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October 5, 2015

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

Re: Internal Fixed Income Annual Review

Dear Mr. Jones:

Wilshire conducted an on-site review of the internal fixed income team's personnel, investment process, and resources. This review was conducted as part of Wilshire's contractual requirement to periodically review all of CalPERS' internal asset management functions. This document serves as a review of the entire fixed income management process. We have also included a multi-page table at the end of this review which is similar to what we would complete for an external manager, detailing our opinion on specific aspects of the fixed income program.

As part of our review, we met with Staff members involved with the management and trading of the various fixed income portfolios. Four key themes were discussed for each portfolio strategy.

- Research Methodology and Process
- Type and Level of Risk Controls
- Portfolio Trading Practices
- Information Feedback Loop

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Summary

In summary, we continue to believe the investment approach remains appropriate for the various CalPERS' portfolios and Staff is aware of and appropriately manages the investment risks faced by the portfolios. Further, with the addition of new personnel, Staff has sufficient resources at its disposal to handle the current scope of the fixed income team's duties. As Wilshire has noted in prior reviews of the Program, it is likely that additional incremental personnel will be required over time to handle the portfolio and the growing complexity of the internal management functions. Wilshire believes that the team continues to manage the portfolio in an effective, risk aware manner and has sophisticated systems to assist in monitoring and managing the portfolio. The Investment Office has continued to augment the fixed income team with additional personnel in an effort to enhance the internal management capabilities of the fixed income program. Further, the Global Fixed Income Programs' investment policy documents afford Staff sufficient flexibility to manage the portfolio's inherent investment risks.

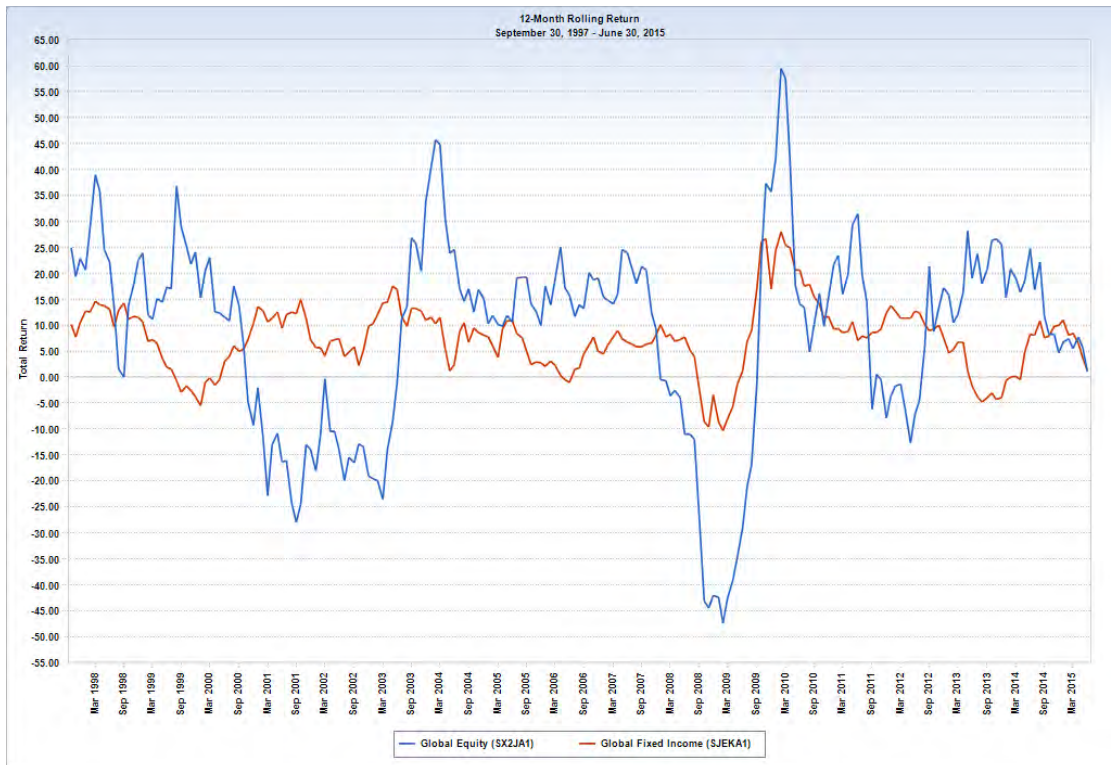
Discussion

Global Fixed Income Program

Program Description

The CalPERS Fixed Income Programs are designed to diversify equity risk for the total fund and provide current income and liquidity. The Programs are actively managed with almost 95% of the \$74.5 billion in assets managed internally by staff and the remaining 5% outsourced to external managers. The fixed income team manages portfolios with various duration targets ranging from highly liquid, short-term Fed Funds-benchmarked portfolios to longer duration portfolios benchmarked to the Barclay's Long Liability Index. Additionally, the fixed income team invests across the credit spectrum from U.S. Treasury bonds to high yield bonds and in a variety of structured fixed income securities, such as mortgage obligations and asset-backed securities. Staff also manages international fixed income, and currency. A separate allocation to inflation-linked bonds and commodities as a part of the Inflation Assets portfolio is also managed within the internal fixed income program. Finally, 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.

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Team Structure

The MID-Fixed Income has overall responsibility for all portfolios' sector weights and duration positioning. The MID-Fixed Income will adjust exposures at the aggregate portfolio level, but does not direct the portfolio managers (e.g., the internally managed credit portfolio or the mortgage portfolio) to change the underlying portfolios' exposures provided they remain within the appropriate guidelines. As such, the investment philosophy is based on garnering a yield advantage over a full market cycle in each sector compared to the sector's yield, but without substantially increasing the risk of default in the sector. Duration is normally close to the duration of the benchmark, unless real returns and economic analysis dictate otherwise. According to policy, both the Programs' duration can range from -50% to +10% of the duration of their respective benchmark indexes.

Staff has sector specialists that focus on credit (corporate), structured products (mortgage-backed, asset-backed, etc.), and global governments that are highly knowledgeable and manage their respective sectors of the portfolio against appropriate benchmarks. In addition, the domestic research team has been expanded over the last few years in line with Investment Belief #10 – Resource/Process, while also remaining cognizant of Investment Belief #8 – Costs Matter. Wilshire views the addition of resources favorably and believes that continuing to build out the depth and

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breadth of the internal fixed income team should be a long-term goal for CalPERS, particularly if new mandates are considered for internal management.

As Wilshire has consistently noted, CalPERS does face some organizational risks that for-profit enterprises do not encounter. The lack of long-term ownership in the enterprise as a significant retention incentive puts the organization at risk for losing intellectual capital. While the Fixed Income team continues to look for outstanding candidates for new and open positions, compensation bands constrain its ability to attract candidates and have generally extended the search timeline. The Staff presentation illustrates this point as there are currently 5 Investment Officer positions and 1 Investment Director position vacant.

Investment team turnover continues to be a long-term concern, given the improvement in the economy and the competitive compensation packages offered to private sector employees. This is an ongoing risk for the entire organization, and has been discussed previously in our reviews of the other investment teams within CalPERS. 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. However, as the employment market tightens, the ability to fill vacant positions will become more challenging. Staff is clearly cognizant of this issue and has structured the team with layers of expertise for coverage of critical investment functions.

From a team perspective, a large and identifiable future risk to the internally managed fixed income team is the succession from the current MID-Fixed Income to the next generation of leadership. It will be imperative for the leadership transition to be communicated clearly and executed in a thoughtful manner. Strong internal candidates with the experience and broad investment expertise are certainly an option. Any successor will need to maintain and build on an investment culture that has cultivated success over a long time horizon. We discussed with senior staff the importance of diversity of viewpoints and the staff supports and continues to provide opportunity to all qualified candidates.

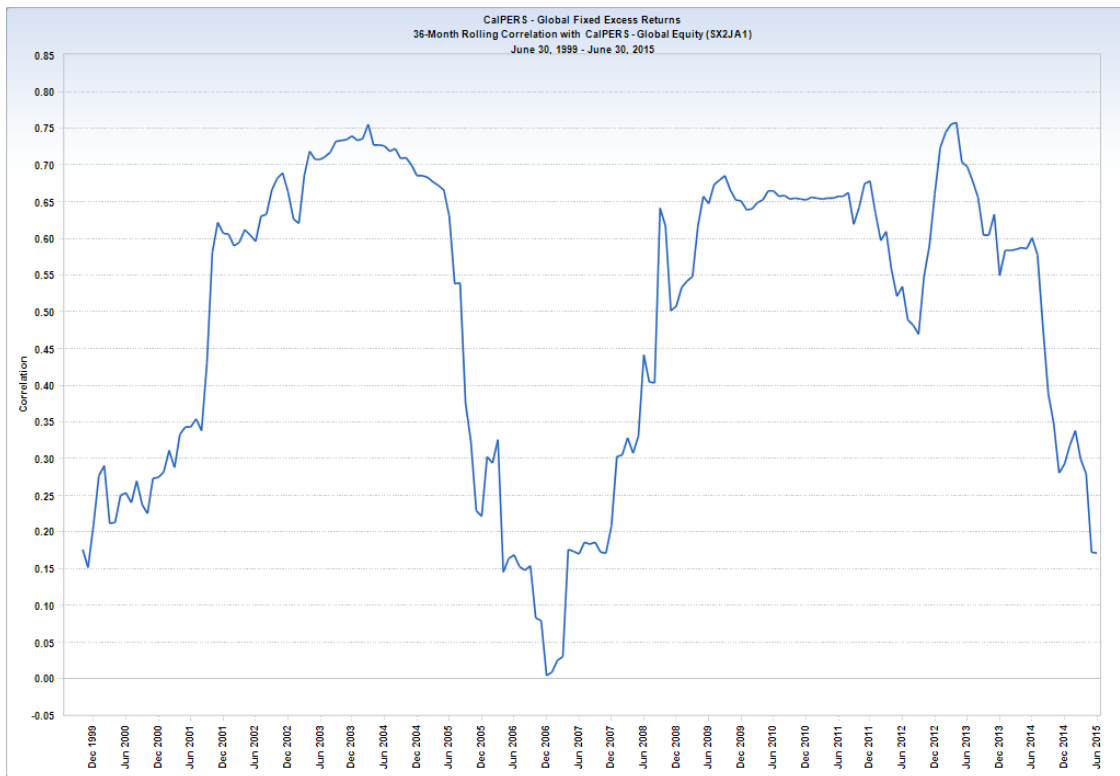
Investment Philosophy

Wilshire views the overall investment philosophy and approach favorably and believes it is an appropriate one for CalPERS that is supported by research and experience. Staff's active portfolio management and desired yield advantage tends to perform very well across a market cycle. The strategy is likely to underperform when credit and structured spreads widen and the risk of default increases, but has demonstrated the ability to recover as credit markets normalize. The excess return for Global Fixed Income is likely to exhibit some correlation to equity market performance as improving

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economic fundamentals are likely to be positive for stocks as well as fixed income spread sectors.



Additionally, since Staff does not generally make significant duration bets, duration is not expected to drive the relative performance of the portfolio when interest rates rise or fall. Overall, the investment approach comports very well with Investment Beliefs #1 – Liabilities, #2 – Long Term Horizon, and #7 – Risk vs. Reward. Further, the internal staff is able to effectively manage the portfolio at much lower cost relative to placing capital with external managers in line with Investment Belief #8 – Costs Matter.

The two primary investment risks of fixed income securities are well known and unchanged: interest rate risk and default risk. Wilshire believes that Staff is monitoring and managing these risks appropriately. The duration of the portfolio is generally kept very close to the duration of the index, ameliorating much of the interest rate risk *relative* to the index. The guidelines have increased the lower duration band to allow Staff to position the portfolio for rising interest rates. However, *absolute* interest rate risk remains present due to the duration of the portfolio. Default risk is managed by limitations on the size of any corporate issuer in the total portfolio, and a strong research effort. The Fixed Income policy further controls credit risk with minimum rating requirements by sector and by placing net ranges around sector weights. Default

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risk cannot be eliminated without forgoing the potential return of credit-related securities and investing solely in Treasury securities, and academic studies clearly illustrate that the increased yield from credit over a market cycle fully compensates for any normal level of default risk.

Implementation, Attribution, and Commitment to Improvement

The third-party portfolio management and trading platform, which is one of the most important tools for any asset management organization, is high quality and helps to achieve the program's goals. This investment should not be (and is not currently) viewed as a one-time investment. It is clear that Staff is well aware of the re-investment requirement and is actively engaged in improving system capabilities and supplementing them when necessary. The enhancement of the internal systems continues to be a focus for certain team members and ensures that new capabilities keep pace with the additional workload being undertaken by the internal team, a process which Wilshire fully supports. Of note, senior Staff would like to improve the attribution capabilities of the system to provide clearer information on the drivers of portfolio risk and return. This will further improve the program's alignment with Investment Beliefs #5 – Accountability and #10 – Resources/Process.

Staff is pursuing initiatives related to the 20/20 Vision, and as these initiatives demand material time commitment, balancing the demands of the day-to-day portfolio management with the desires to move the organization forward strategically is imperative.

As a result of this review, we continue to be confident in the ability of CalPERS' Staff to effectively manage the fixed income portion of the CalPERS portfolios. The following sections provide more specific commentary around each of the three broad programs:

- Global Fixed Income
- Inflation Assets
- Liquidity.

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Global Fixed Income Portfolio

The Global Fixed Income Portfolio represents \$56 Billion in assets and is the largest portion of the fixed income portfolio overseen by internal fixed income staff. This portfolio is managed against a blend of 90% Barclays Long Liability Index and 10% Barclays International Fixed Income Index GDP Weighted ex-U.S. For internal management purposes, Staff has sector specialists covering sovereign bonds, structured securities, and corporate bonds. The Investment Manager (IM) and Investment Director (ID) specialists manage their sectors against the performance and characteristics of the respective sectors of the index. Each sector specialist, as well as the MID-Fixed Income, emphasized the importance of having an established framework with which to construct and monitor a portfolio. In this way, the sector specialists maintain consistency across time as they evaluate securities for inclusion/exclusion from the portfolio. This process aligns well with Investment Belief #5 – Accountability as the relative performance comparisons of the sector specialists are driven by the sector team’s decisions versus an appropriate benchmark.

The MID-Fixed Income has overall responsibility for managing the duration of the portfolio and the sector mix. The MID-Fixed Income determines the appropriate mix of sectors based on their relative attractiveness, comparing the option-adjusted spread of each sector and stress testing the forecasted results of the portfolio under different economic assumptions. Philosophically, the MID-Fixed Income believes that improved risk-adjusted returns are likely to come from spread sectors, like mortgages and credit; hence, the portfolio is likely to show a consistent bias towards those sectors. The staff presentation illustrates this tilt with the underweight government and overweight opportunistic positioning.

The sector specialists are involved in sourcing and evaluating securities that might fit into the opportunistic bucket, although the MID-Fixed Income is the ultimate arbiter of that portion of the portfolio. The MID-Fixed Income is able to vary the duration of the portfolio by -50%/+10% versus the benchmark per policy. The level of flexibility allows Staff to significantly shorten the duration of the portfolio if they have high conviction that rates will rise. Staff is required to report to the Investment Committee the duration and the sector weights of the portfolio, relative to the benchmark. Currently, Staff has positioned the portfolio duration to be moderately less than the index.

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Total Domestic Program Sector Guidelines

| Sector | Index | Range |
|---------------------------------|-------|-----------|
| U.S. Treasury & Gov't Sponsored | 40% | 10% - 80% |
| Mortgage | 30% | 15% - 45% |
| Corporate | 24% | 10% - 40% |
| Opportunistic | 3% | 0% - 12% |
| Sovereign | 3% | 0% - 10% |

Total International Program Sector Guidelines

| Sector | Benchmark | Net Range |
|--------------------------------|-----------|-------------|
| U.S. Treasuries (ex TIPS) | 0% | -10% - +10% |
| Governments (ex U.S.) | 100% | 90% - 100% |
| Investment Grade Corporate | 0% | -10% - +10% |
| Mortgages | 0% | 0% - +10% |
| Non-Investment Grade Corporate | 0% | 0% - 5% |

The Investment Director responsible for U.S. Governments has transitioned back to the internal fixed income team from the CalPERS real estate group, and the Global Governments ex-U.S. Investment Director continues with oversight of all Government ex-U.S. portfolios in addition to Commodities, non-U.S., and Emerging Markets Debt. The reorganized responsibilities of the U.S Government – Investment Director is more limited than it was historically, but offers capacity for research and other special projects and some redundancy should turnover occur at the ID level in the future. The team has put in place process and structure to help manage an increased opportunity set, including weekly macro outlook and portfolio strategy meetings. In addition, internal research related to modeling duration and the shape of the yield curve illustrates a continued effort to improve the portfolio management inputs. Staff would like to continue to build out the team's capabilities by adding additional resources underneath the ID-Economics. Wilshire would support this direction, particularly as additional international fixed income assets are managed internally.

One theme which emerged during our interviews with a number of the senior members of the team was the cross-functional work being done to help improve total fund performance. For example, the weekly economic scorecard and analysis produced by the fixed income team is shared with other parts of the Investment Office for debate and discussion. The work done by the derivatives policy committee impacts areas outside of Global Fixed Income as well, while the Short Duration program is utilized by the Equity team in the synthetic enhanced equity portfolio. There continues to be meaningful resources committed to improving the enhanced cash and CLO capabilities,

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which are used in a cross asset class capacity as well. Additional legal and research resources (likely external) are now necessary to provide support for the expanded use of the Short Duration program by both GFI and the Global Equity Programs due to the complexity and legal documentation required for strategies using CLOs.

Overall, a relatively stable and experienced team and a proven investment process remain positive. The team seems more capacity constrained than in prior years given portfolio responsibilities and necessary strategic initiatives. This has resulted in a moderate decrease in score this year.

Inflation Assets

There are two primary components to the Inflation Assets portfolio: inflation protected bonds and commodities. Inflation Assets represent \$15 billion in assets and 20% of the Global Fixed Income Program. The team for the Commodity program consists of an experienced commodity portfolio manager along with an additional Staff resource to focus on research and trading. The reporting structure shifted to ID-Global Governments ex-U.S. but this has not functionally changed the day-to-day dynamic according to the Investment Manager. Strategically, the IM views the commodity exposure as an insurance policy against unexpected or accelerating inflation. While this has not materialized recently, the diversification or tail risk hedging properties of a commodities position remain, and reflect adherence to Investment Belief #9 – Multi-faceted Risk. The IM continues to utilize a risk system to monitor the portfolio and a tactical inflation strategy utilizing a quantitative framework developed internally. The IM has shifted implementation from a focus on relative value to more directional views implemented in a risk-adjusted manner through options positions. From a resource perspective, the portfolio manager feels they could benefit from further fundamental research resources and an IO II position is in active recruitment.

The IM-Commodities also works on the derivatives policy committee within fixed income, which is consistent with the previously stated plan to utilize his expertise more broadly across the portfolio. The derivatives policy committee has made strides in improving counterparty governance and monitoring, which provides a benefit throughout the Investment Office.

The commodities portfolio continues to be managed in accordance with the approved policy.

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Liquidity

The Liquidity Program represents \$4.4 billion in assets and 6% of the Global Fixed Income Program. CalPERS' staff manages the Liquidity Portfolio which represents the 1% liquidity allocation for the Total Fund. The objective of the Liquidity Program is to provide liquidity to CalPERS and to maximize investment returns at a prudent level of risk. The Benchmark is a blend of 75% 2-10 Year Treasuries and 25% 91-day Treasury Bills. Staff can add value by managing a portfolio that has some credit exposure and some increase in duration. Interest rate risk is considered minimal.

Currency

In prior years, all currency trades were performed within the Global Fixed Income Program. The Execution Service platform has been created to centralize and better resource currency, derivatives, securities lending and other liquid transactions between Global Fixed Income and Global Equity and therefore seeks to reduce operational risk. In practice, Global Fixed Income is not participating fully and Execution Services will only be handling spot currency transactions. Wilshire recognizes that global fixed income investing is inextricably linked to currency management and that the expertise to design alpha currency strategies resides within the internal fixed income team. That said, Wilshire recommends that this arrangement be continually evaluated in an effort to improve efficiency of implementation in accordance with Investment Belief #8 – Costs Matter.

Securities Lending

The lending operations of the securities lending program have been moved outside of the Global Fixed Income Program and onto the Execution Services platform. Oversight of securities lending (lending component not collateral management) will be provided by the Chief Operating Investment Officer and the MID-Global Equity. As the ID managing Securities Lending continues to innovate and create further efficiencies through the use of the CalPERS eSECLending trading platform. INVO must continue to vet newly created strategies for potential risks.

The securities lending collateral is managed in accordance with the CalPERS' Securities Lending Policy – Attachment B Cash Collateral Reinvestment Guidelines. As such, this portfolio is invested in securities with short maturities, which are generally highly rated. Additionally, stress testing is performed on the structured securities in order to understand and appropriately manage how changes in interest rates will affect the

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price of the securities. CalPERS is presently undergoing an analysis, and will eventually form a plan, to consolidate the management of all short-term funds.

It is important to remember that the securities lending program must take on some form of investment risk within the collateral investment pool in order to earn a yield spread on each loan. Essentially, the collateral investment pool must produce a return in excess of the Fed Funds rate. The portfolio manager has significant experience in evaluating structured product characteristics and has continually worked to refine the process and implement new investment ideas.

Performance

The Global Fixed Income Programs cumulative performance shows that the internal fixed income team has generated excess returns over both short and long periods of time. This provides tangible evidence that the internal fixed income team is managing the portfolio in an effective manner.

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Performance as of June 30, 2015

| | Market Value | Qtr | 1-Year | 3-Year | 5-Year | 10-Year | Date |
|---|---------------------|--------------|---------------|---------------|---------------|----------------|--------------|
| INCOME | 53.1 | -3.3% | 1.3% | 2.6% | 5.4% | 6.1% | 6/88 |
| <i>Income Policy Benchmark</i> | | -3.3% | 0.4% | 1.4% | 4.6% | 5.3% | |
| <i>Value Added</i> | | 0.0% | 0.9% | 1.2% | 0.8% | 0.8% | |
| Internal US Income + Opportunistic | 47.9 | -3.5% | 3.1% | 3.3% | 5.9% | 6.4% | 12/95 |
| Mortgage Bonds | 10.2 | -0.6% | 5.3% | 4.1% | 4.5% | 5.4% | 12/82 |
| Long Duration Mortgages | 3.9 | -1.2% | 3.9% | 2.7% | 5.8% | 6.3% | 6/05 |
| Corporate Bonds | 11.4 | -5.1% | 0.2% | 5.5% | 7.8% | 6.9% | 3/02 |
| U S Government | 15.5 | -5.2% | 3.3% | 0.4% | 4.9% | 5.4% | 12/99 |
| Sovereign Bonds | 2.1 | -4.0% | 2.4% | 2.8% | 6.5% | 6.1% | 6/96 |
| Long Duration Corporates | 1.5 | -8.9% | -6.1% | 5.1% | 9.5% | - | 9/05 |
| <i>Custom Benchmark</i> | | -3.7% | 2.1% | 2.0% | 5.1% | 5.5% | |
| Opportunistic | 5.5 | 0.2% | 4.1% | 7.9% | 7.6% | 6.9% | 6/00 |
| Internal High Yield Bonds | 0.9 | -0.3% | 8.8% | 9.3% | 7.8% | 12.0% | 9/99 |
| External High Yield | 1.9 | 0.6% | 0.7% | 8.2% | 9.7% | 6.2% | 3/02 |
| High Yield Mortgage | 0.3 | 1.1% | 6.7% | 15.5% | 12.0% | - | 3/08 |
| <i>Citigroup High Yield Cash Pay</i> | | 0.1% | -1.0% | 6.4% | 8.3% | 7.5% | |
| Special Investments | 3.3 | 2.3% | 8.4% | 9.4% | 6.2% | 6.5% | 3/91 |
| Total International Fixed Income | 5.2 | -1.2% | -13.5% | -3.7% | 1.2% | 3.3% | 3/89 |
| <i>Custom Benchmark</i> | | -0.1% | -14.5% | -4.3% | 0.1% | 2.5% | |
| <i>Value Added</i> | | -1.1% | 1.0% | 0.6% | 1.1% | 0.8% | |
| Securities Lending | 10.7 | 0.2% | 0.4% | 0.7% | 1.0% | 1.7% | 8/00 |
| <i>Custom Benchmark</i> | | 0.0% | 0.1% | 0.1% | 0.1% | 1.4% | |
| <i>Value Added</i> | | 0.2% | 0.3% | 0.6% | 0.9% | 0.3% | |
| Internal Active Short Term | 2.7 | 0.1% | 0.3% | 0.2% | - | - | 3/11 |
| <i>Custom Benchmark</i> | | 0.0% | 0.1% | 0.0% | - | - | |
| <i>Value Added</i> | | 0.1% | 0.2% | 0.2% | - | - | |
| CalPERS ESEC Cash Collateral | 8.0 | 0.3% | 0.4% | 0.2% | 0.2% | - | 6/10 |
| <i>Custom Benchmark</i> | | 0.0% | 0.1% | 0.1% | 0.1% | - | |
| <i>Value Added</i> | | 0.3% | 0.3% | 0.1% | 0.1% | - | |
| | Market Value | Qtr | 1-Year | 3-Year | 5-Year | 10-Year | Date |
| INFLATION | 15.6 | 1.3% | -11.5% | -1.3% | 3.2% | -. | 9/07 |
| <i>Inflation Policy Benchmark</i> | | 2.0% | -13.0% | -2.3% | 1.9% | - | |
| <i>Value Added</i> | | -0.7% | 1.5% | 1.0% | 1.3% | - | |
| Internal Commodities | 2.8 | 8.6% | -36.5% | -11.1% | -4.5% | -. | 9/07 |
| <i>GSCI Total Return Index</i> | | 8.7% | -36.8% | -10.7% | -4.3% | - | |
| <i>Value Added</i> | | -0.1% | 0.3% | -0.4% | -0.2% | - | |
| Core Inflation Linked Bonds | 10.5 | -0.8% | -3.5% | 0.9% | 4.4% | -. | 3/08 |
| <i>Custom Benchmark</i> | | -0.1% | -4.2% | 0.4% | 4.0% | - | |
| <i>Value Added</i> | | -0.7% | 0.7% | 0.5% | 0.4% | - | |
| Tactical Commodities | 1.1 | 8.1% | -36.8% | -. | -. | -. | 1/13 |
| <i>GSCI Total Return Index</i> | | 8.7% | -36.8% | - | - | - | |
| <i>Value Added</i> | | -0.6% | 0.0% | - | - | - | |
| Tactical TIPS | 1.1 | -1.4% | -1.8% | -. | -. | -. | 1/13 |
| <i>CalPERS TIPS</i> | | -1.1% | -1.7% | - | - | - | |
| <i>Value Added</i> | | -0.3% | -0.1% | - | - | - | |

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Sustainable Investment Practices

Further, in line with Investment Beliefs #3 and #4– Stakeholders and Three Forms of Capital, the internal fixed income team is working to integrate environmental, social, and governance (ESG) factors into their investment process. Over the past year the team has created Sustainable Practice Guidelines to provide guidance to incorporate these factors into the investment process. Recognizing that the mandate for Global Fixed Income is to be a diversifier to global equity volatility and a reliable source of income for CalPERS, the team considers a range of risks that include ESG factors and regulatory factors. These are re-evaluated periodically in recognition of the evolution of research on the materiality of current factors and newly identified factors that describe the return and risk drivers of a fixed income portfolio. The team uses MSCI's ESG pillars and the PRI Reporting Framework definition of Corporate Focused ESG risks to help identify these factors.

Structural impediments exist in terms of how effective these factors can be due to the benchmark. The policy benchmark for the Global Fixed Income Program has 63% of its exposure in US Government and US Government Sponsored Entities related securities. This leaves only 37% of the portfolio available to consider such factors. Significant impact in the use of ESG in the GFI Program may need to be addressed by the IC through the policy benchmark, if it wishes to do so. However, substantial restriction of the investable universe will likely impact the risk adjusted returns that can be generated by the program.

In addition to the above integration of ESG and Regulatory factors into the internally managed fixed income portfolios, the team has conducted a survey of external managers and incorporated questions into due diligence questionnaires to determine how these factors are used within these strategies.

Additional Risk Factors

Operational and compliance risk is also present in the internal fixed income portfolio, as it would be for any external manager. CalPERS has both enterprise and investment compliance teams, and a risk management group which are collectively tasked with monitoring portfolios across asset classes. Given the size and complexity of the CalPERS portfolio, ensuring that the risk management group is adequately staffed is important.


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Conclusion

In brief, we believe that Staff has demonstrated the ability to both effectively and efficiently manage CalPERS' fixed income portfolios. The investment philosophy is appropriate to CalPERS' needs and sufficient investment risk controls are present to mitigate many of the risks of managing fixed income portfolios. Operational and compliance risks continue to be examined and improved upon.

Should you require anything further or have any questions, please do not hesitate to contact us.

Best regards,



Julia Bonafede
President of Consulting



Thomas Toth
Managing Director

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Strategy Evaluation: CalPERS Internal Fixed Income Strategy

Organization (0-115)

SCORE: 78

COMMENTS:

Ownership/Incentives (0-30)

- Direct Ownership/Phantom Stock
- Profit Sharing
- Performance Bonus
- Depth of Incentives

Employees receive performance bonus only. Bonus is driven by multiple factors, some geared around the investment performance generated by the fixed income team but others related to total fund performance. This bonus structure has been revised to bring it in-line with the new alpha targets.

Score: 10

Human resource constraints on hiring and promoting in place have the potential to impact incentives. Incentive Compensation formulas should be reviewed and updated regularly to address unintended incentives.

Obviously, no equity ownership is available for employees. Further, travel rules and regulations have the potential to impede the review of external managers as well as information sharing between internal Staff and outside resources.

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Team (0-25)

Communication
Role of Manager, Research, and Operations
Longevity of Team

Score: 18

Additions to the Team in portfolio management and research have improved the capacity to manage additional strategies effectively. This has reduced the key-person risk and allows Staff to focus on more value-added opportunities. An informal succession plan for senior fixed income positions exists and does include appropriate mentoring and monitoring to ensure a smooth evolution. Succession planning for next generation of leadership remains a risk. Communication links are informal and proximity of team members is close, adding to the team's ability to communicate quickly. Staff recognizes the value of diversity and will continue to seek out diversity during the hiring process.

Senior members of the team have generally been together for several years with one of the six ID's returning to the group after a stint with the real asset program. The reorganized responsibilities are more limited than historically, but offers capacity for research and other special projects and some redundancy should turnover occur at the ID level in the future. Senior team members noted that they now spend considerable time on Vision 20/20 committees, which they believe is productive. However, existing workloads are only growing which leaves less time to spend on day-to-day portfolio management. It is a valuable function but needs to be managed to avoid overwhelming the team and potentially increasing operational risk

Quality of Key Professionals (0-15)

Experience
Quality of Leadership
Quality of Education

Score: 15

Education, experience and technical skill set of ID's, IM's and MID-Fixed Income are exceptionally good, by any standard. The tenure of the MID-Fixed Income with CalPERS is the longest of the senior investment staff.

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Turnover of Senior Professionals (0-15)
Low (<10%), Medium (<20%), High (>20%)

Score: 10

The Global Fixed Income Program experienced lower turnover this year than previous years, the organization has changed significantly with reorganization of positions and shifting of employees. Lack of long-term retention incentives lead some staff to consider the organization as a "stepping stone" to better compensation in similar positions elsewhere. Turnover on the fixed income team has been more limited than the organization as a whole, but there have been lateral movements this year as responsibilities have moved out of the Global Fixed Income group.

Commitment to Improvement (0-30)
Clear Mission
Re-investment
Process Enhancement
Sustainability
Diversity

Score: 25

Strategies have clear mission and objectives. Resources levels are sufficient for the tasks assigned to team as well as additional programs being considered for inclusion in the internal Fixed Income program. Staff is open about continuing to improve internal investment capabilities, portfolio transparency and attribution, as well as making operational safeguards more robust. Further, the team is working on integrating ESG considerations into the investment process where appropriate. Senior staff has committed material time to Vision 20/20 initiatives. Continuing the promotion of diversity within the investment team was specifically discussed.

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Philosophy/Process (0-100)

SCORE: 89

COMMENTS:

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

Sector specialists (Sovereigns, Structured Products, and Credit) actively manage respective parts of the portfolio in an attempt to outperform through yield curve positioning and issue selection. MID-Fixed Income oversees the total allocation to each sector and the portfolio's overall interest rate positioning.

Score: 35

Value has been added by focusing on maintaining a yield advantage in the spread sectors, and the consistent additional yield in the portfolio versus the benchmark compounds to the advantage of CalPERS over longer time periods. High score given as the yield advantage approach is appropriate and consistently applied across all sectors of the portfolio.

Information (0-15)
Unique Sources, Unique Processing

Information sources are primarily external, which is appropriate given the size of Staff relative to the size of the market (more than 10,000 available securities). In the case of structured products, the underlying securities are analyzed at a granular level utilizing systems provided by an outside strategic partner, but which internal staff continues to build on. Credit and Research Staff feel positive about their current team and their ability to perform deep research. In addition, they also have frequent contact with outside managers to gain information.

Score: 13

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

Buy/sell discipline based on relative value of securities. If Staff has an opportunity to "upgrade" one of the holdings in the portfolio, a trade will be initiated by the appropriate sector specialist, who has intimate knowledge of his/her sector.

Score: 15

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

Portfolio construction techniques and monitoring are very good with industry-leading software. MID-Fixed Income has ultimate oversight as to the construction of the portfolio, utilizing a defined framework. Further, the portfolio has exhibited less tracking error relative to the index as risk is reduced across sectors. The Strategy has written compliance policies and procedures in place and a "checklist system" to ensure compliance.

Score: 13

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Quality Control (0-15)

- Return Dispersion
- Performance Attribution
- Performance Consistency
- Style Drift
- Compliance

Score: 13

The process has risk controls built in with regard to sector weights and duration. Attribution analysis provided by BlackRock's Aladdin system, but Staff has indicated that the attribution capabilities could be improved and has implemented substantial improvements, particularly on the credit side. Within the portfolio management team there is good separation of responsibilities as well as back-up and cross-checks. Guidelines, roles, and responsibilities have been updated and reflected in policy. Further, trade settlement and back-office support is separate from portfolio management. Systems are in place to monitor compliance of the portfolio on a regular basis, including daily trade reports. The Execution Services platform has lightened the responsibility of trading by absorbing securities lending and spot currency trading. Other efficiencies should continue to be explored.

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Resources (0-85)

SCORE: 75

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

Economic research resources have been expanded and are utilized by multiple internal teams. Additional research on forecasting models continues as well. Much of the credit research is provided by external sources and synthesized by Staff. Structured research is conducted internally analyzing the underlying securities with regards to quality and risk of prepayment. More granular research into the underlying collateral is done in collaboration with external managers. Additional internal research can now be performed with the expansion of Staff. This additional research can be used in conjunction with the external research to help provide a more robust analysis of credit.

Score: 37

Information/Systems Management (0-15)

Ability to Manage Large Flows of Data
Appropriate Systems for Research and
Management

Hardware and software support is very strong. Members of Staff all have access to Bloomberg for research and information on current market conditions. Trading and portfolio management tools were custom-designed to CalPERS' specifications by a leading external vendor. Ongoing improvements in structured product research capabilities continue to help round out the systems more completely for structured products side. Staff continues to actively work to improve the system capabilities which are reflected in the strong score.

Score: 13

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Trading (0-30)

Turnover Relative to Process
Sophistication of Trading Process
Measurement of Trading Costs
Operational Controls

Score: 25

CalPERS' trading room is very sophisticated, and has subscriptions to all of the most popular trading resources, i.e. Bloomberg, Instinet, ITG, WM, etc. There is sufficient back-up and separation of responsibilities in the trading function, but continued evaluation of the utilization of the Execution Services Group where appropriate is necessary. There is ex-post review of trading execution, but as with all trading reviews it can be improved. The score has been moderately increased to reflect the separation of trading and portfolio management within the credit team.

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Discussion

Wilshire's score on this strategy of 80.7% or 242 out of 300 possible points, which reflects a decrease of 6 points over the prior score. The Global Fixed Income Program continues to reflect the strong team and clear success at managing the portfolio as charged. The decreased score relative to the prior review is attributable to the adjustment in the Organization score due to reorganization and potential risks around leadership succession. The main reasons for a less-than-perfect score overall are largely due to organizational-level issues such a lack of long-term retention incentives rather than issues specific to the portfolio management process.

| Categories | Total Fixed Income | | | | | | | |
|------------------------|--------------------|--------|-------|-------|-------|-------|-------|-------|
| | Possible | Actual | | | | | | |
| | | 2015 | 2014 | 2013 | 2011 | 2010 | 2009 | 2008 |
| Ownership | 30 | 10 | 10 | 5 | 5 | 5 | 5 | 5 |
| Team | 25 | 18 | 22 | 22 | 22 | 20 | 15 | 15 |
| Quality of Pros | 15 | 15 | 15 | 15 | 15 | 12 | 15 | 15 |
| Turnover | 15 | 10 | 10 | 10 | 5 | 7 | 7 | 10 |
| Commit to Improve* | 30 | 25 | 15 | 15 | 15 | 15 | 10 | 15 |
| Market Anomaly | 40 | 35 | 35 | 35 | 35 | 35 | 35 | 35 |
| Information | 15 | 13 | 13 | 12 | 12 | 12 | 12 | 12 |
| Buy/Sell Discipline | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 |
| Portfolio Construction | 15 | 13 | 13 | 13 | 13 | 12 | 10 | 15 |
| Quality Control | 15 | 13 | 13 | 12 | 12 | 10 | 10 | 15 |
| Research | 40 | 37 | 37 | 37 | 35 | 35 | 35 | 35 |
| IT Systems** | 15 | 13 | 13 | 13 | 13 | 13 | 13 | 15 |
| Marketing*** | 0 | 0 | 15 | 15 | 15 | 15 | 15 | 14 |
| Trading | 30 | 25 | 22 | 22 | 20 | 20 | 20 | 25 |
| Total | 300 | 242 | 248 | 241 | 232 | 226 | 217 | 241 |
| | | 80.7% | 82.7% | 80.3% | 77.3% | 75.3% | 72.3% | 80.3% |

*Commitment to Improve – Scoring changed from (0-15) to (0-30) in 2015 review

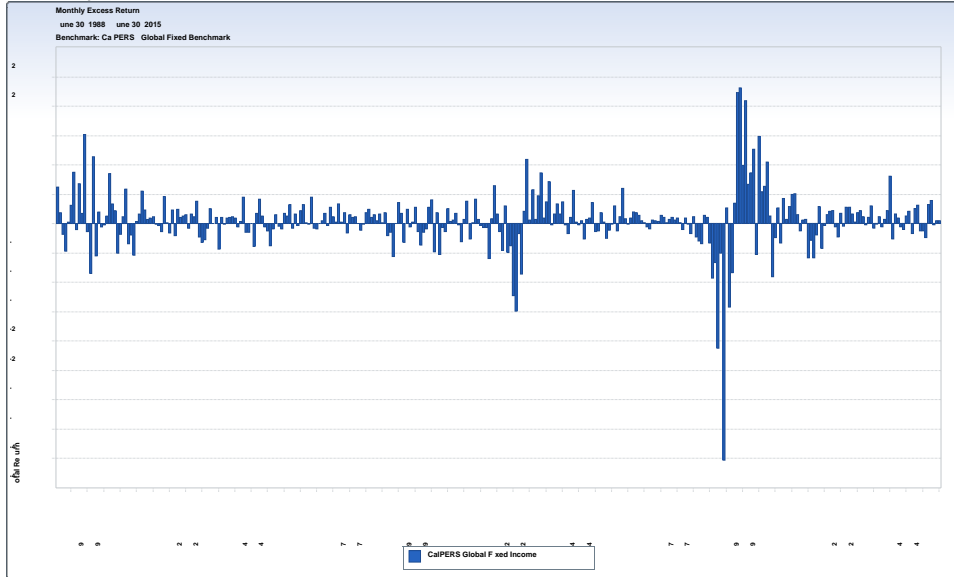
**IT Systems-Scoring changed from (0-30) to (0-15) in 2015 review

***Marketing category removed in 2015 review

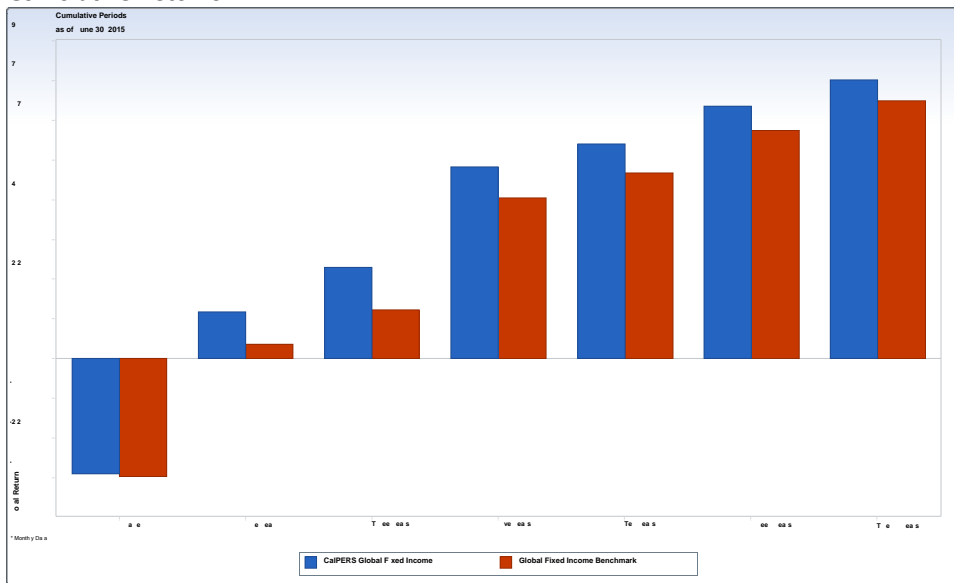
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Performance Appendix

Monthly Excess Returns

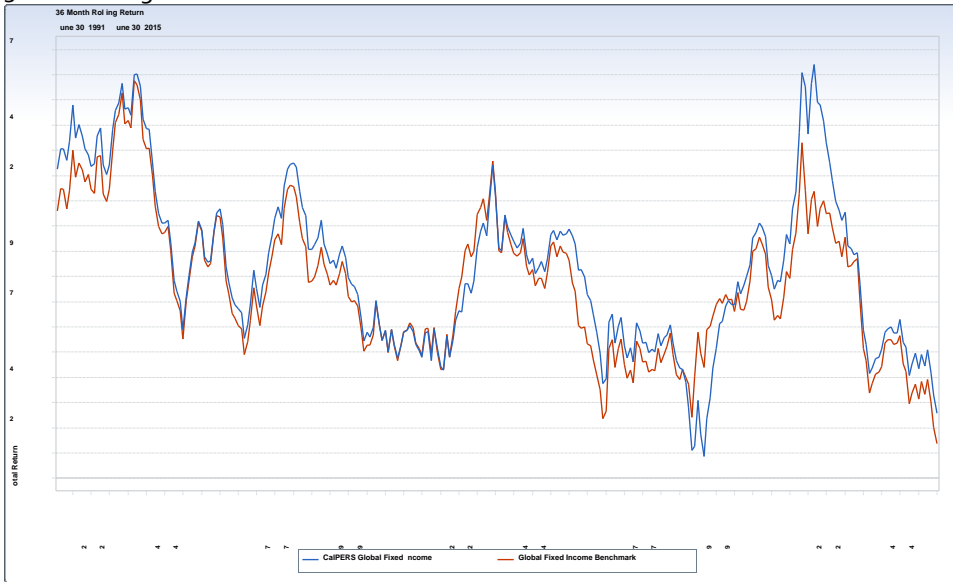


Cumulative Returns



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3 Year Rolling Returns



3 Year Rolling Risk

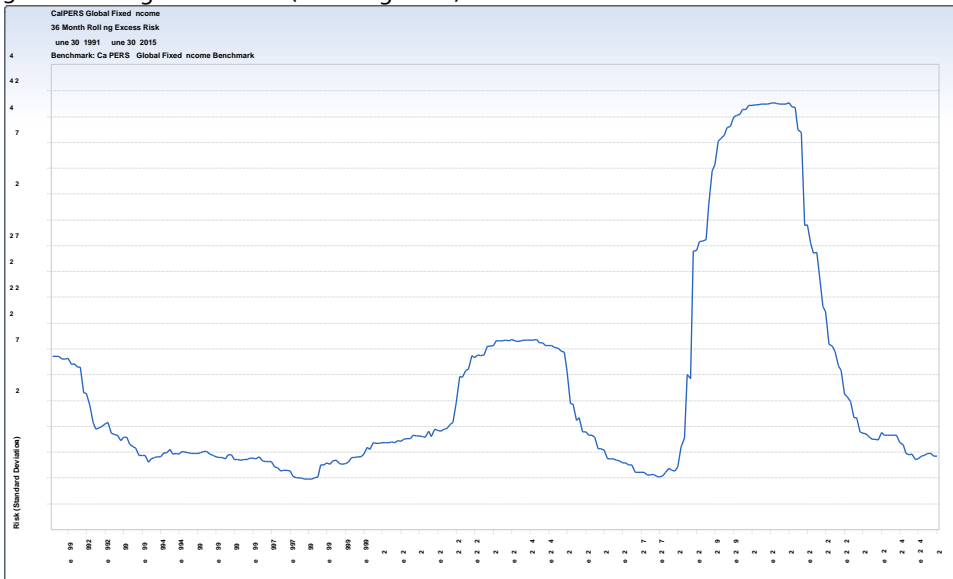


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3 Year Rolling Excess Returns



3 Year Rolling Excess Risk (Tracking Error)

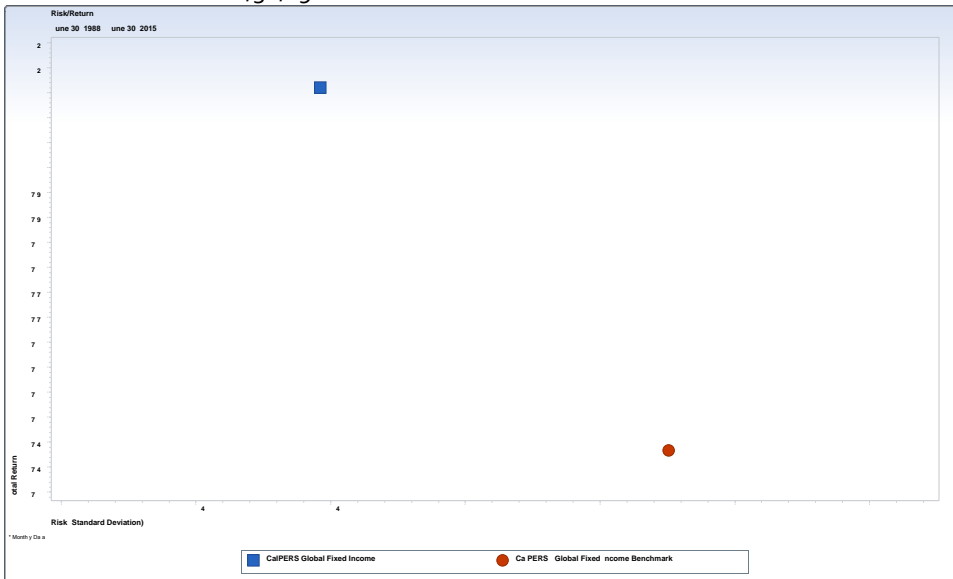


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3 Year Rolling Information Ratio

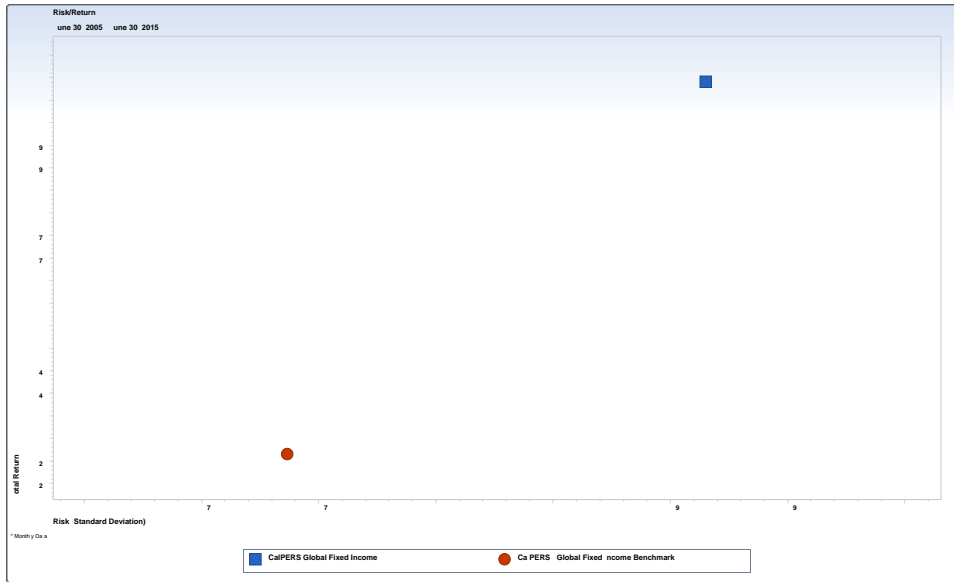


Risk vs. Return since 6/30/1988

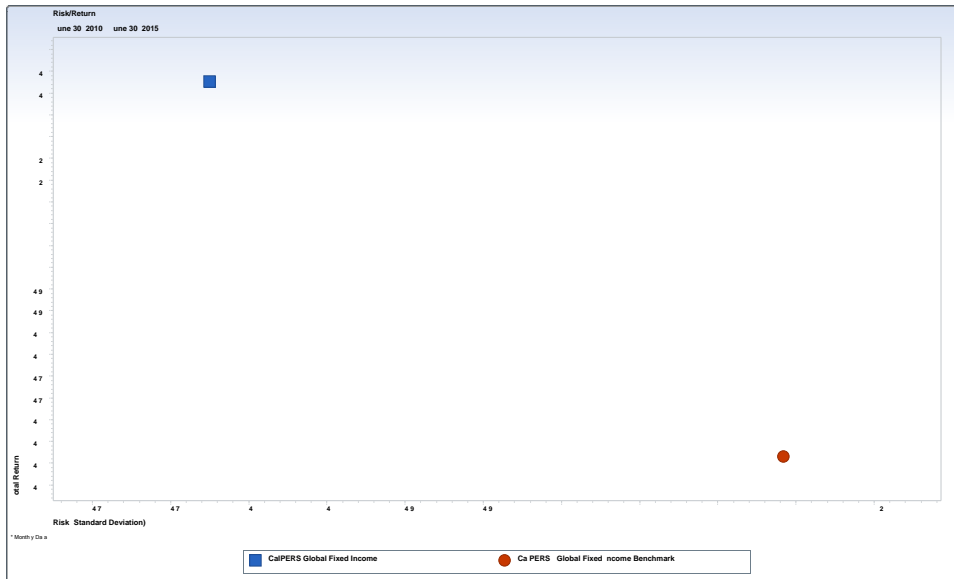


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Risk vs. Return - Last 10 Years



Risk vs. Return – Last Five Years



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Up/Down Market Performance

