in search of positive ESG-tilted investment strategies which have the potential to deliver similar returns to their existing portfolio with either reduced downside risk or incremental return relative to the benchmark. Wilshire views these efforts to further integrate ESG initiatives within the

GE program to be very positive, consistent with CalPERS' Investment Beliefs and ultimately instrumental in further establishing CalPERS' leadership role among institutional investors.

Information & Forecasting

CalPERS' Global Equity Program 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 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. ***Wilshire views Global Equity's ability to select from a variety of different alpha generating strategies and implementation approaches as an important competitive edge relative to other organizations.***

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 ("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, both externally and internally managed, are continuously evaluated to determine if they individually and collectively can be expected to add value on a long-term basis. The annual review process provides a more formal assessment whereby a potentially negative outcome would lead to an evaluation within the rationalization subcommittee to potentially issue a recommendation to have that strategy removed. 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.

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.
- Benchmark and eligible universe considerations.

Global Equity has access to external ESG quantitative and qualitative data from both MSCI and Sustainalytics for each portfolio and their underlying investments. Use of these platforms provides Global Equity with information on over 8,000 global companies including company profiles, thematic and sector reports and controversies. Portfolios are measured on each of the three components of E, S and G.

Portfolio Construction

The internal implementation of both externally and internally developed models allows Global Equity to effectively manage the portfolio at a much lower cost relative to placing capital completely with external managers. This structure is implemented in line with Investment Belief #8 – Costs Matter. In addition to internally managed portfolios, there are 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 the past three years to liquidate the remaining activist management approaches. As noted earlier, internal and external strategies are regularly reviewed to evaluate their role in the broader investment structure which could lead to a further reduction in certain allocations or even termination of certain mandates. As impressive evidence of the strategy rationalization process and action to reduce external costs, the GE team has reduced its number of external traditional strategies from 49 in fiscal 2009 to 15 this year – a nearly 70% reduction in less than ten years.

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 up 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 and emerging manager strategies with varying levels of tracking error or risk due to actively managing security or derivative exposure versus the benchmark. 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 process has a strong focus on portfolio construction through its allocation to strategies approved by the Investment Review Committee (IRC) and funded by the GE Capital Allocation Committee (GECAC), and on monitoring risk factors underlying the individual allocations as well as the total equity portfolio. Global Equity has access to portfolio analysis and attribution tools which contribute to an Executive Dashboard that facilitates the effective monitoring of portfolio risk characteristics. This analytics package highlights active tilts and contributions to risk from individual factors and can be customized to focus on key drivers of risk and return.

There are various internally managed portfolios that leverage intellectual capital/models from external providers. 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 can adjust strategy allocations to efficiently pursue incremental returns within a projected level of tracking error.

Staff's 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. As such, strategy and overall portfolio tracking errors are reviewed at least monthly to ensure that risk is being deployed in areas with positive expected payoffs. 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. 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).

Global Equity staff identifies ESG risks found in individual portfolios and uses the information to initiate discussions with its partners to better understand the potential risk/reward pay-off and the justification for holding the security. Global Equity's external partners are expected to evaluate and respond accordingly to the impact of ESG risks and opportunities in an identified investment or portfolio. Wilshire views this as a sound process for monitoring and managing ESG risks across individual strategies and the aggregate portfolio

Consistent with CalPERS' approved program of divestments, Global Equity excludes some markets and industries including Tobacco, EM principles, Iran & Sudan, Firearms (and more recently some thermal coal companies).

Implementation

As previously indicated, while the ESS function has recently been moved into the Opportunistic Program, it was managed within the GE Program during the 2016-2017 fiscal year so remains part of this year's Program review. 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.

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 carrying out of all orders, while regularly monitoring, reviewing and disclosing their performance

The ESS team also has oversight of structural alpha opportunities such as enhanced securities lending and the implementation of the volatility harvesting strategy. Especially noteworthy are the improvements in securities lending revenue that have been achieved in past years due to the strong cooperation between Portfolio Implementation and ESS. ***ESS has also shown itself to be very capable in dealing with large transitions such as the Fall 2016 reduction in Global Equity allocation that was implemented very cost effectively and without any information leakage to the market. 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 and the investment book of record through the custodian.

Global Equity uses at least two systems for monitoring transaction costs, and scores well under both systems. CalPERS does not use soft dollars. Staff maintains a solid 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.

Attribution

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 Executive 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 potential impact from various 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 2nd 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,

Daniel Ingram