Independent Fiduciary Services, Inc.

Investment Fiduciary Review of the Pennsylvania Public School Employees Retirement System

PSERS Report II – Additional Objectives not covered by the Pennsylvania Department of the Auditor General

September 18, 2006

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Introduction

This report is presented in four sections: an executive summary; background information and methodology; detailed discussion and analysis; and exhibits.

Section I, the Executive Summary, offers a high level overview of the major themes in the report. The Executive Summary should be used in the context of the full report.

Section II, Background and Methodology, describes Independent Fiduciary Services, Inc. ("IFS") and the methodology we followed in performing this assignment. It then explains the overall format of this Report within the context of the broader fiduciary review conducted by IFS and the audit conducted by the Pennsylvania Department of the Auditor General ("DAG") and concludes with caveats and observations about the substantive sections of the Report.

The next Section III, Discussion and Analysis, comprises the body of the report. Section III addresses all objectives/tasks defined in the April 14, 2005 Agreement for Investment Fiduciary Review Services other than the DAG Supporting Objectives. The complete discussion and analysis of the DAG Supporting Objectives[1] – organizational structure and resources (Task

[1] The objectives/tasks listed in Exhibit B under items A,G, I and M and the evaluation of the efficiency and effectiveness of class action activities (in Exhibit E) of the April 14, 2005 Agreement for Investment Fiduciary Review Service

Area A), due diligence procedures (Task Area G), legal matters (Task Area I), investment consultants' responsibilities (Task Area M), and securities class action litigation activities (Task Area Q) – is contained in a separate report ("PSERS Report I") as an appendix to the Auditor General's performance audit report. Since each report must be distinct, to facilitate readability, the task areas corresponding to DAG Supporting Objectives (Task Areas A, G, I, M, and Q listed in Exhibit B to the Agreement) are identified as I-A, I-B, I-C, I-D and I-E in PSERS Report I. The remaining objective/task areas listed in Exhibit B to the Agreement, addressed in this Report, are identified as II-A through II-M.

Section III sets forth background information (including best and common practices where applicable), detailed observed conditions and findings, and recommendations. Our findings and recommendations are based on the review we conducted of each objective/task area in coordination with the Board, the Executive Director, the Chief Investment Officer and the investment staff. Since each task area is addressed as a separate section, there is some overlap within the overall Report.

Section IV, Exhibits, contains supporting material, tables and charts that are referenced within the body of the report. However, many charts and tables are inserted in the body of the report where feasible. A summary of the report recommendations is provided as Exhibit H. Exhibit I contains the formal response of the DAG to IFS' PSERS Report II.

Section I.

Executive Summary

Basis for the Review

The Commonwealth of Pennsylvania Public School Employees' Retirement System (referenced interchangeably in this document as "PSERS" or the "System") provides retirement, disability and survivor benefits for Pennsylvania public school employees. PSERS is governed by a Board of Trustees. The Board determined that it was prudent and in the best interest of the Board and its numerous fund stakeholders and beneficiaries to have an independent, experienced financial services organization assist them in evaluating various aspects of PSERS' operations and investment program.

PSERS and SERS (the Commonwealth of Pennsylvania State Employees' Retirement System) together issued RFP PSERS/SERS-2002-2, Request for Proposal for Fiduciary Audit Services, dated October 23, 2002. PSERS and SERS each selected Independent Fiduciary Services, Inc. ("IFS") to perform fiduciary reviews relative to each of their investment organization and operations.

The Department of the Auditor General ("DAG"), PSERS and SERS entered into an Agreement for Investment Fiduciary Review Services, dated April 14, 2005 (the "Agreement"), which provides for fiduciary reviews of PSERS and SERS by IFS to complement the performance audits of PSERS and SERS simultaneously conducted by DAG. The IFS Objectives in support of the Auditor General's Performance Audit (the "DAG Supporting Objectives") consist of a review and evaluation of the following areas:

- Organizational structure and resources;
- Due diligence procedures;

- Legal matters;
- Investment consultants' responsibilities; and
- Securities class action litigation activities.

The DAG Supporting Objectives identified above are addressed in PSERS Report I, attached as an appendix to the Auditor General's performance audit of PSERS.

This Report, ("PSERS Report II") consists of a fiduciary review and evaluation of the remaining objectives/task areas listed in Exhibit B to the Agreement and identified below (the "PSERS Objectives"):

- Investment policy;
- Asset allocation;
- Investment performance;
- Investment performance reporting;
- Performance benchmarks;
- Costs and fees;
- Investment personnel practices;
- Investment manager structure;
- Trust and custody arrangements;
- Fiduciary liability insurance;
- Innovative practices;
- Proxy voting process; and
- Disaster preparedness.

IFS delivered the preliminary discussion documents concerning the DAG Supporting Objectives on November 14, 2005 and the PSERS Objectives on December 14, 2005. Preliminary comments on the DAG Supporting Objectives were received from PSERS on December 7, 2005. Comments were received from DAG on the DAG Supporting Objectives on

December 13, 2005. A face to face meeting with representatives from DAG and IFS to discuss DAG's comments was held on January 9, 2006. Written comments from DAG on the PSERS Objectives were received on January 10, 2006. IFS provided written comments to DAG's comments on the preliminary drafts on January 19th 2006.Consistent with IFS' review methodology as stated in Exhibit B of the Agreement, a first draft for review and discussion on the DAG Supporting Objectives and the PSERS Objectives was submitted on January 19, 2006. Additional written comments were received from DAG during the month of March, 2006.[2] Written comments were received from PSERS on the DAG Supporting Objectives on December 7, 2005 and on March 1, 2006 regarding the PSERS Objectives with further comments on the DAG Supporting Objectives and discussed with PSERS on March 6, 2006.

In accordance with Amendment No. 2 to the Agreement, IFS submitted a second draft for review and discussion on April 14, 2006. PSERS submitted their formal written comments on May 26, 2006 and DAG submitted their formal written response on June 14, 2006. PSERS' comments were discussed on June 14, 2006 and DAG's comments were discussed on June 22 and 29, 2006. IFS presented the final draft report to the PSERS Board on August 4, 2006 and received final Board comments on August 11, 2006. DAG provided its final formal written comments on August 25, 2006.

The following paragraphs describe in summary fashion some of the highlights of our Report. IFS has performed numerous operational reviews of public pension funds over the past twenty years. The results of this review demonstrate that, except with respect to its current degree of autonomy, PSERS is generally in line with best practices in terms of its overall governance, administration and management of its investment program. We thank the Board members for their time during this project. We also thank Mr. Clay and his staff for all of their time and cooperation during our review. We especially thank Mr. Halke for coordinating the project and seeing to our needs and numerous requests for information.

[2] March 3rd, 13th, 15th and 16th.

Key Findings and Recommendations Regarding PSERS Objectives

II-A. Investment Policy

We found that PSERS' Investment Policy Statement is generally thorough and contains most of the essential elements. However, we note in our Report a few areas where the Investment Policy could be enhanced primarily through expansion or better documentation, such as: specifying the actuarial rate of return as an additional long-term investment objective; expanding the discussion on risk and liquidity needs to reflect the Board's risk tolerance and cash needs in more clearly; further detailing the roles and responsibilities of the various key parties; clarifying the role of the Developmental Fund; and incorporating additional policies by reference.

II-B. Asset Allocation

We found that PSERS uses an appropriate process to set the Fund's asset allocation policy that is in line with best practices. PSERS' investment consultant conducts an asset allocation analysis and limited asset liability study annually. PSERS has been in the fore front of investing in non-traditional asset classes and has sought a higher allocation to non-public market investments in order to maximize total return while increasing diversification. Through our own analysis, we found that PSERS' asset allocation is reasonable and fairly efficient. In light of the progressive asset classes, it is essential, for the Board to receive appropriate training so that they understand the sophisticated strategies employed.

II-C. Investment Performance

PSERS beat its Total Fund policy benchmark over the one, three and five year time periods ended June 30, 2005 and its performance generally compares favorably to its peers. IFS analyzed PSERS' gross of fees investment performance and risk characteristics for the five year period ended June 30, 2005 for the total Fund and the individual asset classes. Detailed cumulative and consecutive performance analysis for each asset class is contained within our report.

II-D. Investment Performance Reporting

IFS found the level of investment performance reporting generally to meet industry best practices. The level of reporting provided to staff from their investment consultants was extensive and typically met or exceeded "best practices." The level of reporting provided to the Board contained most of the necessary exhibits to evaluate a sophisticated investment program, although additional exhibits could be provided to supplement certain subjects. In our Report, we recommend including consecutive time period performance in addition to cumulative data.

II-E. Performance Benchmarks

The performance benchmarks used by the System to evaluate the total Fund and each underlying asset class are generally appropriate. IFS found that some of the asset class benchmarks are narrower than the allowable range of investments; and therefore we recommend some broad based investment benchmarks as replacements for the public market asset classes in our Report.

II-F. Costs and Fees

Since PSERS uses both internal and external management, it needs to measure and attempt to minimize both the internal costs of investment management as well as fees paid to external firms. While we believe that PSERS is likely correct in its conclusion that its use of internal asset management is cost effective, we think that PSERS should re-engineer its cost-benefit calculation to confirm the data. As for external investment management fees, we found that PSERS appears to be paying reasonable fees, although we recommend that the System review the performance based fees.

In regards to trading, PSERS is somewhat atypical in that it executes trades for both its internal portfolio managers and its external equity managers. While PSERS believes that it is able to achieve lower commissions and that the quality of its execution exceeds manager universe averages, IFS recommends that the System undertake a comprehensive cost analysis and trading analysis of the incremental value of internally trading for outside investment managers, including staff needs.

II-G. Investment Personnel Practices

In order to manage its personnel practices optimally, the PSERS Board should have the autonomy necessary to implement its decisions regarding staffing structure and resources without the approval of others who may not be subject to the same fiduciary standards or who may have competing interests. While IFS is fully aware of the difficulties and risks associated with the legislative process, IFS recommends that PSERS support and, if enacted, implement legislation intended to modify PSERS' governance structure to grant to the PSERS Board a level of autonomy appropriate in view of the PSERS Board's fiduciary responsibilities of prudence and loyalty to the interests of the PSERS membership imposed by Commonwealth law. These suggestions include providing PSERS with:

- Independent personnel authority,
- Independent budgetary authority,
- Independent procurement authority, and
- Ability to obtain independent legal counsel.

At a minimum, IFS recommends that PSERS' personnel authority be expanded to include setting compensation levels for all senior level positions and allowing the Board to determine the appropriate staff complement. In addition, current budgetary and procurement authority could be expanded without full autonomy. We also recommend that PSERS adopt a formal Statement of

Governance Principles that identifies the other Commonwealth entities that effect the management of PSERS.

IFS compared PSERS' staffing and compensation levels to its custom peer group, the majority of which also use internal asset management. In our Report, we discuss the limitations of these peer group comparisons. Regarding staff, we found that while PSERS' total investment staff is line with the peer group median, PSERS' total authorized staff complement has not increased since 1994, even though PSERS' asset size has doubled. Certain asset classes, such as public equities and internal audit, also have fewer staff than the peers and we recommend that PSERS consider increasing its staffing level in these areas. Other areas, such as legal and information technology, have more staff than the peers. PSERS is also atypical in maintaining an independent investment accounting book of record and we recommend that PSERS perform a staffing adequacy assessment after the independent accounting book of record project is complete.

Regarding compensation, we found that base compensation, without incentive pay, of most PSERS' investment staff is generally lower than its peers. With incentive compensation included, investment staff salaries are fairly comparable to or slightly higher than PSERS' peers, although we note that incentive compensation is not guaranteed. In our Report we recommend increasing the top of the compensation range for a few positions in order to be consistent with the peer group ranges. We also recommend reviewing the incentive compensation program; adjusting the qualitative and quantitative criteria and payout percentages in the incentive compensation plan policy; and using an external, independent accounting firm to review and verify the performance calculations of staff in determining the quantitative portion of the incentive payout.

II-H. Investment Manager Structure

With the help of its general investment consultant, PSERS reviews its investment manager structure as part of an annual investment review. PSERS has made the decision to use internal asset management for approximately one-third of its assets, including indexed and enhanced index equities as well as active fixed income. We found that overall PSERS' investment manager structure is well diversified and generally reasonable, although the large number of public market external managers stretches the staff thin for monitoring purposes. Going forward, we believe it is important for PSERS to continue to review the number of public market investment managers it employs as well as its use of strategies such as passive management and global macro.

II-I. Trust and Custody Arrangements

The elected State Treasurer is the statutory custodian for PSERS and the Treasurer selected Mellon Bank as the custody bank for PSERS, SERS and other Pennsylvania funds. We found that despite the fact the PSERS Board was not involved in the selection process, the current custody bank is a top tier global custodian. Changing custody banks is a costly and time consuming process and PSERS should be involved to the extent possible. In our Report, we also discuss PSERS' securities lending program, which we believe contains the essential features and the income derived from the program is in line with other funds.

II-J. Fiduciary Liability Insurance

PSERS self–insures for breaches of fiduciary liability rather than purchasing third party fiduciary liability insurance. This alternative should be reviewed periodically as changes in the insurance market develop.

II-K. Innovative Practices

In order to create a portfolio reasonably expected to achieve a high target rate of return, PSERS has made significant allocations to real estate and alternative investments and has a long history of doing so. More recently, PSERS has expanded its use of portable alpha strategies with the global macro program. Even when invested through limited partnerships, real estate and alternatives are complex asset classes that benefit from intensive due diligence and monitoring. Overall, we found that PSERS' real estate and alternatives program is well managed, diversified and appropriate for their overall investment program. While we agree with PSERS' policy to actively participate on limited partnership advisory boards, as this can add significant value both in considering general partners for future investments and in keeping the partnership's activities, valuations, and reporting under scrutiny, PSERS' staff is stretched thin and additional resources may be needed.

II-L. Proxy Voting Process

PSERS' proxy voting program is comprehensive and well documented. The Board has adopted proxy voting policies for U.S. and international equities. Internal staff monitors the third party specialist (who is responsible for research, advice, proxy collection, tracking and voting), but could enhance its monitoring capabilities with regard to international proxies.

II-M. Disaster Preparedness

PSERS has established a solid policy regarding business continuity that lays the foundation for development of the plan. PSERS has a well thought-out written business continuity plan that includes various disaster scenarios, action plans and step by step procedures, among other elements. PSERS and SERS have a reciprocal arrangement to assist each other in the event of a disaster. In our report, we recommend ways that PSERS could enhance its testing of the plan.

Section II.

Background, Review Methodology, and Limitations on the Report

IFS specializes in evaluating the organizational governance, day to day administration, and investment programs of pension systems using combined expertise in investment practices, pension fund administration and fiduciary responsibility. In operation for almost 20 years, IFS has performed similar evaluations for numerous other public and private pension funds, and is recognized as the leading firm in the industry performing this type of consulting services.

The specific details, scope and depth of the review are defined by the April 14, 2005 Agreement, among PSERS, SERS, DAG and IFS.

Throughout the Report, as part of our fiduciary review methodology, we identify and highlight our findings or observations and provide recommendations. As part of this process, we set forth and explain the principles and criteria we use for the scope area being evaluated. Our goal is not only to identify problems, it is to "add value" by identifying alternatives intended to enhance the pension fund's operations and/or address prospective problematic issues. For this reason, the initial standard we typically use in making our findings and recommendations is industry "best practice." A "best practice" is not necessarily the "norm" or most common practice, rather it is the most effective and efficient means (e.g., a process, procedure or structure) of doing something in a given situation to achieve an optimal outcome. Since effectiveness and efficiency are situational, what is a best practice for one operation may not be a best practice for all operations.

A best practice is often viewed as the baseline, the experience-tested optimum standard, which is then modified to suit a particular organization. What is a "best practice" for an individual organization is determined by examining how a particular function is carried out and then concluding what course of action/methodology would enhance the process. To appreciate the importance of "best practices" it is essential to recognize the difference between a function being achieved and a function being achieved in an effective and efficient manner – the distinction is analogous to the differentiation between being good and being great. IFS' declaration of a "best practice" is based on a combination of various legal standards (enacted and proposed) – e.g., ERISA,[3] UPIA,[4] UMPERSA,[5] secondary research from authoritative industry sources (e.g., studies and pronouncements by DOL, SEC, and industry professional organizations), its own empirical assessments of pension fund practices attained performing similar fiduciary reviews, and the extensive experience of the firm's staff, many of whom, having worked at pension funds have first-hand knowledge of the nuances of pension fund processes.

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[3] The Employee Retirement Income Security Act of 1974 (ERISA) is a federal law that sets minimum standards for most voluntarily established pension and health plans in private industry to provide protection for individuals in these plans.

[4] The Uniform Prudent Investor Act (UPIA) was promulgated by the National Conference of Commissioners on Uniform State Laws (the "Uniform Law Commissioners") in 1994. The Prefatory Note to UPIA states that the model law "undertakes to update trust investment law in recognition of the alterations that have occurred in investment practice." UPIA was endorsed by the American Bar Association and has been adopted in 46 states.

[5] The Uniform Management of Public Employees Retirement Systems Act (UMPERSA) was promulgated in 1997 by the Uniform Law Commissioners to provide legal rules that would permit public employee retirement systems to invest their funds in the most productive and secure manner, with a minimum of regulatory interference. UMPERSA modernizes, clarifies, and makes uniform the rules governing the investment and management of public retirement systems' assets. UMPERSA was endorsed by the American Bar Association. A number of public pension fund organizations participated in the development of the law (e.g., the National Council of Public Employees Retirement Systems (NCPERS) the National Council on Teacher Retirement (NCTR), and various members of the National Association of Public Pension Attorneys (NAPPA). However, because UMPERSA did not address portability, pension board representation, full funding, service credit purchase, disclosure and reporting proxy voting, contractual rights to benefits, and domestic relations orders, it was not endorsed by the public pension fund organizations that participated in its development.

Our approach also recognizes that it is difficult to transform the status quo without an apparent problem. A pension fund may not have the inclination or statutory ability to bring its operations in line with best practices. For this reason, we attempt to also include alternative recommendations, where feasible, which take into consideration the practical realities of the pension fund's circumstances and functional environment. We note these situations in the text of the report.

The analysis leading up to this Report progressed through the following stages:

Document Collection

The first stage in our process was collection – with the staff's cooperation – of information regarding the Board's investment program, practices and operations. This included amassing extensive data and documents, such as the Board's enabling and related statutes, written operating policies and procedures governing the organization, written investment policies and guidelines, service provider contracts, and other materials. This phase was conducted primarily in May and June, 2005, with additional documents requested as necessary. DAG also received all of the documents we requested.

Analysis

The next stage of our process, which continued throughout the project, was analysis. In undertaking this review, IFS employed a team approach, assigning certain of its personnel to concentrate on particular subject areas. Throughout the process, we coordinated and integrated our efforts and maintained communication with representatives of the Board.

Interviews & Discussions

The third stage of the process was to hold a series of interviews with people directly associated with the Board. These included face-to-face and/or telephone interviews with the Board Members, the Executive Director, investment staff members, legal counsel and various service providers. The main interview phase was conducted in two phases in June and July, 2005. Subsequent interviews were conducted in person in Harrisburg and by telephone. Representatives from DAG attended all of our staff, Board and service provider interviews.

Survey and Research

IFS developed a lengthy survey directed at peer public pension funds. We developed a list of peer funds (the "custom peer group"), which was approved by PSERS, based on certain factors. Experts will acknowledge that no two pension funds are precisely identical. Some argue the various differences among the pension cancel each other out and therefore asset size is the appropriate measure of comparability. The distinctions among pension funds are many. However, some have more factors in common than others. Therefore, we use commonality of characteristics to measure comparability. The greater the number of shared characteristic, the greater the level of comparability. We define the PSERS "peer group" as the pension funds with the greatest level of comparability to PSERS.

To determine comparability and define the PSERS "custom peer group," we considered not only the size of the fund (e.g., assets under management), but also the complexity of the investment portfolio (e.g., the extent of participation in various asset classes the asset classes utilized, whether the majority of assets were internally or externally managed, the use of active versus passive management of investment assets, whether the entity was responsible for investments and benefits administration, etc. Based on the comparability characteristics, IFS identified fourteen funds as suitable for participation in the survey pool. Outliers (funds that mirrored PSERS less than some) were also included to assess whether their diminished comparability had a significant impact on the comparison. (See Exhibit A – Customized Peer Group Survey Recipients.) Using commonality of characteristics IFS would typically not consider PSERS' sister fund (SERS) as a peer. However, we agreed to include SERS because there is an instinctive comparative tendency with respect to "sister funds."

Eight funds responded, including SERS (see Exhibit B – Custom Peer Group Respondents), although several funds did not provide all of the information requested. Several recipients declined to participate due to the significant amount of time required to compile the necessary information to respond to the survey. To promote participation we agreed, if requested, to maintain the confidentiality of information and to provide participants with a copy of the survey results. Where confidentiality is a consideration we do not attribute such information to a specific organization. Rather, when reviewing such information each survey participant was assigned a code letter.

The results of the survey are incorporated throughout the Discussion and Analysis section of the report where applicable. We can not attest to the accuracy of the data provided by the peer funds. A copy of the survey instrument used can be found at Exhibit C.

In addition to the survey we also researched the enabling statutes, regulations, and governance documents of the peer group members to obtain information that was not requested in the survey or where clarification was needed.

Draft, Preliminary, and Final Report

The written report also progressed through several stages. IFS delivered the preliminary discussion documents concerning the DAG Supporting Objectives on November 14, 2005 and the PSERS Objectives on December 14, 2005. Preliminary comments on the DAG Supporting Objectives were received from PSERS on December 7, 2005. Comments were received from DAG on the DAG Supporting Objectives on December 13, 2005. A face to face meeting with representatives from DAG and IFS to discuss DAG's comments was held on January 9, 2006. Written comments from DAG on the PSERS objectives were received on January 10, 2006. IFS provided written comments to DAG's comments on the preliminary drafts on January 19th 2006. Consistent with IFS' review methodology as stated in Exhibit B to the Agreement a first draft for review and discussion on the DAG Supporting Objectives and the PSERS Objectives was submitted on January 19, 2006. Additional written comments were received from DAG during the month of March, 2006.[6] Written comments were received from PSERS on the DAG Supporting Objectives on December 7, 2005 and on March 1, 2006 regarding the PSERS Objectives with further comments on the DAG Supporting Objectives and discussed with PSERS on March 6, 2006.

In accordance with Amendment No. 2 to the Agreement, IFS submitted a second draft for review and discussion on April 14, 2006. PSERS submitted their formal written comments on May 26, 2006 and DAG submitted their formal written response on June 14, 2006. PSERS' comments were discussed on June 14, 2006 and DAG's comments were discussed on June 22 and 29, 2006. IFS presented the final draft report to the PSERS Board on August 4, 2006 and received final Board comments on August 11, 2006. DAG provided its final formal written comments on August 25, 2006.

This process of draft, comment and redraft enabled relevant parties to point out matters that, in their view, were either factually or conceptually inaccurate, incomplete or misleading, and enabled us to obtain additional information and prepare a revised drat and subsequently a final report that takes into account all relevant comments. The final product reflects the combined analytical and writing efforts of a diverse team of investment professionals. To the extent IFS did not agree with the comments of PSERS or DAG and the language in question was not added or changed, such comment(s) are included in this Report. PSERS responded to each of IFS' recommendations and their responses are noted in the body of the Report. DAG prepared a letter response to the Report (Exhibit I) and we refer the reader to their response where

[6] March 3rd, 13th, 15th and 16th.

appropriate. It is important to note that the fiduciary review methodology and drafting process differs and is not intended to be analogous to the general audit process.

Report Caveats

This Report should be read and evaluated with several caveats in mind.

- First, many of the subjects addressed in this Report are inherently judgmental and not susceptible to absolute or definitive conclusions. Many of our conclusions constitute alternatives for the Board and staff to consider in light of PSERS' evolving investment program, management and practices now and over the coming years.

- Second, in conducting this review, we assumed the information we were provided, whether by the Service Providers, PSERS or the peer funds, is accurate, and could be relied upon, including the information presented in response to the survey. We can not attest to the accuracy of the data provided by the survey peer group respondents. We sought to cross-verify certain information among different interviewees, survey respondents and documents, but the process of cross-verification was limited.

  We were not hired to detect or investigate fraud, concealment or misrepresentations and did not attempt to do so. We were not hired to, and did not attempt to conduct a formal or legal investigation or otherwise to use judicial processes or evidentiary safeguards in conducting our review. Our findings and conclusions are based upon our extensive review of documents, the interviews we conducted with the Board, staff, and others associated with PSERS, independent analysis, and our experience and expertise.

- Third, this Report does not and is not intended to provide legal advice. Although the report considers various legal matters, IFS' analysis, findings and recommendations are not intended to provide legal interpretations, legal conclusions or legal advice. For that reason, action upon such matters should not be taken without obtaining legal advice addressing the appropriate statutory or regulatory interpretation and legal findings regarding such matters.

- Fourth, our observations are necessarily based only on the information we considered as of and during the period we performed our review, especially as of June 30, 2005 for the investment holdings.

- Fifth, our Report cannot and does not attempt either to assess the manner in which any of our recommendations may be implemented or observed in the future, or predict whether PSERS' practices, as represented to us, will be observed in the future. Nor does our Report supplant or reduce the ongoing independent fiduciary duty of the Board and staff to structure and evaluate their investment program or policies and procedures.

- Sixth, although this Report sets forth observations and recommendations regarding PSERS' internal controls, we did not conduct – or attempt to conduct – a full or formal examination of PSERS' internal control system. This Report is not intended as a substitute for such an examination, if one is appropriate. The scope of our work was limited by our contract with the Board.

- Finally, although we have discussed our findings with, and submitted draft versions of our Report to PSERS and to DAG, its final form and content reflect the independent judgment of IFS. The extent to which our Report and recommendations are implemented is the Board's decision.

Please see DAG's response at Exhibit I for comments on this section.

Section III.

Discussion and Analysis

II-A. Investment Policy

1. Key Elements of an Investment Policy Statement

An investment policy statement ("Investment Policy" or "IPS") is the framework for the entire investment program. The purpose of an IPS is to articulate the consensus views of the Board of Trustees regarding the overall investment program and its major components, to explicate policies and procedures to assist the Trustees with major issues (e.g., developing a long-term strategic asset allocation, selecting service providers and performing due diligence, monitoring performance and investing assets consistent with appropriate fiduciary standards) and to set forth the manner in which the assets of the Fund shall be invested in a manner consistent with the appropriate fiduciary standard. Another primary purpose of an IPS should be to establish that all transactions are in the best interest of the pension fund's participants and beneficiaries and designed to provide benefits and defray reasonable expenses of plan administration in a prudent manner.

Key elements of an IPS include:

- The System's mission and purpose;
- The System's investment objectives;
- The System's risk tolerance;

- The liquidity needs of the System;
- The roles and responsibilities of the essential parties, e.g., Board of Trustees, staff, the investment consultants, investment managers, custodian(s) and the decision-making process;
- The System's long-term strategic asset allocation:
    - Including specific targets and ranges, and
    - Rebalancing process;
- Standards and measures of investment performance, including:
    - Benchmarks for each asset class and the System as a whole, and
    - The process for monitoring and evaluating performance of the Fund as a whole and the individual managers (both external and internal, if applicable);
- Selection of external investment managers;
- Broad total Fund and asset class investment guidelines, including:
    - Permissible and impermissible asset classes, investment strategies and instruments, and
    - Reasons and general parameters for each major asset class;

- Criteria and procedures (or reference to separate policies) regarding specific miscellaneous subjects, including:
    - Securities lending,
    - Proxy voting,
    - Securities litigation, and
    - Brokerage; and
- The process for periodic review of the IPS.

2. Review of PSERS' IPS

The PSERS IPS Contains Most of the Critical Elements

We reviewed the Investment Policy Statement for the Pennsylvania Public School Employees' Retirement Fund ("PSERS IPS"), as updated March 18, 2005, to see whether, in our opinion, it contains all of the essential elements. Not including certain critical elements could expose PSERS to undue risk, such as not evaluating the Fund's performance correctly, not structuring the Fund in an optimal fashion to meet its objectives, or not achieving the actuarial assumed rate of return, which could lead to unanticipated underfunding over the long-term.

a. PSERS' Mission and Purpose

An IPS should summarize the mission and purpose of the retirement system (e.g., to accumulate funds exclusively for the benefit of the members and beneficiaries of members of the system for the payment of withdrawal, retirement, disability, and death benefits as provided in the Statutes) and to state long-term goals (e.g., to have the ability to pay all benefit and expense obligations when due, to achieve fully funded status, etc.). This section should also state and define the fiduciary standard with which board members must comply. Board members need to be informed as to their fiduciary duty and this should be part of a board's education and orientation.

The IPS Could Elaborate its Definition of the System's Mission

The PSERS IPS states that the Board recognizes that it is responsible for "formulating investment policy" and that it has "exclusive investment control and management of the Fund," the largest public pension fund in the Commonwealth of Pennsylvania. It must abide by Section 8521 (Prudent Person Legislation) of the Public School Employees' Retirement Code, 24 Pa. C.S. and the laws of the Commonwealth of Pennsylvania. The PSERS IPS acknowledges that the Board is responsible for, among other items, implementing investment policy, including hiring and firing of investment managers, reviewing performance, and setting policies regarding fees and commissions. Based on information provided to us by the System, we understand that the standard to which the PSERS Board is held is actually the "prudent investor" standard, a stricter standard, and the IPS should reflect that fact to avoid confusion.[7]

The PSERS IPS also states that the current policy is "deemed to be consistent with the projected pattern of cash-flows to the plan and its projected benefit payments" and that it will revise the policy if necessary as circumstances change. However, the PSERS IPS does not specifically mention the main purpose of PSERS is to be able to pay benefits as promised when due nor does it state the desire to be fully funded as a goal. We believe this section could be expanded to state in more detail PSERS' mission as a major public retirement system.

[7] See memo dated January 4, 2006 from Michael Budin and Gerald Gornish, Chief Counsels of SERS and PSERS, respectively, to Christal Pike-Nase, Deputy Chief Counsel DAG, which states that they "concluded that the standard applicable to each of our boards in making investment decisions is a prudent investor standard."

Recommendations IIA-1 and IIA-2	PSERS Response
Clarify in the IPS that the PSERS Board members are held to the "prudent investor" standard and define the standard in the IPS.	PSERS agrees and, in fact, has already implemented this recommendation by amending its IPS (August 2006 Board Action).
Expand the mission and purpose section of the IPS to better define the purpose of PSERS.	PSERS agrees and, in fact, has already implemented this recommendation by amending its IPS (August 2006 Board action).

b. Investment Objectives

Investment objectives should grow out of – and conform to – the investment horizon of PSERS, its current and expected future cash flow needs and liability stream. It is necessary to establish clear total fund performance objectives, e.g., "earn a rate of return in excess of inflation, which meets or exceeds the pension system's assumed actuarial rate and is consistent with the pension system's long-term Policy Index," to help shape the entire investment program. Establishing objectives for each asset class and strategy likewise can help shape their nature and structure.

The Board has set Reasonable Investment Objectives Although there is Room for Refinement

The PSERS IPS states that the Fund's long-term investment objectives are:

- Preservation of capital in real terms;
- To maximize total returns while limiting the risk of volatility through diversification;
- To achieve total returns in excess of the policy index;
- To achieve a real rate of return over CPI over time; and

- To provide sufficient liquidity to meet the current operating needs of the Fund.

In general, we believe that these goals are reasonable, however PSERS does not state the additional goals of meeting or exceeding the actuarial rate over the long-term (currently 8.5%) or of achieving a desirable ranking in a comparable public fund universe over the long-term (such as above median). We note that comparing performance to that of a peer universe is imprecise, because other public funds will each have different asset allocations, although many funds do compare themselves to their peers. In addition, simply beating the CPI over time will only preserve capital and not offer the Fund any significant real growth.

Recommendation IIA-3	PSERS Response
We recommend including "meeting or exceeding the actuarial rate over the long-term" as an additional long-term investment objective in the IPS.	PSERS agrees and, in fact, has already implemented this recommendation by amending its IPS (August 2006 Board Action).

c. Risk Tolerance and Liquidity Needs

The ultimate decision makers (i.e., the Trustees) must determine and specify the types and levels of risk suitable for each portion of the portfolio and the portfolio as a whole. They should have an awareness of the risk level of the Fund's asset allocation and reach a consensus as to what is acceptable. Risks taken should be appropriate to generate the necessary level of expected return, otherwise the Board risks setting an inefficient or overly risky policy. Risk tolerance is also affected by the funded status of a plan, i.e., if a plan is underfunded and is willing to take greater risk to increase the funded level or if a plan's benefit payments exceed its contributions and it needs greater liquidity.

In general, risk measures attempt to quantify the likelihood of investment loss given an expected or desired level of return. Some risks can be quantified in a straightforward manner, e.g., a fixed income portfolio's sensitivity to changes in interest rates through measures such as duration; while other risks are more difficult to quantify, e.g., the impact of external shocks to the economy that could cause economic sector meltdowns, etc.

The Trustees should use their best efforts to understand and determine the types and level of risk suitable for the portfolio as a whole and for each portion of the portfolio. The Board should take into account the Fund's:

- Demographics: average age and years of experience, active/inactive ratio, duration of liabilities
- Funded status: funded ratios, actuarial assumptions, future contribution requirements, etc.
- Time horizon
- Cash flow: timing of contributions, benefits schedule
- Investment objectives
- Board and System tolerance for volatility, e.g., the possibility of short-term losses versus the chance of long-term gains or tolerance for unpredictable returns
- Other concerns and ancillary goals such as a campaign to increase benefits

The resulting risk level should be appropriate to generate the necessary level of expected return, consistent with the IPS.

The PSERS IPS Does Not Clearly State the Risk Tolerance of the Board

As mentioned above, one of the Fund's investment objectives is "to maximize total returns while limiting the risk of volatility through diversification." However, the IPS does not directly address how risk averse or risk accepting the System is or should be to achieve its goals. Demographics, funded ratios and contribution rates are all discussed in the System's Asset Liability Review and the IPS refers to that analysis, but it could more directly comment on the System's risk tolerance in the IPS, i.e., whether the Board is willing to accept above average market risk given its long time horizon, or something similar.

Recommendation IIA-4	PSERS Response
Consider expanding the discussion on risk in the IPS to define more clearly the Board's risk tolerance.	PSERS agrees and, in fact, has already implemented this recommendation by amending its IPS (August 2006 Board Action).

Liquidity Requirements are not Addressed Sufficiently in the PSERS IPS

The Board should also take into account current and future cash flow needs for the Fund. Although, one objective of the Fund is to provide sufficient liquidity to meet the current operating needs of the Fund, the PSERS IPS does not address the negative cash flow of the Fund and how that is to be handled.

Recommendation IIA-5	PSERS Response
The Board should more clearly address the cash needs of the System in the IPS.	PSERS agrees and, in fact, has already implemented this recommendation by amending its IPS (August 2006 Board Action).

d. Identification of Roles and Responsibilities

An IPS should also be used to outline the assignment of responsibilities. It should clearly delineate the responsibilities of the Board and distinguish them from those of the investment staff, investment managers and other service providers (e.g., investment consultants) to PSERS.

The PSERS IPS Could More Clearly Define Roles and Responsibilities

Individual sections of the PSERS IPS address the roles of certain of the parties (e.g., "Annually, the Board approves the investment structure as presented by the general investment consultant"), but the IPS does not define the responsibilities of all of the distinct groups of individuals in detail. Although not required, we believe that it can be useful to delineate specific roles and responsibilities in a distinct section of the IPS, summarizing the main responsibilities of each party.

Recommendation IIA-6	PSERS Response
Consider adding a more detailed description of the roles and responsibilities of the various parties (e.g., Board, staff, service providers) in the IPS.	PSERS agrees and, in fact, has already implemented this recommendation by amending its IPS (August 2006 Board Action).

e. Strategic Asset Allocation

The PSERS IPS Establishes the Asset Allocation Policy

Another fundamental purpose of the IPS is to establish the System's long-term asset allocation policy. The targets for each asset class should be based on and generally consistent with the results of PSERS' most recent asset allocation and/or asset liability study. It should reflect the balance between the Board's risk tolerance (willingness to accept short-term volatility of returns and the possibility of negative total return over short periods) and the desire to achieve PSERS' long-term investment objectives. To further control risk, PSERS should also diversify within each asset class by style, capitalization, sector, etc.

The PSERS IPS states that the Board "will review long-term asset allocation targets at least annually…..[and] will seek the opinion of its actuary, consultants, staff, and any other sources of information it deems appropriate in formulating this allocation." The intent of the asset allocation is "to achieve diversification…that is consistent in meeting the near and long-term financial needs and objectives of the Fund." The IPS outlines the target allocation and range for each of the following asset and classes and sub-classes: U.S. equity (broken down between large cap and small cap), non-U.S. equity (broken down between developed large cap and emerging markets), alternative investments (broken down between private debt and private equity/venture capital), real estate (including REITS), and fixed income (broken down among TIPS, domestic fixed income, global fixed income, high yield and cash).

The PSERS IPS also mentions the "Developmental Fund" and its target allocation of 1.5%, but does not define what the Developmental Fund is. It states, "the advisor's objectives will determine where the manager is included in the overall asset allocation of the Fund." We find this statement to be confusing and believe this section should be clarified and expanded.

Recommendation IIA-7	PSERS Response
Clarify in the IPS the role of the "Developmental Fund."	PSERS agrees and, in fact, has already implemented this recommendation by amending its IPS (August 2006 Board Action).

f. Rebalancing

An IPS should also define the rebalancing process. Rebalancing ranges around the long-term targets are set up to ensure that asset allocation "drift" is minimized. When an asset class exceeds the range around the long-term target, the IPS should describe the process and timing for rebalancing and whether it is to the target or half-way. Over time, disciplined rebalancing may enhance performance and manage overall risk. The PSERS IPS states that the asset class values should be reviewed monthly and that "[a]ny asset class allocation that falls outside the policy ranges described above will be rebalanced to within the policy range, but in no cases beyond the target allocation objective, within a reasonable period of time by the Chief Investment Officer." The CIO is encouraged to use index funds where possible in order achieve cost and time savings and is permitted to use derivative securities to "implement temporary adjustments."

Recommendation
No recommendation necessary.

g. Evaluation of Investment Performance

In addition to the overall investment objectives, an IPS should also establish the standards and measures of investment performance, including designating benchmarks which reflect performance expectations for each asset class and for the fund as a whole. For the total fund, "best practices" suggest employing a Total Fund Policy Index and an Asset Allocation Index. Published market indices are weighted to create a "Policy Index" that matches the Fund's long-term target asset allocation and the weights remain fixed over time, until those targets are changed. The Policy Index serves as an objective measure of total fund performance. Differences in performance between the Fund's actual return and the Policy Index can be attributed to:

- asset allocation "drifts" from the long-term target,
- over or under-performance by the Fund's investment managers, and
- tactical decisions to overweight or underweight an asset class.

As an additional measure, many funds also (as a matter of policy) establish an "Asset Allocation" index. This also is constructed using published market benchmarks. In contrast to the Policy Index, the Asset Allocation Index's asset class weights change to reflect the actual asset allocation of the fund as it "drifts" or as tactical decisions are made to overweight or underweight an asset class. Therefore, this benchmark adjusts for the asset allocation drift over time. A fund's excess or under-performance versus the Asset Allocation Index is mainly attributable to the performance of the underlying investment managers (internal or external).

The PSERS IPS Designates the Policy Index for the Total Fund

The PSERS IPS designates market indexes for each asset class, such as the Wilshire 5000 for domestic equity, (and some, but not all, sub-asset classes) based on the asset allocation, the combination of which are specified as the Policy Index. The IPS does not require or specify an Asset Allocation Index for the total Fund, which we believe can serve as a useful additional benchmark. We note, however, that staff does review performance attribution analytics, which help determine whether or not individual portfolio managers add value.

Recommendation IIA-8	PSERS Response
Consider designating an Asset Allocation Index as an additional total Fund benchmark in the IPS.	PSERS will explore creating an Asset Allocation Index, which would show how the allocation differences add value vs. the performance of the underlying managers. PSERS, however, believes it can and does answer the same question - whether each manager adds value or the "drifts"/allocation differences add value - through the quarterly analysis currently prepared and reviewed with the Board.

h. Selection and Termination of Investment Managers

An IPS should designate who has primary and ultimate responsibility for the selection and subsequent termination of investment managers. Selection of investment managers, as well as the decision whether or not to use internal or external investment management, is one of the fundamental decisions a Board must make as a fiduciary. It is important to have a well documented process and that process itself should be outlined in writing. This could be in the IPS or in another policy document referred to in the IPS.

The IPS Should Include Explanation of or Reference to the Manager Search Policy

The introduction to the IPS states that the Board is responsible for "retention of investment advisors, and ongoing supervision of results," however the IPS does not give any detail as to who is primarily responsible for conducting searches for investment managers. We understand that Wilshire and the investment staff work closely together in conducting searches for fixed income and equity managers and that the specialty consultants lead the search process for real estate and alternatives managers. We believe that the IPS could be enhanced by at least outlining or clarifying the roles of the various parties involved or referring to a separate manager search policy document.

As for terminations, the IPS states that the CIO "after receiving concurrence from the Executive Director and the Chair of the Finance Committee, and notifying the Board, has authority to terminate an investment manager for any valid business reason…" Board members can also initiate discussion of a possible manager termination by including it on the agenda of the Finance Committee.

Recommendation IIA-9	PSERS Response
Include a description of the manager search process in the IPS or a reference to a separate manager search policy document.	PSERS agrees and, in fact, has already implemented this recommendation by amending its IPS (August 2006 Board Action).

i. Investment Guidelines

Many institutional investors distinguish between investment policy provisions applicable to the Fund as a whole from more particularized investment guidelines for individual portfolios and investment managers (internal and/or external). Consistent with those institutional investors, we believe investment manager guidelines should be separate and distinct from the IPS. The IPS should reflect policy provisions that apply to all managers, internal and external, for the portfolio as a whole and for broad asset classes, e.g., minimum levels of diversification, prohibited securities or strategies, etc. By contrast, customized guidelines should be developed for each manager or account to articulate and manage the particular risks associated with the unique investment process, strategy and risk characteristics of each.

The PSERS IPS Contains Minimal Guidelines with Respect to Derivatives

The PSERS IPS follows this general layout by stating up front that the "Investment Policy represents policy for the entire Fund….. Detailed guidelines for each of these portfolios have been constructed so that they collectively implement policy for the entire Fund." The PSERS IPS contains a few items that constitute broad guidelines for some asset classes, but for the most part does not contain broad asset class policies. For example, the PSERS IPS outlines the policies on Interest, Dividend and Other Miscellaneous Income Earned and Index Portfolio Rebalancing.

We believe that an IPS should also indicate the types of investment strategies, vehicles and sub-classes that, as a matter of policy, are permissible and those that are prohibited across the entire Fund in order to avoid unintended investments in prohibited asset classes, such as the following:

- whether currency hedging is permitted,
- any limits on investments in below investment-grade fixed income,
- derivatives,
- certain types of real estate investments, e.g., REITs (Real Estate Investment Trusts), direct investments, and
- permissible alternative investments, e.g., hedge funds, private equity.

The PSERS IPS does not address these issues except for when they intersect with a distinct policy (e.g., using derivatives to assist in rebalancing). We believe it would be prudent to be more specific with broad asset class guidelines and strategy guidelines in a few areas, such as derivatives.

Derivative usage is quite complex and can be valuable for enhancing net returns and controlling risk; however, derivatives are also potentially dangerous if not properly controlled. Characteristics of derivatives that may pose significant risks include (but are not limited to) leverage, exposure to counterparties, and illiquidity.

Recommendation IIA-10	PSERS Response
The Board should develop a well articulated supplemental policy regarding derivatives, including definitions of "high risk."	The Board agrees and will look to enhance its documentation of derivatives usage as well as document, either in the IPS or a stand-alone document, its policy on permissible investment strategies, vehicles, and assets.

On a positive note, the PSERS IPS does note that the Board will approve the investment structure annually, which includes the weightings to the various strategies and types of investment managers.

j. Securities Lending

The IPS should indicate whether or not the Retirement System is allowed to participate in a security lending program as well as the broad parameters of the program, e.g., collateral should have a market value of 102% for U.S. securities and be marked to market daily.

The PSERS IPS does not address securities lending, although separate guidelines do exist for this program.

Recommendation IIA-11	PSERS Response
Include reference to the Fund's policy on securities lending in the IPS.	PSERS agrees and, in fact, has already implemented this recommendation by amending its IPS (August 2006 Board Action).

k. Proxy Voting

In order for the Board to fully avail itself of its rights as a shareholder, the IPS should indicate who has responsibility for voting proxies.If investment managers are delegated the responsibility, the System should establish a process by which voting can be monitored. The IPS should require periodic reporting of proxy voting (no less than annually) and it should indicate whether or not managers are permitted to "abstain" from voting on any issue or whether votes should be either "for" or "against." Manager voting reports to the Trustees should summarize each proxy issue and indicate whether the manager's vote was for or against management's recommendation. The Board needs to make sure that managers receive written guidelines established by the Trustees, if any, and adhere to them.

The PSERS IPS does not address proxy voting. The proxy voting policy could be an appendix to the IPS or in another policy document referred to in the IPS.

Recommendation IIA-12	PSERS Response
Include, either as an attachment or by reference, the Fund's policy on proxy voting in the IPS.	PSERS agrees and, in fact, has already implemented this recommendation by amending its IPS (August 2006 Board Action).

l. Brokerage

The IPS should acknowledge that brokerage commissions are a plan asset and, as such, the Trustees will monitor them with the assistance of the investment consultant. It should also indicate that investment managers are obligated to seek best execution on all trades and whether they are permitted to enter into soft-dollar arrangements, provided that:

- Such arrangements are consistent with applicable law and best execution obligations.

- All amounts paid for brokerage and related services are reasonable.

The IPS should also address what PSERS' policies are regarding commission recapture or directed brokerage, if any, and it should establish a process by which the Trustees will monitor the System's investment manager brokerage commission activity and practices. The PSERS IPS does not address brokerage.

Recommendation IIA-13	PSERS Response
Expand the IPS to define clearly how brokerage commissions should be monitored and what types of arrangements (e.g., commission recapture) are permissible or include reference to a separate brokerage policy document.	PSERS agrees and, in fact, has already implemented this recommendation by amending its IPS (August 2006 Board Action).

m. Securities Litigation

An organized approach to securities class action litigation can recoup material value. The PSERS IPS makes no reference to a policy on securities litigation. An IPS should also specify whether or not the System considers legal claims to be plan assets.

Recommendation IIA-14	PSERS Response
The Board should consider including in the IPS what the System's policies are regarding securities class action litigation and claims and include a reference to the policy.	PSERS agrees and, in fact, has already implemented this recommendation by amending its IPS (August 2006 Board Action).

n. Periodic Review of the IPS

The introduction to the PSERS IPS states that "it is the intention of the Board to review the Investment Policy at least annually." We believe that this is an appropriate level of review.

Recommendation
No recommendation necessary.

Please see DAG's response at Exhibit I for comments on this section.

II-B. Asset Allocation

1. Background – Asset Allocation in General

Asset allocation is the process of diversifying an investment portfolio among asset classes (stocks, bonds, real estate, etc.) in order to have a high probability of achieving a particular investment objective, such as consistently attaining a certain level of total return while controlling risk (e.g., volatility or standard deviation). Empirical research[8] has shown that asset allocation generally has a far greater effect on investment performance than does the selection of investment managers or individual securities.

Asset allocation is generally considered to be the single most important determinant in minimizing risk and maximizing return over time. However, determining the appropriate balance of asset classes is not an exact science. The use of computer modeling techniques (e.g., mean variance optimization or "MVO") and appropriate assumptions about the expected risk and return of various asset classes can increase the probability of achieving long-term investment objectives.

Establishing an appropriate asset allocation requires an examination of several key factors, including but not limited to:

- The nature of the fund, e.g., a pension fund is typically considered to have a long-term investment horizon;

[8] See for example, Gary P. Brinson, L. Randolph Hood, and Gilbert L. Beebower, "Determinants of Portfolio Performance," *Financial Analysts Journal* (July/August 1986):39-44. "[T]otal return to a plan is dominated by investment policy decisions. Active management, while important, describes far less of a plan's returns than investment policy."

- The collective risk tolerance of the Board as expressed in the IPS, including expressed tolerance for various types of risk. Some Board members may be more or less aggressive and willing to accept more or less volatility in asset levels;

- Willingness to invest in "alternative" asset classes, e.g., private equity, hedge funds, etc.;

- Actuarial condition (such as its funded status and the demographic characteristics of its participant population), cash flow projections and liquidity needs; and

- The current and expected future economic and market climate.

A retirement system is responsible for both investing pension fund assets as well as making benefit payments to participants. Therefore, an asset allocation study should take into account the liability structure of the pension funds – or even better – a full-blown asset liability study should be completed.

2. Asset Allocation Process

Mean variance optimization continues to be the most common approach used by institutional investors. The MVO model calculates a series of efficient portfolios which form the efficient frontier. A portfolio is considered "efficient" when, compared to all other possible combinations of permissible assets, it produces the highest expected return for a given level of expected risk (or, conversely, the lowest level of risk given a desired level of expected return). The optimal portfolio is the efficient portfolio that best matches the Board's requirements regarding return, cash flow, risk and other essential criteria.

Asset allocation modeling is only as sound as the quality and objectivity of the inputs employed in the process. The assumed levels of risk, return and correlation for each asset class are critical to the process, both on an absolute basis and relative to other asset classes. Small adjustments to any of the assumptions can profoundly alter the conclusions as to which portfolios are efficient. Asset allocation inputs should be forward looking, i.e., they in effect project how each asset class may be expected to perform in the future. Thus, uncertainty exists and simple mechanistic extrapolations of past data may ignore changed environments and may fail to consider where various markets currently are within their cycles.

Compared to an "asset only" approach, an asset liability model (ALM) allows a board to consider, among other items, a probability analysis of the expected impact of the investment portfolio on future contribution levels and funding ratios, the impact of benefit policy changes, changing demographics and COLAs on funding levels and cash flow, as well as the amount of downside protection across various time periods. Moreover, an ALM analyzes the effect of these elements based not only on the expected average long-term investment returns, standard deviation and correlations for the asset classes which comprise the whole portfolio, but can also look at many different economic scenarios which incorporate the behavior of inflation and long bond yields over time. This would be in addition to a simple analysis of the probability of achieving negative returns or of meeting the actuarially assumed rate of return.

Overall, we believe conducting a full ALM is superior to the "plain vanilla" asset allocation modeling used by many institutional investors and/or investment consultants, although it is not necessary to perform such a study as frequently as a more basic asset allocation study. Each pension plan is unique due to its individual demographics, funding level and cash flow requirements and should therefore have a unique asset liability study (at least a limited asset liability study) approximately every five years.

In recent years, many pension plans have found it difficult to meet their actuarial assumed rate given the decreased return expectations for some of the typically employed asset classes (e.g., domestic equity). In addition, the volatility of funded ratios and need for increased contributions has caused pension plans to suffer increased scrutiny and become political hotbuttons. These factors have helped to rekindle an interest in strategies that focus on matching liabilities, rather than focusing only on maximizing returns. There is often a trade-off between seeking higher total return and optimizing a portfolio to better match liabilities, and it is generally more difficult to make up a funding deficit with a portfolio more heavily tilted towards bonds. Historically the more volatile asset classes have also produced the highest returns over time, despite occasional periods of sharp decline.

Given its fundamental importance to the success of an investment program, best practices dictate that asset allocation decisions be made at the Board level, where they can be coordinated with funding policies, actuarial condition and investment objectives. In our view, the ultimate fiduciary decision-maker – the Board – should seek to understand the process used to develop the assumptions and to assure that the process is reasonable and fundamentally sound.

Asset allocation is distinguishable from portfolio structure, the former of which can be modeled using MVO, while the latter includes various policy judgments and some quantitative work (such as possible use of risk budgeting). Portfolio structure involves the implementation of an asset class decision such as how much domestic equity will be actively or passively managed.

3. Analysis of PSERS' Asset Allocation Process

We reviewed the process the PSERS Board uses to set its asset allocation policy, specifically, IFS considered the following:

- Who is involved in setting the asset allocation?
- What are the current asset classes used, how do their targets and ranges compare to peers and are they suitable for the System?
- What methodology was used, e.g., was a quantitative model used?

- What capital market assumptions were employed?

- What is the risk level and risk tolerance of the Board?

- What is the rebalancing policy?

In addition, for illustrative purposes, IFS performed an MVO analysis using our 2005 assumptions and produced a sample efficient frontier to determine the efficiency of PSERS' current asset allocation. We compared the current asset allocation targets for the PSERS portfolio to our model efficient frontier and calculated the probability of these portfolios meeting their actuarial rate of return over various time periods and discussed our findings below.

a. PSERS' Process for Setting the Asset Allocation

PSERS Used an Appropriate Process to Set the Fund's Asset Allocation Policy

As mentioned previously, the PSERS IPS states that "the Board will review long-term asset allocation targets at least annually…..[and] will seek the opinion of its actuary, consultants, staff, and any other sources of information it deems appropriate in formulating this allocation." In recent years, PSERS' investment consultant, working closely with PSERS' investment staff, has conducted asset allocation studies annually and recommended revisions to the Board as necessary.

The PSERS fund is a mature pension fund where the number of active members only slightly exceeds the number of inactive members, vestees, annuitants and beneficiaries. However, the funded ratio has dropped in recent years. Based on the actuarial market value and accrued liabilities, the funded ratio was 91.2% as of June 30, 2004, which is a drop from 97.2% in 2003 and its most recent peak in 123.8% in 2000 during the height of the bull market[9].

Recommendation
No recommendation necessary.

b. Wilshire's Asset/Liability Study for PSERS

The 2005 PSERS Asset Liability Study was Sufficient but Could Include Additional Elements

Wilshire completed an Asset Liability and Investment Management Structure Review for PSERS and presented it to the Board on March 17, 2005. Wilshire's study covers more than a "plain vanilla" asset only study, but not as much as a full-blown asset liability study (usually performed with the assistance of an actuarial firm – we understand that Wilshire has some actuaries on staff that perform the analysis with data provided by the System's actuary). This type of limited asset/liability study is generally sufficient unless there are other types of changes that need to be modeled affecting the liability side, e.g., benefit increases/decreases, significant demographic changes and/or various economic scenarios. Wilshire's analysis assumed a constant employee contribution rate of 7%. They showed how the inactive population will soon far exceed the active population so that increased employer contributions would be needed to improve the funded ratio, with a spike in employer contribution rates expected to occur around 2011.

In the study, Wilshire discussed how the recent capital market environment and pension legislation have had a negative impact on the funded status of the Plan. The funded status of the Plan peaked in 2000 at 135% on a market value basis and 123% on an actuarial value basis. On a market value basis, the funded ratio increased from 78% at June 30, 2003 to 85% at June 30,

[9] The funded ratio has dropped in part due to benefit enhancements brought about by legislative changes (Act 9 of 2001 and Act 38 of 2002) as well as the continued realization of the poor performance of the equity markets in 2000

2004, but on an actuarial basis, the funded ratio fell from 97% to 91% over that same one year time frame. The estimated market value funded ratio as of December 31, 2004 was 88.4% and Wilshire uses the market value of assets in its limited asset liability studies. Although the funded ratio has dropped, it is still above the average of the retirement systems surveyed by Wilshire. Wilshire reports an average market value funded ratio for 2004 of 83% (64 systems responded) and 81% in 2003 (109 systems responded).[10]

Wilshire performed an efficient frontier analysis using MVO and modeled four portfolios: current policy, proposed policy, lower risk and higher risk. The March 2005 proposed policy was identical to the previous policy except for a 2% decrease in U.S. Equity and corresponding 2% increase in Non-U.S. Equity. The study does not state how Wilshire (and staff) chose the "low" and "high" risk portfolios; none of these portfolios fell on Wilshire's efficient frontier. Wilshire's study covered a ten-year planning horizon and for each of the four portfolios Wilshire provided the distribution of estimated returns for one and 10-year time horizons, the distribution of expected market values over a 10-year time horizon and the expected future funded ratios. Wilshire constrained its MVO with a maximum of 10% in real estate and 15% in private markets. We understand that PSERS' investment staff works with Wilshire to develop the constraints for the MVO analysis and asks Wilshire to produce a number of efficient portfolios for staff review in order to come up with the ultimate recommendation.

The outlook for contribution levels and funded ratios is less favorable if that 8.5% rate is not achieved, i.e., contribution rates will need to be even higher than forecast. We understand that the PSERS Board set the employer contribution rate for FY 2007 at 6.46% of payroll, up from 4.69% in FY 2006. One factor contributing to the rising employer contribution rate is the fact that PSERS is still amortizing the actuarial losses incurred due to not meeting its investment earning assumption of 8.5% for FY's 2001-2003. As mentioned above, recent legislation that enhanced benefits is another reason future increases in contributions will be necessary. In its

to 2002.

[10] See "2005 Wilshire Report on State Retirement Systems: Funding Levels and Asset Allocation," March 10, 2005.

report, Wilshire acknowledges that both the previous and proposed policy portfolios are not expected to meet the actuarial rate of 8.50% by returning 8.01% and 8.02% respectively on a passive basis. According to the report, "the difference of 49 basis points represents a return experience shortfall of approximately $238 million or approximately 2.1% of payroll." Wilshire does not appear to have offered a solution to this dilemma as part of the asset allocation analysis and notes that "Pursuing alternative policies designed to generate higher returns becomes impractical from an implementation standpoint." All four modeled portfolios had an expected market value funded ratio of 80% or less over 10 years.

The expected rate of return generated in an MVO analysis does not include any "alpha" (or excess return versus the passive benchmark) generated by the active investment managers or the global macro managers. We understand that the global macro program is expected to generate approximately 40 basis points of alpha to the total Fund's return. This would come close to closing the gap between Wilshire's expected return of 8.02% and the 8.5% actuarial assumed rate, potentially generating an 8.42% total Fund return. We believe, however, that PSERS should talk with its actuary and Wilshire and revisit the 8.50% assumption. Wilshire's survey of large public funds shows that 8.50% is on the high side when compared to other large state retirement systems – the average is 7.91% and the median is 8.00%. We acknowledge that the actuarial investment return assumption is a very long-term rate and may still be appropriate for the plan.

Recommendation IIB-1	PSERS Response
PSERS should continue to discuss the 8.5% actuarial rate annually with their actuary and Wilshire and reevaluate whether it continues to be appropriate for the System.	PSERS agrees. PSERS discussed this issue with its actuary at the December 2005 Board meeting and in conjunction with the annual asset allocation review at the March 2006 Board meeting. In both cases the Board did not make a change in the rate. Consistent with past practices, the Board will again review the actuarial rate in December 2006 when it considers the results of the System's June 30, 2006 actuarial valuation.

c. Asset Classes Used By PSERS

Major institutional investors, including public pension funds, tend to diversify their investments across many asset classes, in an effort to maximize expected return at the lowest feasible levels of risk, and in light of their respective investment policies. The opportunity set of available asset classes has grown over the last 10 to 20 years, with increased investments in hedge funds (including new types of derivatives), private equity and other alternatives, inflation protected securities, etc. A recent survey of 76 corporate, public and nonprofit funds conducted by The Bank of New York[11] shows that "only about 15% of participants were investing in hedge funds five years ago, in the next five years, 45% expect to invest in hedge funds." In addition, the average corporate and public fund target rate of return is 7.5%.

The appropriate asset allocation for any given fund depends on numerous factors, including, e.g., its investment policy, liability structure, cash flow needs, investment horizon, risk controls, organizational structure (including staffing and resources appropriate for managing certain types of assets and risks) and other matters. Even though the appropriate asset classes and asset allocation for a given investor depend on its individual circumstances, comparisons to peers may provide useful reference points. By not investing in all available (and advisable) asset classes, a Board risks not being appropriately diversified. Mixing traditional and nontraditional asset classes and strategies should lower volatility of returns (risk), enhance risk adjusted returns and potentially increase absolute returns.

PSERS has a Well Diversified Progressive Asset Allocation

We show two tables below, the first, Table II-B-1, compares PSERS to various third party surveys as well as to the average of the custom peer group survey IFS conducted. The second, Table II-B-2, compares it to the individual peers surveyed specifically for this report.

[11] "New Frontiers of Risk: The 360° Risk Manager for Pensions and Nonprofits," The Bank of New York Company, Inc., October 2005.

PSERS adopted a new asset allocation after the March 2005 study and presentation by its investment consultant. The IPS was revised in March to reflect the changes made.

Table II-B-1 - Third Party Asset Allocation Surveys

Asset Class	PSERS Previous Portfolio	PSERS March 2005 Allocation	Custom Peer Group Average	Greenwich Public Funds Surveyed[12]	Wilshire 2005 Survey[13]	P&I Top 200 Public Plans[14]
U.S. Stocks	42%	40%	41.5%	45.1%	44.5%	46.2%
Non-U.S. Stocks	18%	20%	18.5%	16.1%	14.4%	16.4%
Total Publicly-Traded Stocks	*60%*	*60%*	*60.0%*	*61.2%*	*58.9%*	*62.6%*
Core Fixed Income	11.5%[15]	12.6%	21.9%	27.2%	29.1%	24.9%
High Yield	2.2%	1.1%	-		-	
Inflation Indexed Bonds	5%	5%	-	-	-	-
International Fixed Income	3.3%	3.3%	1.8%	-	1.3%	1.5%
Total Fixed Income	*22%*	*22%*	*23.7%*	*27.2%*	*30.4%*	*26.4%*
Equity Real Estate	7%	7%	6.6%	5.6%	3.8%	3.8%
Real Estate Mortgages	--	--	-	-	-	0.7%
Alternatives/Private Equity	11%	11%	6.7%	4.3%	4.3%	3.9%
Hedge Funds	-	-[16]	-	0.7%	-	-
Short-Term/Cash	-	-	1.6%	-	-	1.5%
Other	-	-	1.4%	1.1%	2.5%	1.1%

As can be seen in Table II-B-1 above, PSERS' new target policy portfolio has a similar allocation to traditional publicly traded domestic and international stocks as the third party averages, with a slightly larger tilt towards non-U.S. stocks versus domestic stocks than its peers. The PSERS portfolio has an allocation to fixed income that is significantly lower than the peer groups (note: most surveys did not break out Inflation Indexed Bonds or TIPS (Treasury Inflation Protected Securities) in their results and we break out PSERS' structural fixed income

[12] 2005 Greenwich Associates Survey – results include responses from 94 state pension funds in 2004.
[13] "2005 Wilshire Report on State Retirement Systems: Funding Levels and Asset Allocation" (includes data from 125 state retirement systems).
[14] P&I Data is as of 9/30/2004, "The P&I 1,000," January 24, 2005.
[15] The consultant's asset allocation study modeled allocations to Fixed Income and TIPS. The investment structure study for Fixed Income breaks that 17% total allocation down to include high yield, global fixed income and core domestic fixed income.
[16] Global Macro allocation is considered part of the domestic equity allocation.

decisions in the above table). These differences are offset by the slightly higher allocation to real estate and the significantly larger allocation to private market assets. The custom peer group average has a slightly lower allocation to fixed income and higher allocations to real estate and private equity than the broader third party surveys. PSERS is now investing in hedge funds as well through its global macro portable alpha strategies, which are projected to make up 10% of the large cap allocation at $2 billion (or approximately 4% of the total Fund).

Table II-B-2, below, shows that even amongst a custom peer group, individual public fund allocations to certain asset classes can vary considerably. For example, WSIB (Washington State Investment Board) has the smallest allocation to U.S. stocks at 32.8% versus the highest allocation of 48.8% by the Maryland Retirement Agency. PSERS falls in the middle of that range. WSIB also has the greatest allocation to private equity at 14.5%, whereas four peers had 3% or less allocated to that asset class. All of the peer funds had relatively sizable allocations to real estate equity, with SWIB (State of Wisconsin Investment Board) having the only allocation below 5% (at 3%). A few funds also have lower allocation to fixed income that PSERS – Ohio STRS, State of Michigan and PA SERS.

Asset Class	PSERS	Maryland Retirement	Ohio PERS	Ohio STRS	Oregon PERS	PA SERS	State of Michigan	SWIB	WSIB
Table II-B-2 - Surveyed Peer Asset Allocation as of 6/30/2005									
Defined Benefit Assets ($ millions)	$51,765	$33,000	$64,967	$56,182	$49,484	$26,899	$49,521	$63,996	$47,462
U.S. Stocks	42.0%	48.8%	46.2%	44.0%	36.0%	34.6%	48.2%	41.4%	32.8%
Non-U.S. Stocks	20.6%	15.9%	20.0%	21.1%	21.6%	20.5%	11.4%	21.1%	16.4%
Total Publicly-Traded Stocks	*62.6%*	*64.7%*	*66.2%*	*65.1%*	*57.6%*	*55.1%*	*59.6%*	*62.5%*	*49.2%*
U.S. Fixed Income	15.9%	29.6%	24.0%	18.0%	27.9%	12.5%	16.9%	20.5%	25.9%
Int'l Fixed Income	5.6%	0.0%	1.1%	1.0%	0.0%	4.4%	0.0%	7.8%	0.0%
Total Fixed Income	*21.1%*	*29.6%*	*25.1%*	*19.0%*	*27.9%*	*16.9%*	*16.9%*	*28.3%*	*25.9%*
Real Estate Equity	5.2%	2.4%	4.6%	7.0%	0.0%	5.7%	7.9%	3.0%	9.4%
REITS	1.9%	2.7%	1.3%	1.0%	5.7%	1.7%	0.0%	0.0%	0.0%
Real Estate Mortgages	--	--	--	--	--	0.1%	0.0%	0.0%	0.0%
Alternatives/Private Equity	9.6%	0.5%	0.7%	3.0%	8.8%	12.3%	11.6%	2.3%	14.5%
Hedge Funds	--	--	--	--	--	--	--	--	--
Short-Term/Cash	-0.8%	0.0%	1.1%	4.0%	0.0%	0.3%	4.0%	2.2%	1.0%
Commodities/Inflation Protection	[5% TIPS]	0.0%	0.9%	0.0%	0.0%	7.2%	0.0%	0.0%	0.0%
Other	--	--	0.1%	1.0%	--	0.6%	--	1.7%	--
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Overall, PSERS has been on the forefront of investing in non-traditional asset classes and has sought a high allocation to total equity oriented investments in order to maximize total return. Although its asset allocation could be deemed "progressive" it is not out of the ordinary.

Recommendation
No recommendation necessary.

d. Capital Market Assumptions Used by PSERS

Asset classes may be defined very broadly in formulating assumptions for risk, return and correlation, or more narrowly with segregation into sub-asset classes. When asset classes are defined more broadly, allocations to asset subsets may be considered "policy" decisions, rather than being quantitatively modeled. When asset classes are defined narrowly for purposes of modeling, it can be difficult to develop reliable risk, return and correlation statistics for some classes due to various factors, including:

- Lack of historical data,
- Lack or insufficiency of an index or benchmark,
- Lack of public market valuations, e.g., some real estate data is appraisal based (appraisals are generally performed annually or bi-annually with quarterly updates) and is therefore subject to smoothing, which may artificially decrease its correlation with other asset classes, if judged in isolation.

Fund boards should consider the asset allocation process an art, not a science. We believe there is a *range* of acceptable inputs, rather than a single, precise set of "correct" inputs for each asset class. Modeling techniques can use ranges as well as specific points to generate expected future results.

The following inputs need to be developed to perform an MVO analysis:

- Average expected return for each asset class
- Expected asset class risk (e.g., standard deviation)

- Correlation between asset class returns

The combination of these three elements produces optimized portfolios. Expected returns should be developed using both historical analysis and forward-looking observations, given various historical and current market valuation measures. The inputs into the model should generally be forward looking, rather than purely historical averages and should reflect expectations for the time horizon being considered.

Using either overly pessimistic or optimistic return assumptions for some of the asset classes can put the portfolio at risk. The System could either take on too much risk in an attempt to generate a high enough expected return or, conversely, not take on enough risk. Then the System might not achieve the needed return and thus, risk eventual underfunding, the need for unexpectedly high government contributions, and/or decreased benefits.

Capital Market Assumptions Used Appear Reasonable

In Table II-B-3 (the following table), we compare return assumptions used by PSERS' investment consultant (Wilshire) in the March 2005 Asset Liability Review with IFS' internal assumptions as well as some used by other organizations.

Table II-B-3: Comparison of return assumptions

Asset Class	PSERS/Wilshire 2005	IFS 2005	Greenwich Associates 2005[17]	Ennis Knupp 2005 Survey[18]	JP Morgan Fleming 2005
Domestic Equity	8.00%	8.5%	8.1%	7.7%	7.25%
International Equities	8.00%	8.5%	8.7%	7.9%	7.75%
Emerging Markets	-	-	-	-	8.25%
Private Equity	11.00%	11.7%	11.1%	11.5%	8.50%
Hedge Funds	-	8.0%	8.6%		5.25-6.50%
Real Estate Equity		7.0%	8.1%	7.3%	7.00%
REITs	7.00%		-	7.5%	
Domestic Fixed Income	4.75%	4.8%	4.9%	5.0%	5.00%
TIPS	4.25%	4.5%	-	-	-
High Yield Bonds	-	-	-	-	-
Cash (STIF)	3.00%	3.4%	-	-	3.50%

Wilshire's assumptions are fairly similar to those used by IFS as is the methodology we use to develop them. Wilshire and IFS both project the same return for domestic and international stocks (risk and correlation statistics vary between domestic and international stocks). Although as a firm Wilshire develops assumptions for the various fixed income sub-asset classes (e.g., high yield), in their study for PSERS they used a broad fixed income assumption for the total fixed income asset class and allocated to the various fixed income sub-asset classes in their investment structure study that was presented to the Board in conjunction with the asset allocation study. Wilshire did use separate assumptions for TIPS, which many consider to be a separate asset class due to the behavioral characteristics of these securities.

One area that we think deserves reevaluation is the assumptions used for real estate equity. In its analysis for PSERS, Wilshire used its assumptions for REITS, or public market equity, when the vast majority (approximately 75%) of PSERS' real estate allocation is in private market real estate. REITS are much more highly correlated with publicly traded equities than

17 Results from survey of 763 pension funds and endowments, February 2005.
18 Ennis Knupp Capital Markets Modeling Survey Results 2005 – median of 11 investment managers and four investment consultants surveyed.

private market real estate and using only capital market assumptions for REITS in the asset allocation study could skew the results. PSERS uses different benchmarks for its public and private market real estate assets, which is appropriate.

In general, however, Wilshire uses a well thought out and reasonable methodology to develop their capital market assumptions, and their return assumptions are in line with those of the other firms.

Recommendation IIB-2	PSERS Response
Reconsider and discuss the capital market assumptions used for real estate with the investment consultant.	PSERS will consider this recommendation when it next reviews the asset allocation plan with the real estate consultant and the general investment consultant.

e. IFS MVO Analysis of PSERS' Asset Allocation

PSERS' Asset Allocation is Fairly Efficient Given the Constraints

IFS conducted a sample mean variance optimization using our assumptions for 2004 and we discuss the results below. We imposed a few constraints on our analysis (limiting the maximum amount allowed in a few asset classes), which we show below along with our risk and return assumptions in the following table. Similar to Wilshire's approach, we did not model hedge funds as a possible separate asset class in our analysis since PSERS' allocation to hedge funds is being implemented through its portable alpha/global macro strategies as part of the domestic equity allocation. It is not likely that PSERS would also develop and maintain a distinct separate allocation to a pure hedge fund program, for which one would model a separate hedge fund allocation. As mentioned earlier in this section, asset allocation analysis generally does not factor the "alpha" into the MVO model. The exposure to the large cap equity market comes through the "beta"[19] or market exposure to the S&P 500 Index futures overlay.

Table II-B-4: IFS AA Constraints and Assumptions				
Asset Class	**Expected Return**	**Expected Risk**	**Asset Min. %**	**Asset Max. %**
U.S. Stocks	8.5%	17.0%	0%	100%
Int'l Stocks	8.5%	17.0%	0%	30%
Fixed Income	4.8%	5.0%	0%	100%
TIPS	4.5%	5.0%	0%	10%
Real Estate	7.0%	10.0%	0%	10%
Private Equity	11.7%	30.0%	0%	15%
Cash	3.4%	1.5%	0%	3%

As can be seen in the graph below, both PSERS' previous policy and 2005 policy lie close to the constrained efficient frontier and are very similar in terms of risk and return. The main reasons that the policy portfolios do not lie directly on the efficient frontier produced by our model are that our constraints allowed up to 30% in international equity, 10% in TIPS and 15% in private equity and the MVO model likes these asset classes due to their low correlation with other classes. Developing constraints is a matter for the staff and consultant to determine based on the Board's expressed risk/return objectives. In addition it is difficult to become fully invested in some asset classes, such as private equity.

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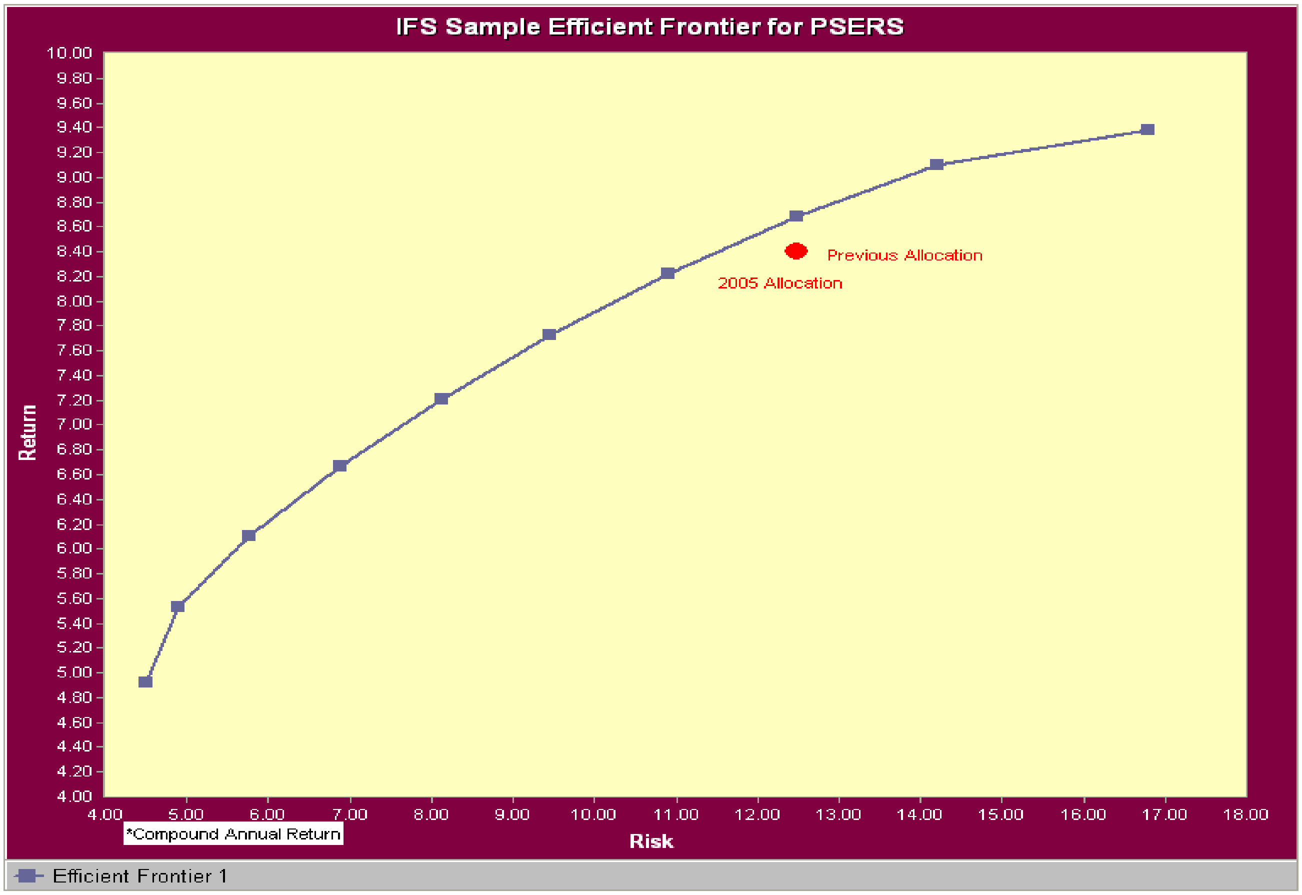
[19] "Beta is a statistical measure correlating the change of an investment with the movement of the market. Beta measures how much market risk a portfolio or security faces. A beta of 1.00 implies that the portfolio value will change proportionate to the market change." *Glossary of Terms*, Goldman Sachs.



In Table II-B-5 below, we show the return, risk and return/risk ratio calculated by the MVO model for the two PSERS portfolios as well as the 10 possible efficient portfolios.

Table II-B-5 – Efficient Frontier Portfolio Return/Risk Data

Asset Class	PSERS Previous Policy	PSERS 2005 Policy	1	2	3	4	5	6	7	8	9	10
Return	8.40	8.41	4.92	5.53	6.11	6.67	7.21	7.73	8.22	8.68	9.10	9.38
Risk	12.51	12.46	4.49	4.89	5.77	6.87	8.13	9.45	10.90	12.47	14.21	16.80
Return/Risk	0.67	0.67	1.10	1.13	1.06	0.97	0.89	0.82	0.75	0.70	0.64	0.56

Table II-B-5 above shows the return, risk (standard deviation) and the return/risk ratio for PSERS' new and previous policy portfolios as well as ten sample portfolios that lie on the efficient frontier. For example, Portfolio 8 would provide an expected rate of return greater than the PSERS' allocation at a similar level of risk. Our analysis calculates an expected return for the new policy portfolio that does not meet the actuarial rate of return of 8.5%, but it is higher than that projected by Wilshire (8.4% versus 8.0%). The difference is primarily due to our higher return expectations for public equities.

We believe that one useful way to look at the overall "risk" of PSERS' current asset allocation is to examine the probability of total fund returns achieving (or not achieving) certain rates of expected return over short and longer-term periods. The probabilities, based on IFS' MVO analysis, are set forth immediately below in Table II-B-6:

Table II-B-6 – PSERS Proposed Policy Portfolio

Consecutive Time Periods	Probability of Return > 0.0%		Probability of Return > 8.5%	
	2005 Policy	Long-Term	2005 Policy	Long-Term
1 Year	76.0	76.0	48.6	48.7
10 Years	97.9	97.9	50.1	51.0

As Table II-B-6 shows, IFS' analysis indicates that the probability of PSERS' previous and 2005 target asset allocations earning a positive return over one and 10 years are approximately equal (76% and 97.9%, respectively). The new policy allocation has a slightly higher probability of earning a return greater than the 8.5% actuarial rate over both one and 10 years (48.7% and 51.0%, respectively). Using IFS' assumptions, PSERS has a slightly greater than 50% probability of meeting its actuarial rate over the long-term (without allowing for additional alpha generating strategies). (See our recommendation above regarding reevaluating the actuarial rate.)

Recommendation
No recommendation necessary.

f. Rebalancing Ranges and the Rebalancing Process

Rebalancing is the process of re-adjusting the proportion of a portfolio invested in each of the major asset classes to within the permissible range around long-term targets. Over time, disciplined rebalancing can enhance performance and manage overall risk. A rebalancing program should be implemented and followed on a regular basis, e.g., monthly, quarterly, semi-annually, or annually.

Rebalancing ranges around long-term targets should be designed to ensure that asset allocation "drift" is controlled in a cost-effective way. The IPS should describe the process and timing for rebalancing. The fund may choose to rebalance only when an asset class exceeds its range or it could choose to have a more systemized approach and rebalance every quarter, semi-annually or annually, for example. Rebalancing more frequently can reduce tracking error to the fund's policy benchmark, but it will also create additional transaction costs. The policy should also prescribe whether or not the asset class should be rebalanced to target, half-way to target or merely to within the range. Rebalancing to the target, rather than half-way to the target, will also reduce tracking error but again the fund will likely incur slightly higher transaction costs during the rebalancing due to the additional amounts of security transactions.

Recent studies on rebalancing[20] have shown that the most important factor is having a rebalancing policy. Secondary to that decision is the policy itself. A more risk adverse board that wants to have minimal tracking error and is willing to incur slightly higher transaction costs might choose to rebalance at every month end. Alternatively, the Board might decide that it prefers to let an outperforming asset class run up to the outer bounds of its range and rebalance only when outside the range and perhaps half-way to target.

[20] See for example Nesbitt, Stephen, "Asset Mix Range and Rebalancing Policy," Wilshire Associates, May 31, 2001; and Masters, Seth J., "Is There a Better Way to Rebalance?" Alliance Bernstein, December 2003.

The lack of an adequate documented rebalancing policy leads to an improperly managed asset allocation and unrewarded risk. It could cause rebalancing to occur too frequently (incurring unnecessary transaction costs, especially in a very volatile market) or not frequently enough, which could lead to significant policy benchmark risk. Overly frequent rebalancing may also occur if a policy range is too narrow or a target is set too close to the outer limit of a range. Therefore, a Board needs to consider its risk tolerance as well as the practical realities of implementing the rebalancing policy. Many retirement systems use cash flows to assist in their rebalancing to help minimize transaction costs.

The PSERS Rebalancing Policy Could be Refined

The PSERS IPS states that the "asset allocation will be reviewed on a regular basis, but no less frequently than monthly, for potential rebalancing. Any asset class allocation that falls outside the policy ranges described above will be rebalanced to within the policy range, but in no cases beyond the target allocation objective, within a reasonable period of time by the Chief Investment Officer." In addition, "any account may be increased or decreased to achieve the rebalancing objective based on the judgment of the Chief Investment Officer."

The stated ranges are +/-3% for total public market equity and total fixed income, with smaller ranges for some of the sub-asset classes (e.g., +/-1% for emerging markets equity, +/-1.5% for TIPS, domestic and global fixed income and +/-1% for high yield). The range for real estate (including REITs, which are easier to rebalance than private real estate investments) is +/-2% and there is no stated range for alternative investments as a regularly scheduled rebalancing process is not effective for this asset class. Overall these ranges seem reasonable, if perhaps a little more restrictive than we typically see for total equity and total fixed income.

The policy gives the CIO flexibility as to the degree of rebalancing and the methods to be employed. For example, it does not specify that the CIO must rebalance to target versus half-way to target or merely to within the range. It also apparently permits staff to rebalance based on mid-month numbers if deemed necessary. The CIO is required to take into account "relevant considerations to ensure prudence and care" and must report to the Board at the next scheduled meeting.

Given the expertise of the investment staff and the analytical tools at their disposal, we believe that it makes sense to allow the CIO some discretion in the rebalancing process. From our understanding of the policy, however, it might make sense to put a few additional limits on the process, such as limit mid-month rebalancing to extreme market conditions since these rebalancings would be done on preliminary data and could result in overly frequent and costly transitions. We understand, however, that PSERS generally only uses month-end data for rebalancing, but reviews the mid-month allocation prior to implementing changes to see if the need for rebalancing has lessened (or increased) to avoid potentially costly round-trip transitions.

Recommendation IIB-3	PSERS Response
Limit the rebalancing policy so that mid-month rebalancing is only permitted in extreme circumstances.	PSERS agrees and, in fact, has already implemented this recommendation by amending its IPS (August 2006 Board Action).

g. PSERS' Board Members Awareness of Asset Allocation Process and Risks

It is essential that the Board understand the process used to develop the asset allocation recommendations and that the process is reasonable and fundamentally sound. The Board should also be made aware of the risks involved with various asset classes and asset allocations and be comfortable with the capital market assumptions used. Education on the asset allocation process is especially necessary for lay board members.

Board Members are Generally Comfortable with the Asset Allocation Process and Risk Level but Desire Continued Investment Education

We discussed the asset allocation process with Board members and staff and reviewed relevant documents. The asset allocation report shows the expected overall risk of the portfolio and the projected risk of the various asset classes. It also reviews the expected impact on contributions, funded level and projected market values.

As noted previously, PSERS' IPS states that one of the long-term investment objectives of the Fund is "to maximize total returns while limiting the risk of volatility through diversification." Based on the interviews we conducted as part of our review, it appears that in general the Board members are comfortable with the education they have received on asset allocation from their investment consultant and that the consultant presents a fair discussion on the risks involved with the asset allocation in general and the specific asset classes. One criticism we heard is that the Consultant does not give the Board enough options from which to choose.

The Board appears willing to take the necessary risks, however, many Board and staff members expressed the belief that the 8.5% actuarial rate is either "aggressive, but achievable" or "not achievable" in the current investment environment. Most felt the rate was unlikely to be changed given the resulting increase in contributions. IFS believes that this is a bit contradictory as most Board members stated that they were comfortable with the overall asset allocation and risk level of the Fund. We recommended above that they should continue to consider the appropriateness of this rate.

Since it has historically been a lay Board, most Board members do not have an investment background and most also expressed a desire for continuing education on investment topics. PSERS has been active in investing in innovative strategies and there are many facets to these "alternative" strategies and financial instruments that are difficult for non-investment professionals to understand. Many Board members do not travel to outside educational conferences and would benefit from increased "refresher" courses on site. The Board appears to have great confidence in its investment consultant and investment staff and relies on them heavily for both investment recommendations and education, which is not atypical. It is important to note that having a documented educational policy is reflective of best practices.

Recommendation IIB-4	PSERS Response
Ensure that Board members have access to and are satisfied with investment educational opportunities on topics such as on asset allocation.	The Board agrees and will endeavor to ensure that Board members have access to the necessary training to allow Board members to effectively and efficiently fulfill their fiduciary duties to the members of PSERS.

II-C. Investment Performance

1. Overview

IFS examined the investment performance history of PSERS' Total Fund and each underlying asset class investment. Presented below are summary investment performance tables for PSERS' Total Fund and each asset class, along with their respective policy benchmarks through June 30, 2005. (Note: performance for alternative investment and real estate is on a one quarter lagged basis.) IFS compared the returns of the Total Fund against a universe[21] of Public Fund Sponsors (Wilshire Cooperative[22]). This universe contained 179 public plans as of June 30, 2005 and the allocation of the median fund was 51.54% U.S. Equity, 10.20% International Equity, 30.69% U.S. Fixed Income and 2.64% Short Term Fixed Income. IFS compared the segment returns of each asset class against a universe of Total Funds, compiled from Public, Taft-Hartley, Corporate, and other Plan Sponsors. IFS also calculated the System's 5-year standard deviation and Sharpe ratio for the Total Fund and each asset class.

It is important to note that the returns provided by PSERS are slightly different than the returns that are used to create the asset class universes. The peer asset class universes are derived by taking the segment return of a total fund composite, which excludes the cash position. The data provided by PSERS is a composite return of each asset class which includes cash. This would most likely result in a downward bias in the System's ranking during periods of positive performance, and an upward bias in periods of negative performance. Additionally, the asset classes of real estate and private equity are reported net-of-fees, while the Wilshire Universe's are reported gross-of-fees. Again, this would result in a downward bias in ranking.

[21] In the world of investments, the word universe refers to a specific group or category of investments that share certain characteristics www.morganstanley.com (Dictionary of Financial Terms)
[22] The Wilshire Cooperative is a collaboration between Wilshire Associates and more than 60 independent investment consulting firms to provide performance measurement and analytical services to their plan sponsor clients www.wilshire.com. The investment performance data for their universe comparisons are generally composed of gross-of-fee returns.

2. Total Fund: Cumulative Performance

PSERS' Total Fund has Performed Well
Over Most Time Periods

As can be seen in the Table II-C-1, the System ranked in the top decile for the one and three year time periods. Over a longer period of five years, the System ranked in the top half of the Public Fund Universe. It appears that the high ranking over the short and mid term is most likely due to the significant allocations to international equity, real estate and alternative investments. Over the past five years, the Fund's median level returns are most likely due to the significant allocation to the domestic equity markets. On a relative basis, the System outperformed its policy benchmark over the one, three and five year periods. The System achieved this level of return at a higher level of volatility when compared to its policy benchmark over the five year period ending June 30, 2005 (12.67% versus 11.60%), but the System did have a higher (positive) Sharpe ratio, indicating that the higher volatility was rewarded with excess return.

Table II-C-1: Total Fund Returns (%) - Annualized Cumulative Performance – As of June 30, 2005					
	1 Year	3 Year	5 Year	5 Year Risk	5 Year Sharpe Ratio[23]
PSERS	**13.08%**	**11.75%**	**4.19%**	**12.67%**	**0.12**
PSERS Universe Percentile*	*4*	*6*	*47*	--	--
Policy Benchmark	10.54%	9.89%	2.50%	11.60%	(0.01)
Policy Universe Percentile*	14	21	81	--	--
Universe Median	8.63%	8.48%	4.12%	--	--
Note: Performance for periods longer than one year is annualized					
* Universe: Wilshire Cooperative Total Returns of Total Fund Public Sponsors					

[23] Sharpe Ratio = (Portfolio Return – Return of the 91 Day Treasury Bill)/ (Standard Deviation of Portfolio). The Sharpe Ratio is a measurement of return per unit of risk, therefore the higher the ratio, the better the performance. This interpretation can only be made when the Sharpe ratio is a positive number. This interpretation can not be used for periods where the Sharpe ratio is negative. Currently there is no universal standard on how to interpret a negative Sharpe ratio, therefore IFS does not offer an opinion on the risk-return characteristics of an asset class when the Sharpe ratio is negative.

Tables II-C-2, II-C-3, and II-C-4 include Total Fund annualized investment performance returns from the custom peer group survey. As can be seen below, some of the peers provided returns on a gross of fee basis, while others provided returns net of fees and a few provided both. The average and median returns were calculated excluding the return of the System. Overall, the System outperformed the average and median Fund (both gross and net of fees) over the one, three and five year time periods.

Table II-C-2 : Total Fund Gross Returns (%) - Annualized Cumulative Performance - As of June 30, 2005

	1 Year	3 Year	5 Year
PSERS	**13.08%**	**11.75%**	**4.19%**
Maryland Retirement Agency	9.53%	9.51%	1.90%
Ohio Public Employees Retirement System	N/A	N/A	N/A
Ohio State Teachers Retirement System	12.35%	10.68%	3.16%
Oregon Public Employee Retirement Fund	14.20%	11.68%	3.99%
Penn. State Employees' Retirement System	N/A	N/A	N/A
State of Michigan Retirement System	N/A	N/A	N/A
State of Wisconsin Investment Board	11.05%	10.65%	4.04%
Washington State Investment Board	N/A	N/A	N/A
Peer Group Average Return	11.78%	10.63%	3.27%
Peer Group Median Return	11.70%	10.67%	3.58%

Table II-C-3 : Total Fund Net Returns (%) - Annualized Cumulative Performance – As of June 30, 2005

	1 Year	3 Year	5 Year
PSERS	**12.87%**	**11.54%**	**4.03%**
Maryland Retirement Agency	N/A	N/A	N/A
Ohio Public Employees Retirement System	10.46%	10.28%	3.57%
Ohio State Teachers Retirement System	12.13%	10.45%	2.95%
Oregon Public Employee Retirement Fund	13.90%	11.43%	3.76%
Penn. State Employees' Retirement System	13.46%	11.39%	3.34%
State of Michigan Retirement System	8.30%	8.34%	2.33%
State of Wisconsin Investment Board	N/A	N/A	N/A
Washington State Investment Board	13.34%	11.06%	3.81%
Peer Group Average Return	11.93%	10.49%	3.29%
Peer Group Median Return	12.74%	10.76%	3.46%

Table II-C-4 : Policy Benchmark Returns (%) - Annualized Cumulative Performance - As of June 30, 2005			
	1 Year	3 Year	5 Year
PSERS	**10.54%**	**9.89%**	**2.50%**
Maryland Retirement Agency	10.10%	9.95%	2.03%
Ohio Public Employees Retirement System	10.31%	9.93%	3.50%
Ohio State Teachers Retirement System	11.43%	9.79%	2.81%
Oregon Public Employee Retirement Fund	10.80%	10.03%	3.21%
Penn. State Employees' Retirement System	13.36%	10.91%	2.42%
State of Michigan Retirement System	10.00%	9.80%	4.05%
State of Wisconsin Investment Board	10.39%	10.01%	3.44%
Washington State Investment Board	9.41%	10.06%	3.20%
Peer Group Average Return	10.73%	10.06%	3.08%
Peer Group Median Return	10.35%	9.98%	3.20%

3. Total Fund: Consecutive Performance

As can be seen in Table II-C-5, the Total Fund ranked in the top quartile over the last two years. Over the annual periods ending June 30, 2001- 2003 the fund ranks in the 3rd and 4th quartile against other public funds. A significant amount of the negative return may be attributable to the Fund’s considerable allocation to domestic and international equity. One positive note that can be drawn from the data below is the Fund’s excess performance against its policy index. The Fund outperformed its policy index four of the last five years by an average of 1.75%.

Table II-C-5 : Total Fund Returns (%) - Consecutive One Year Performance ending June 30th					
	2005	**2004**	**2003**	**2002**	**2001**
PSERS	**13.08%**	**19.90%**	**2.93%**	**-5.14%**	**-7.23%**
PSERS Universe Percentile*	*4*	*5*	*75*	*52*	*82*
Policy Benchmark	10.54%	16.30%	3.20%	-5.85%	-9.41%
Policy Universe Percentile*	14	23	72	62	90
Universe Median	8.63%	13.61%	4.19%	-5.05%	-2.90%
* Universe: Wilshire Cooperative Total Returns of Total Fund Public Sponsors					

Tables II-C-6, II-C-7, and II-C-8 contain the Total Fund consecutive investment performance returns from the custom peer group survey. As can be seen below, the System outperformed the peer group average and median, gross of fees, for three of the five annual time periods. The System also outperformed the peer group average and median, net of fees, for four of the five annual time periods.

Table II-C-6 : Total Fund Gross Returns (%) - Consecutive One Year Performance ending June 30th					
	2005	**2004**	**2003**	**2002**	**2001**
PSERS	**13.08%**	**19.90%**	**2.93%**	**-5.14%**	**-7.23%**
Maryland Retirement Agency	9.53%	16.16%	3.22%	-7.63%	-9.41%
Ohio Public Employees Retirement System	N/A	N/A	N/A	N/A	N/A
Ohio State Teachers Retirement System	12.35%	17.81%	2.43%	-8.04%	-6.29%
Oregon Public Employee Retirement Fund	14.20%	18.08%	3.30%	-5.56%	-7.56%
Penn. State Employees' Retirement System	N/A	N/A	N/A	N/A	N/A
State of Michigan Retirement System	N/A	N/A	N/A	N/A	N/A
State of Wisconsin Investment Board	11.05%	16.61%	4.63%	-4.84%	-5.44%
Washington State Investment Board	N/A	N/A	N/A	N/A	N/A
Peer Group Average Return	*11.78%*	*17.17%*	*3.40%*	*-6.52%*	*-7.18%*
Peer Group Median Return	*11.70%*	*17.21%*	*3.26%*	*-6.60%*	*-6.93%*

Table II-C-7 : Total Fund Net Returns (%) - Consecutive One Year Performance ending June 30th					
	2005	**2004**	**2003**	**2002**	**2001**
PSERS	**12.87%**	**19.67%**	**2.74%**	**-5.26%**	**-7.34%**
Maryland Retirement Agency	N/A	N/A	N/A	N/A	N/A
Ohio Public Employees Retirement System	10.46%	17.65%	3.21%	-6.91%	-4.55%
Ohio State Teachers Retirement System	12.13%	17.58%	2.19%	-8.24%	-6.44%
Oregon Public Employee Retirement Fund	13.90%	17.82%	3.09%	-5.72%	-7.79%
Penn. State Employees' Retirement System	13.46%	20.75%	0.88%	-7.58%	-7.71%
State of Michigan Retirement System	8.30%	16.50%	0.80%	-7.80%	-4.30%
State of Wisconsin Investment Board	N/A	N/A	N/A	N/A	N/A
Washington State Investment Board	13.34%	16.06%	4.15%	-6.40%	-6.00%
Peer Group Average Return	*11.93%*	*17.73%*	*2.39%*	*-7.11%*	*-6.13%*
Peer Group Median Return	*12.74%*	*17.62%*	*2.64%*	*-7.25%*	*-6.22%*

Table II-C-8 : Policy Benchmark Returns (%) - Consecutive One Year Performance ending June 30th					
	2005	**2004**	**2003**	**2002**	**2001**
PSERS	**10.54%**	**16.30%**	**3.20%**	**-5.85%**	**-9.41%**
Maryland Retirement Agency	10.10%	15.60%	4.43%	-7.61%	-9.98%
Ohio Public Employees Retirement System	10.31%	17.10%	2.83%	-6.54%	-4.35%
Ohio State Teachers Retirement System	11.43%	16.35%	2.07%	-7.32%	-6.35%
Oregon Public Employee Retirement Fund	10.80%	18.47%	1.48%	-4.60%	-7.84%
Penn. State Employees' Retirement System	13.36%	18.51%	1.54%	-8.37%	-9.86%
State of Michigan Retirement System	10.00%	15.60%	4.10%	-5.20%	-2.80%
State of Wisconsin Investment Board	10.39%	15.10%	4.78%	-5.50%	-5.86%
Washington State Investment Board	9.41%	17.53%	3.67%	-6.20%	-6.39%
Peer Group Average Return	*10.73%*	*16.78%*	*3.11%*	*-6.42%*	*-6.68%*
Peer Group Median Return	*10.35%*	*16.73%*	*3.25%*	*-6.37%*	*-6.37%*

4. Domestic Equity: Cumulative Performance

PSERS' Domestic Equity has Performed Well over Most Time Periods

As can be seen in Table II-C-9, the System's domestic equity segment was ranked slightly below the median for the one-year period ending June 30, 2005 and slightly above the median return over the last three and five-year periods. The Fund outperformed the Russell 3000 over one, three and five year periods. It also outperformed the Dow Jones Wilshire 5000 over the last one and five year time periods as well. Over five years, the return for the Fund's equity allocation was earned at a slightly lower level of risk as measured by a standard deviation. The standard deviation of the equity composite was 19.18% versus 19.23% for the Russell 3000 Index and 19.47% for the Wilshire 5000 Index.

Table II-C-9 : Domestic Equity Returns (%) - Annualized Cumulative Performance – As of June 30, 2005

	1 Year	3 Year	5 Year	5 Year Risk	5 Year Sharpe Ratio
PSERS	**8.24%**	**9.78%**	**1.65%**	**19.18%**	**(0.05)**
Universe Percentile*	*51*	*46*	*44*	*--*	*--*
Russell 3000	8.06%	9.46%	-1.36%	19.23%	(0.21)
Universe Percentile*	56	58	72	--	--
Dow Jones Wilshire 5000	8.21%	9.94%	-1.27%	19.47%	(0.20)
Universe Percentile*	53	43	72	--	--
Universe Median	8.34%	9.70%	0.46%	--	--

Note: Performance for periods longer than one year is annualized.
* Universe: Wilshire Cooperative Equity Returns of Total Fund Portfolios

Table II-C-10 represents the domestic equity annualized returns of the custom peer group survey. As can be seen below, the System's domestic equity composite outperformed the average and median peer Fund over the one, three and five year time periods.

Table II-C-10 : Domestic Equity Returns (%) - Annualized Cumulative Performance - As of June 30, 2005			
	1 Year	**3 Year**	**5 Year**
PSERS	**8.24%**	**9.78%**	**1.65%**
Maryland Retirement Agency	6.92%	9.65%	-1.35%
Ohio Public Employees Retirement System	8.18%	9.65%	-0.68%
Ohio State Teachers Retirement System	8.01%	9.11%	-1.32%
Oregon Public Employee Retirement Fund	8.20%	10.14%	-0.72%
Penn. State Employees' Retirement System	9.41%	11.11%	0.46%
State of Michigan Retirement System	6.00%	7.19%	-1.52%
State of Wisconsin Investment Board	7.06%	8.90%	-0.67%
Washington State Investment Board	8.27%	9.98%	-1.12%
Peer Group Average Return	7.76%	9.47%	-0.86%
Peer Group Median Return	8.10%	9.65%	-0.92%

5. Domestic Equity: Consecutive Performance

As can be seen in Table II-C-11, the System's domestic equity composite outperformed the universe median in four of the five annual periods ending June 30. The System's domestic equity ranked in the second quartile in four of the five periods, and its ranking ranged between the 34th and 51st percentile. The System's domestic equity outperformed its policy benchmarks in four of the five years as well.

Table II-C-11 : Domestic Equity Returns (%) - Consecutive One Year Performance ending June 30th					
	2005	**2004**	**2003**	**2002**	**2001**
PSERS	**8.24%**	**22.43%**	**-0.18%**	**-12.73%**	**-5.99%**
Universe Percentile*	*51*	*46*	*48*	*34*	*41*
Russell 3000	8.06%	20.45%	0.76%	-17.25%	-13.94%
Universe Percentile*	56	65	35	64	71
Dow Jones Wilshire 5000	8.21%	21.24%	1.27%	-16.62%	-15.32%
Universe Percentile*	53	59	31	60	78
Universe Median	8.34%	22.11%	-0.28%	-15.19%	-8.49%
* Universe: Wilshire Cooperative Equity Returns of Total Fund Portfolios					

Table II-C-12 represents the domestic equity consecutive returns of the custom peer group survey. As can be seen below, the System's domestic equity composite outperformed the average and median peer Fund over four of the five annual time periods.

Table II-C-12 : Domestic Equity Returns (%) - Consecutive One Year Performance ending June 30th					
	2005	**2004**	**2003**	**2002**	**2001**
PSERS	**8.24%**	**22.43%**	**-0.18%**	**-12.73%**	**-5.99%**
Maryland Retirement Agency	6.92%	21.59%	1.42%	-16.20%	-15.44%
Ohio Public Employees Retirement System	8.18%	20.60%	1.06%	-16.44%	-12.27%
Ohio State Teachers Retirement System	8.01%	20.04%	0.19%	-17.50%	-12.67%
Oregon Public Employee Retirement Fund	8.20%	22.46%	0.84%	-16.84%	-13.19%
Penn. State Employees' Retirement System	9.41%	23.43%	1.58%	-15.68%	-11.52%
State of Michigan Retirement System	6.00%	19.40%	-2.70%	-15.40%	-11.10%
State of Wisconsin Investment Board	7.06%	21.00%	-0.30%	-16.41%	-10.45%
Washington State Investment Board	8.27%	21.44%	1.18%	-16.90%	-14.50%
Peer Group Average Return	*7.76%*	*21.25%*	*0.41%*	*-16.42%*	*-12.64%*
Peer Group Median Return	*8.10%*	*21.22%*	*0.95%*	*-16.43%*	*-12.47%*

6. Domestic Fixed Income: Cumulative Performance

PSERS' Domestic Fixed Income has Performed Well over the Most Recent Time Periods

As seen in Table II-C-13, the System's fixed income portfolio has consistently ranked in the top decile over the one, three and five year time periods. The System not only earned a higher level of return compared to its benchmark, but also did so at a lower level of volatility as measured by standard deviation, 3.14% versus 3.85%. As measured by the Sharpe ratio, the System was able to earn a higher rate of return per unit of risk relative to its policy benchmark.

Table II-C-13 : Domestic Fixed Income Returns (%) - Annualized Cumulative Performance – As of June 30, 2005					
	1 Year	**3 Year**	**5 Year**	**5 Year Risk**	**5 Year Sharpe Ratio**
PSERS	**8.85%**	**8.41%**	**8.52%**	**3.14%**	**1.88**
Universe Percentile*	*3*	*4*	*9*	--	--
LB Aggregate	6.81%	5.76%	7.41%	3.85%	1.24
Universe Percentile*	31	49	59	--	--
Universe Median	5.87%	5.75%	7.55%	--	--
Note: Performance for periods longer than one year is annualized.					
* Universe: Wilshire Cooperative Fixed Income Returns of Total Fund Portfolios					

Table II-C-14 includes the domestic fixed income cumulative investment performance results of the custom peer group survey. As can be seen below, the System outperformed both the average and median of the peer group over the one, three and five year time periods.

Table II-C-14 : Domestic Fixed Income Returns (%) - Annualized Cumulative Performance - As of June 30, 2005			
	1 Year	**3 Year**	**5 Year**
PSERS	**8.85%**	**8.41%**	**8.52%**
Maryland Retirement Agency	7.84%	6.85%	7.44%
Ohio Public Employees Retirement System	8.11%	7.06%	7.94%
Ohio State Teachers Retirement System	7.49%	7.23%	8.24%
Oregon Public Employee Retirement Fund	8.70%	8.34%	8.49%
Penn. State Employees' Retirement System	10.04%	9.98%	7.94%
State of Michigan Retirement System	5.30%	4.94%	6.95%
State of Wisconsin Investment Board	7.73%	7.02%	7.88%
Washington State Investment Board	7.03%	7.26%	8.15%
Peer Group Average Return	7.78%	7.34%	7.88%
Peer Group Median Return	7.79%	7.14%	7.94%

7. Domestic Fixed Income: Consecutive Performance

As can be seen in the Table II-C-15, the System's fixed income allocation has earned top decile returns on an annual basis for the period ending June 30, 2003, 2004, and 2005. The System also outperformed it policy benchmark during the same time period. A significant portion of the excess performance may be attributable to the System's allocation to high yield. High yield returns for these annual periods significantly out performed the broad market. For the annual periods ending June 30, 2001 and June 30, 2002, the System under-performed the median fund and benchmark. This may be attributable to the System's significant allocation to high yield, which underperformed the broad market during these two periods.

Table II-C-15 : Domestic Fixed Income Returns (%) - Consecutive One Year Performance ending June 30th

	2005	2004	2003	2002	2001
PSERS	**8.85%**	**3.44%**	**13.17%**	**7.26%**	**10.14%**
Universe Percentile*	*3*	*11*	*9*	*64*	*68*
LB Aggregate	6.81%	0.32%	10.40%	8.63%	11.23%
Universe Percentile*	31	63	50	34	36
Universe Median	5.87%	0.67%	10.40%	7.92%	10.81%

* Universe: Wilshire Cooperative Fixed Income Returns of Total Fund Portfolios

Table II-C-16 includes the domestic fixed income consecutive investment performance results of the custom peer group survey. As can be seen below, the System outperformed the average and median of the peer group for four of the five annual time periods.

Table II-C-16 : Domestic Fixed Income Returns (%) - Consecutive One Year Performance ending June 30th					
	2005	**2004**	**2003**	**2002**	**2001**
PSERS	**8.85%**	**3.44%**	**13.17%**	**7.26%**	**10.14%**
Maryland Retirement Agency	7.84%	1.59%	11.36%	6.45%	10.24%
Ohio Public Employees Retirement System	8.11%	1.42%	11.91%	6.90%	11.70%
Ohio State Teachers Retirement System	7.49%	1.50%	13.00%	7.79%	11.82%
Oregon Public Employee Retirement Fund	8.70%	2.40%	14.25%	6.93%	10.55%
Penn. State Employees' Retirement System	10.04%	5.17%	14.96%	3.22%	6.69%
State of Michigan Retirement System	5.30%	1.80%	7.80%	8.80%	11.30%
State of Wisconsin Investment Board	7.73%	0.71%	12.99%	6.57%	11.84%
Washington State Investment Board	7.03%	1.54%	13.53%	6.60%	12.49%
Peer Group Average Return	*7.78%*	*2.02%*	*12.48%*	*6.66%*	*10.83%*
Peer Group Median Return	*7.79%*	*1.57%*	*13.00%*	*6.75%*	*11.50%*

8. International Equity: Cumulative Performance

PSERS' International Equity has Consistently Performed Well over the Most Recent Time Periods

As seen in the Table II-C-17, the System's international equity portfolio has ranked between the 23rd and 39th percentile over the past one, three and five year time periods ending June 30, 2005. Over the one and five year period the System outperformed its policy index. Over the five-year time period ending June 30, 2005, the System earned a return at a lower level of volatility relative to its policy benchmark, as measured by standard deviation, 20.63% versus 20.79%.

Table II-C-17 : International Equity Returns (%) - Annualized Cumulative Performance – As of June 30, 2005					
	1 Year	**3 Year**	**5 Year**	**5 Year Risk**	**5 Year Sharpe Ratio**
PSERS	**17.26%**	**14.05%**	**1.68%**	**20.63%**	**(0.05)**
Universe Percentile*	*23*	*28*	*39*	--	--
MSCI ACWI ex US	16.95%	14.08%	0.76%	20.79%	(0.09)
Universe Percentile*	*23*	*27*	*52*	--	--
Universe Median	14.87%	15.53%	0.84%	--	--
Note: Performance for periods longer than one year is annualized.					
* Universe: Wilshire Cooperative Custom International Equity Returns of Total Fund Portfolios					

Table II-C-18 includes the international equity cumulative investment performance results of the custom peer group survey. As can be seen below, the System outperformed both the average and median of the peer group over the one, three and five year time periods.

Table II-C-18 : International Equity Returns (%) - Annualized Cumulative Performance – As of June 30, 2005			
	1 Year	**3 Year**	**5 Year**
PSERS	**17.26%**	**14.05%**	**1.68%**
Maryland Retirement Agency	13.98%	10.43%	-1.00%
Ohio Public Employees Retirement System	16.59%	13.85%	0.42%
Ohio State Teachers Retirement System	22.07%	14.54%	2.48%
Oregon Public Employee Retirement Fund	17.20%	14.20%	1.12%
Penn. State Employees' Retirement System	18.14%	13.24%	2.32%
State of Michigan Retirement System	14.20%	10.83%	-0.25%
State of Wisconsin Investment Board	17.30%	14.04%	1.31%
Washington State Investment Board	17.91%	13.52%	1.21%
Peer Group Average Return	17.17%	13.08%	0.95%
Peer Group Median Return	17.25%	13.68%	1.17%

9. International Equity: Consecutive Performance

As seen in Table II-C-19, the System's international equity portfolio ranked between the 23rd and 50th percentile on an annual basis over the past five years. A portion of the above average ranking can be attributed to allocation to emerging markets, as that segment of the market outperformed the broad market for four of the five annual time periods. The System outperformed its policy benchmark for the annual periods ending June 30, 2001, 2002, and 2005. For the periods ending June 30, 2003 and 2004 the System slightly under-performed its international equity policy index on an annual basis.

Table II-C-19 : International Equity Returns (%) - Consecutive One Year Performance ending June 30th

	2005	2004	2003	2002	2001
PSERS	**17.26%**	**32.47%**	**-4.51%**	**-6.54%**	**-21.61%**
Universe Percentile*	*23*	*30*	*40*	*38*	*50*
MSCI ACWI ex US	16.95%	32.50%	-4.19%	-8.16%	-23.82%
Universe Percentile*	23	29	38	52	66
Universe Median	14.87%	30.58%	-5.54%	-8.03%	-21.58%

* Universe: Wilshire Cooperative Custom International Equity Returns of Total Fund Portfolios

Table II-C-20 includes the international equity consecutive investment performance results of the custom peer group survey. As can be seen below, the System outperformed the average and median for four of the five annual time periods.

Table II-C-20 : International Equity Returns (%) - Consecutive One Year Performance ending June 30th					
	2005	**2004**	**2003**	**2002**	**2001**
PSERS	**17.26%**	**32.47%**	**-4.51%**	**-6.54%**	**-21.61%**
Maryland Retirement Agency	13.98%	28.62%	-8.13%	-10.58%	-21.02%
Ohio Public Employees Retirement System	16.59%	32.91%	-4.78%	-8.61%	-24.26%
Ohio State Teachers Retirement System	22.07%	29.25%	-4.76%	-7.90%	-18.33%
Oregon Public Employee Retirement Fund	17.20%	31.71%	-3.51%	-7.94%	-22.89%
Penn. State Employees' Retirement System	18.14%	32.58%	-7.29%	-6.97%	-16.96%
State of Michigan Retirement System	14.20%	29.00%	-7.60%	-12.90%	-16.70%
State of Wisconsin Investment Board	17.30%	32.10%	-4.28%	-6.47%	-23.05%
Washington State Investment Board	17.91%	29.99%	-4.56%	-7.40%	-21.60%
Peer Group Average Return	*17.17%*	*30.77%*	*-5.61%*	*-8.60%*	*-20.60%*
Peer Group Median Return	*17.25%*	*30.85%*	*-4.77%*	*-7.92%*	*-21.31%*

10. Global Fixed Income: Cumulative Returns

PSERS' Global Fixed Income has Consistently Outperformed its Investment Objective over the Last Four Annual Time Periods

As seen below, the Global Fixed Income portfolio has outperformed its policy index over the one, three and five year periods ending June 30, 2005. Over the five year period, the System's return generated a higher level of volatility relative to its policy index (8.13% versus 6.65%). Currently Wilshire CO-OP does not have a Universe to compare the global fixed income portfolio against other funds. Many pension funds do not allocate to global fixed income, thus Wilshire does not have a large enough population set that would make the universe comparisons statistically significant.

Table II-C-21 : Global Fixed Income Returns (%) - Annualized Cumulative Performance – As of June 30, 2005

	1 Year	3 Year	5 Year	5 Year Risk	5 Year Sharpe Ratio
PSERS	**8.52%**	**10.21%**	**8.46%**	**8.13%**	**0.72**
LB Global Aggregate	7.51%	8.92%	7.78%	6.65%	0.78

Note: Performance for periods longer than one year is annualized.

Table II-C-22 includes the international fixed income cumulative investment performance results of the custom peer group survey. It should be noted that the peer group is imperfect. The System provided returns for a global fixed income portfolio, which includes fixed income securities from both the U.S. and international markets. The peer group returns contain international fixed income returns, which are made up of only non-US fixed income securities. As can be seen below, the System's global fixed income composite underperformed the two peers who had an allocation to international fixed income over the one, three and five year time periods.

Table II-C-22 : International Fixed Income Returns (%) - Annualized Cumulative Performance - As of June 30, 2005

	1 Year	3 Year	5 Year
PSERS	**8.52%**	**10.21%**	**8.46%**
Maryland Retirement Agency	N/A	N/A	N/A
Ohio Public Employees Retirement System	N/A	N/A	N/A
Ohio State Teachers Retirement System	24.05%	21.53%	N/A
Oregon Public Employee Retirement Fund	N/A	N/A	N/A
Penn. State Employees' Retirement System	N/A	N/A	N/A
State of Michigan Retirement System	N/A	N/A	N/A
State of Wisconsin Investment Board	10.74%	11.55%	9.19%
Washington State Investment Board	N/A	N/A	N/A
Peer Group Average Return	17.40%	16.54%	9.19%
Peer Group Median Return	17.40%	16.54%	9.19%

11. Global Fixed Income: Consecutive Returns

The System's global fixed income allocation outperformed its policy index on an annual basis for the annual periods ending June 30, 2002, 2003, 2004, and 2005. The one period the System did not outperform the policy index was the annual period ending June 30, 2001.

Table II-C-23 : Global Fixed Income Returns (%) - Consecutive One Year Performance ending June 30th					
	2005	**2004**	**2003**	**2002**	**2001**
PSERS	**8.52%**	**5.00%**	**17.48%**	**13.66%**	**-1.34%**
LB Global Aggregate	7.51%	4.61%	14.88%	12.03%	0.50%

Table II-C-24 includes the international fixed income consecutive investment performance results of the custom peer group survey. The System underperformed one of the peers for three of the four annual time periods and underperformed another peer for four of the five annual time periods. This underperformance may be related to the allocation to the domestic fixed income securities, where the peer group consists of only international fixed income investments.

Table II-C-24 : International Fixed Income Returns (%) - Consecutive One Year Performance ending June 30th					
	2005	**2004**	**2003**	**2002**	**2001**
PSERS	**8.52%**	**5.00%**	**17.48%**	**13.66%**	**-1.34%**
Maryland Retirement Agency	N/A	N/A	N/A	N/A	N/A
Ohio Public Employees Retirement System	N/A	N/A	N/A	N/A	N/A
Ohio State Teachers Retirement System	24.05%	6.59%	35.74%	3.56%	N/A
Oregon Public Employee Retirement Fund	N/A	N/A	N/A	N/A	N/A
Penn. State Employees' Retirement System	N/A	N/A	N/A	N/A	N/A
State of Michigan Retirement System	N/A	N/A	N/A	N/A	N/A
State of Wisconsin Investment Board	10.74%	6.21%	18.01%	14.25%	-2.14%
Washington State Investment Board	N/A	N/A	N/A	N/A	N/A
Peer Group Average Return	*17.40%*	*6.40%*	*26.88%*	*8.91%*	*-2.14%*
Peer Group Median Return	*17.40%*	*6.40%*	*26.88%*	*8.91%*	*-2.14%*

12. Real Estate: Cumulative Periods

PSERS' Real Estate has Performed Well Over the near and Long Term Time Periods

As seen in Table II-C-25, the System's real estate allocation has outperformed its policy index over the one, three and five year periods ending June 30, 2005 and has also consistently ranked in the top quartile against other funds. The System's performance benchmark for the combined Real Estate asset class is 80% of the NCREIF Property Index[24] and 20% of the Wilshire Real Estate Securities Index. The System's outperformance over the five year period came at an increased level of volatility relative to its policy index (5.26% vs. 3.98%). On a risk return basis, the System earned a slightly lower level of return, per unit of risk, relative to the real estate policy index (2.32 vs. 2.53).

Table II-C-25 : Real Estate Returns (%) - Annualized Cumulative Performance - As of June 30, 2005

	1 Year	3 Year	5 Year	5 Year Risk	5 Year Sharpe Ratio
PSERS	**26.14%**	**17.79%**	**14.83%**	**5.26%**	**2.32**
Universe Percentile*	*16*	*10*	*11*	*20*	--
Real Estate Policy Index	21.41%	14.12%	12.71%	3.98%	2.53
Universe Percentile*	23	18	19	--	--
Universe Median	15.44%	9.87%	10.02%	--	--

Note: Performance for periods longer than one year is annualized.
* Universe: Wilshire Cooperative Custom Real Estate Returns of Total Fund Portfolios
** Performance for the real estate segment and benchmark are on a one quarter lagged basis

[24] NCREIF -The National Council of Real Estate Investment Fiduciaries. This index is composed of properties that have been acquired on behalf of tax-exempt institutions and held in a fiduciary environment. The types of properties included in the index are: Apartment, Industrial, Office and Retail.

Table II-C-26 includes the cumulative real estate investment performance results of the custom peer group survey. As can be seen below, the System outperformed both the average and median of the peer group over the one, three and five year time periods.

Table II-C-26 : Real Estate Returns (%) - Annualized Cumulative Performance – As of June 30, 2005			
	1 Year	**3 Year**	**5 Year**
PSERS	**26.14%**	**17.79%**	**14.83%**
Maryland Retirement Agency	27.49%	17.09%	15.62%
Ohio Public Employees Retirement System	14.02%	10.64%	10.94%
Ohio State Teachers Retirement System	21.71%	15.01%	12.21%
Oregon Public Employee Retirement Fund	31.60%	19.04%	15.52%
Penn. State Employees' Retirement System	25.18%	14.99%	12.16%
State of Michigan Retirement System	13.70%	9.22%	9.25%
State of Wisconsin Investment Board	23.26%	15.53%	13.14%
Washington State Investment Board	22.17%	14.57%	13.35%
Peer Group Average Return	22.39%	14.51%	12.77%
Peer Group Median Return	22.72%	15.00%	12.67%

13. Real Estate: Consecutive Periods

As seen in Table II-C-27, the System has outperformed its policy index for the annual periods ending June 30, 2001, 2004, and 2005. During these time periods the System ranked in the top quartile against other funds. For the two periods the System underperformed its policy benchmark, the Real Estate Allocation ranked between the 51st and 56th percentile.

Table II-C-27: Real Estate Returns (%) - Consecutive One Year Performance ending June 30th					
	2005	**2004**	**2003**	**2002**	**2001**
PSERS	**26.14%**	**23.23%**	**5.14%**	**4.78%**	**16.60%**
Universe Percentile*	*16*	*4*	*56*	*51*	*22*
Real Estate Policy Index	21.41%	14.52%	6.91%	7.21%	14.15%
Universe Percentile*	*23*	*12*	*37*	*34*	*31*
Universe Median	15.44%	8.94%	5.73%	5.02%	11.02%
* Universe: Wilshire Cooperative Custom Real Estate Returns of Total Fund Portfolios					
** Performance for the real estate segment and benchmark are on a one quarter lagged basis					

Table II-C-28 includes the real estate consecutive investment performance results of the custom peer group survey. As can be seen below, the System outperformed the average and median for three of the five annual time periods.

Table II-C-28: Real Estate Returns (%) - Consecutive One Year Performance ending June 30th					
	2005	**2004**	**2003**	**2002**	**2001**
PSERS	**26.14%**	**23.23%**	**5.14%**	**4.78%**	**16.60%**
Maryland Retirement Agency	27.49%	20.38%	4.60%	10.25%	16.72%
Ohio Public Employees Retirement System	14.02%	11.70%	6.35%	6.98%	15.95%
Ohio State Teachers Retirement System	21.71%	17.66%	6.24%	3.92%	12.52%
Oregon Public Employee Retirement Fund	31.60%	21.12%	5.84%	6.95%	14.03%
Penn. State Employees' Retirement System	25.18%	14.04%	6.50%	5.57%	10.58%
State of Michigan Retirement System	13.70%	7.90%	6.20%	8.70%	9.90%
State of Wisconsin Investment Board	23.26%	15.71%	8.11%	7.86%	11.46%
Washington State Investment Board	22.17%	10.58%	11.33%	9.80%	13.30%
Peer Group Average Return	*22.39%*	*14.89%*	*6.90%*	*7.50%*	*13.06%*
Peer Group Median Return	*22.72%*	*14.88%*	*6.30%*	*7.42%*	*12.91%*

14. Alternative Investments: Cumulative Returns

PSERS' Alternative Investments have Performed Well on a Cumulative Basis, While Having Both Periods of Positive and Negative Performance

As provided in Table II-C-29, the System's alternative investment portfolio outperformed its policy index over the past one, three and five year time periods ending June 30, 2005. Its volatility, as measured by standard deviation, over five years was over twice as large as its policy index (10.02% versus 4.38%). Currently Wilshire CO-OP does not have a Universe to compare alternative investment returns against other funds. It should be noted that it is best to evaluate private equity over longer term time periods (e.g., 5-10 years). Factors such as J-curves, fund maturity, and the effect of vintage years (the year the fund was established) make short-term performance less meaningful. Short-term returns (one and three year periods) can be misleading when comparing various private equity investments.

Table II-C-29 : Alternative Investments Returns (%) - Annualized Cumulative Performance – As of June 30, 2005

	1 Year	3 Year	5 Year	5 Year Risk	5 Year Sharpe Ratio
PSERS	**25.45%**	**14.02%**	**2.53%**	**10.02%**	**(0.01)**
Venture Economics (Lagged)	8.22%	3.08%	-0.05%	4.38%	(0.61)

Note: Performance for periods longer than one year is annualized.
** Performance for the alternative investments segment and benchmark are on a one quarter lagged basis

Table II-C-30 includes the cumulative private equity performance results of the custom peer group survey. As can be seen below, the System outperformed the average of the peer group over the three and five year time periods. The System outperformed the peer group median for the one and five year time periods.

Table II-C-30 : Private Equity Returns (%) - Annualized Cumulative Performance – As of June 30, 2005			
	1 Year	3 Year	5 Year
PSERS	**25.45%**	**14.02%**	**2.53%**
Maryland Retirement Agency	20.93%	3.19%	-1.81%
Ohio Public Employees Retirement System	21.83%	15.09%	2.90%
Ohio State Teachers Retirement System	21.31%	8.27%	0.48%
Oregon Public Employee Retirement Fund	38.80%	14.09%	1.95%
Penn. State Employees' Retirement System	24.25%	15.36%	4.12%
State of Michigan Retirement System	14.80%	10.11%	-0.44%
State of Wisconsin Investment Board	35.59%	18.40%	7.42%
Washington State Investment Board	27.01%	14.27%	3.86%
Peer Group Average Return	25.57%	12.35%	2.31%
Peer Group Median Return	23.04%	14.18%	2.42%

15. Alternative Investments: Consecutive Returns

Over the three annual time periods ending June 30, 2003, 2004 and 2005, the System's alternative investment portfolio out-performed its policy index. Over the annual periods ending June 30, 2001 and 2002, the System under-performed its policy index on an annual basis. However, as noted above, evaluating private equity performance over short time frames is less meaningful.

Table II-C-31 : Alternative Investment Returns (%) - Consecutive One Year Performance ending June 30, 2005					
	2005	2004	2003	2002	2001
PSERS	**25.45%**	**20.62%**	**-2.02%**	**-8.02%**	**-16.90%**
Venture Economics (Lagged)	8.22%	6.06%	-4.58%	-5.62%	-3.49%
** Performance for the alternative investments segment and benchmark are on a one quarter lagged basis					

Table II-C-32 includes the private equity consecutive investment performance results of the custom peer group survey. As can be seen below, the System underperformed the average for three of the five annual time periods. The System outperformed the median for four of the five annual time periods.

Table II-C-32 : Private Equity Returns (%) - Consecutive One Year Performance ending June 30th					
	2005	**2004**	**2003**	**2002**	**2001**
PSERS	**25.45%**	**20.62%**	**-2.02%**	**-8.02%**	**-16.90%**
Maryland Retirement Agency	20.93%	13.64%	-20.05%	-12.29%	-5.27%
Ohio Public Employees Retirement System	21.83%	32.91%	-5.85%	-6.76%	-18.83%
Ohio State Teachers Retirement System	21.31%	19.68%	-12.57%	-12.37%	-7.94%
Oregon Public Employee Retirement Fund	38.80%	16.49%	-8.15%	-10.77%	-16.90%
Penn. State Employees' Retirement System	24.25%	30.21%	-5.11%	-8.50%	-12.90%
State of Michigan Retirement System	14.80%	27.10%	-8.50%	-13.90%	-14.90%
State of Wisconsin Investment Board	35.59%	19.03%	2.85%	-0.20%	-13.66%
Washington State Investment Board	27.01%	21.48%	-3.30%	-12.99%	-6.90%
Peer Group Average Return	*25.57%*	*22.57%*	*-7.59%*	*-9.72%*	*-12.16%*
Peer Group Median Return	*23.04%*	*20.58%*	*-7.00%*	*-11.53%*	*-13.28%*

Recommendation
No recommendation necessary.

II-D. Investment Performance Reporting

1. Background

Those charged with responsibility for oversight of sophisticated investment programs require clear, concise, consistent reports on the performance and risk of the programs. The reports should be prepared on a regular periodic schedule (e.g., quarterly). Key statistics (such as investment rates of return) should be verified by a third party that is independent of those making the investment decisions within the program. These reports serve as one of the most important management tools available to those with oversight of the investment program.

Quarterly performance reports should include detailed information on:

- Investment performance over multiple cumulative and consecutive time periods for the Total Fund, each asset class composite as well as each individually managed portfolio;

- Comparisons of that performance to well-defined benchmarks and market indices;

- Comparison of that performance to appropriate peer groups, at the Total Fund level, the asset class level and individual manager portfolio level;

- Measurement of a variety of risk metrics and portfolio characteristics, selected on the basis of investment strategy and style, at the Total Fund level, the asset class level and individual manager portfolio level;

- Comparison of these risk metrics and portfolio characteristics to those of the benchmarks and market indices;

- Attribution analysis that decomposes the investment returns to investigate the sources of those returns;

- Compliance verification against investment guidelines regarding holdings, portfolio composition, permitted and prohibited securities, deviation from benchmarks, etc.

Such reports should also be designed to enable the end-user to answer a set of key investment questions:

- How does the performance of the investment program and its individual components compare to its objectives?

- How does the performance compare to other sources of investment performance?

- Is the investment program generating appropriate risk-adjusted returns?

- What are the magnitude of the risks incurred by the investment program and its components?

- How does the risk level compare to its benchmark(s)?

- Do the active investment managers generate a return that is consistently in excess of the return of the appropriate benchmark or market index?

- Do the active investment managers demonstrate skill that adds value above what the investment program could achieve by using passive management?, and if so, how does that skill compare to peers?

- Are the passive investment managers achieving benchmark returns with benchmark risks at reasonable cost?

IFS reviewed the investment consultant's quarterly reports to both the Board and to Staff and compared their contents to the industry's "best practices" of investment performance reporting. The two reports vary significantly in terms of the breadth and content of material. The report provided to the Board contains a high level review of the System's Portfolio, whereas the report provided to the Staff goes into great detail for not only the Total Fund, but each asset class and individual investment portfolio. Listed below are the ten exhibits that we believe should be included in a quarterly report and how the current deliverables that the PSERS Board receives meet those "best practices."

In addition, IFS reviewed the supplemental "Investment Review" presentations given by Wilshire to the Board. As discussed below, where appropriate, these presentations contain additional Total Fund and asset class performance evaluations. They are presented to the Board as part of Wilshire's quarterly in-person presentations in conjunction with other topics, e.g., asset allocation/investment structure recommendations.

2. PSERS' Total Fund Quarterly Performance Report

PSERS' Quarterly Report to the Board Contains Many Necessary Items but could use Some Additional Exhibits. PSERS' Quarterly Report to Staff is Extensive and Thorough, Although a Few Additional Exhibits may be Helpful.

a. General Market Environment Overview

A "Market Environment" report is useful in that it provides insight to both the short and long term performance of the various asset classes where a Fund has made investments. Typical information included in these reports ranges from broad based index returns to economic statistics such as GDP (Gross Domestic Product[25]), employment data and the current Federal Funds rate[26].

The Wilshire Report to the Board contains current investment performance data on the various asset classes in which the System has chosen to invest. Certain asset classes are analyzed by sub-asset class, such as domestic equity, which section contains data on both large versus small (capitalization) and growth versus value (style). Sections for other asset classes, such as fixed income, include data on current and historical levels of interest rates. Overall, the Wilshire Report to the Board provides an extensive review of the asset classes available to the System.

Recommendation
No recommendation necessary.

b. Summary Performance for the Total Fund

Ideally the quarterly report should provide a summary of the performance of the Total Fund against its policy index, and ideally an asset allocation index (see section F for discussion regarding an asset allocation index). Performance history should include both short, mid and long-term performance. Periods such as one quarter, year-to-date, one year, three year and five year performance should be included.

The Wilshire report to the Board includes the System's Total Fund performance against its policy index in a performance summary table. The time periods provided cover the past one, two, and three quarters, along with a one, three and five year and since inception return. PSERS currently does not measure the performance of the Total Fund against an Asset Allocation index.

[25] Gross Domestic Product – Total Value of a country's output produced by residents within the country's physical borders: "International Investments" Fifth Edition, Bruno Solnik & Dennis McLeavey.
[26] Federal funds rate is the interest rate at which depository institutions lend balances at the Federal Reserve to other depository institutions overnight: www.federalreserve.gov.

This would allow the Board to determine how much of return was generated due to the investment managers' skill, as opposed to tactical asset allocation decisions chosen by the Board.

Recommendation
No recommendation necessary.

c. Asset Allocation versus Policy Index Exhibit

The asset allocation versus policy index exhibit should document how the Fund's allocation has changed since the previous time period and how it compares to the fund's Policy Index. This exhibit is important to determine whether the Fund is in compliance with its asset allocation policy and whether changes should be contemplated given recent market shifts. The Board currently receives information on the market value of the portfolio for the most recent quarter. The consultant's current report to the Board does not include information on the market value for any asset class or manager from the previous quarter. The Board does, however, receive this information in the monthly MoneyLine report. The MoneyLine report provides the market value for each asset class for both the current and previous month, along with the System's percentage target range. This information allows the Board to make a comparison on how the Fund has changed in value from the previous reporting period.

The Investment Review presentation also shows PSERS' actual asset allocation by major asset class (U.S. Equity, Non-U.S. Equity, Fixed Income, Alternative Investments and Real Estate), PSERS' Policy asset allocation and the variance. In addition, public fund asset allocation data is presented for comparison.

Recommendation
No recommendation necessary.

d. Breakdown of Each Asset Class by Investment Manager

The System currently receives an Asset Allocation exhibit that breaks down the allocation by asset class and by investment manager. This exhibit includes data on the market value of the Total Fund by each account and the market value by each segment, such as equity, fixed income and cash.

Recommendation
No recommendation necessary.

e. Cumulative and Consecutive Time Period Performance

In order to maintain a thorough understanding of investment performance, it is important to review cumulative and consecutive time period performance for the Total Fund, each asset class and each investment manager compared to their respective benchmarks. The System currently receives a "Fund Return Table" that provides historical performance on a cumulative basis[27] over the past three quarters, and the past one, three and five year periods. Fund performance since June 30, 1995 and inception is included when available. This exhibit provides performance for each investment manager, each asset class composite, the Total Fund, and their respective benchmarks. IFS finds this exhibit to be comprehensive in displaying the Fund's cumulative performance. An exhibit including performance on an annual basis would provide additional insight to the Board to assess whether an investment manager's outperformance/(underperformance) is the result of one year of strong/(poor) performance or a consistent trend over a full market cycle.

[27] The System sometimes refers to cumulative performance data as "rolling time period" data, although not technically the same thing.

Recommendation IID-1	PSERS Response
The PSERS Board should request an exhibit that displays the performance for each investment manager, each asset class composite, the Total Fund, and their respective benchmarks on a consecutive time periods.	The Board will consider this recommendation. In doing so, however, the Board notes that the Quarterly Investment Performance Analysis report provided by Wilshire addresses all of these issues on a rolling time period basis. Still the Board will consider the benefit of having Wilshire provide consecutive time periods in future reports.

f. Universe Comparisons on a Cumulative and Consecutive Basis

Universe comparisons provide the Board an additional tool in evaluating the performance of the Total Fund, an investment manager or an asset class. While the Board may primarily judge the manager against its performance benchmark, the additional information of a universe ranking will inform the Board as to how well their current investment manager compares to other alternative investment options for a particular sub-asset class. This is an important additional perspective since situations frequently arise where an investment product may outperform its benchmark but still lag its peers (who are measured versus the same strategic benchmark). Comparisons on a Total Fund basis are also useful, for political and economic reasons, despite the fact that the peer funds will all have different asset allocations.

Universe comparison should be presented on a cumulative and consecutive basis for the Total Fund, each asset class and each manager, with benchmarks and appropriate style specific peer groups and indexes where applicable. In the quarterly report, the Board currently receives one exhibit that compares the Total Fund and its policy index versus a universe of other Public Sponsors on a cumulative basis. In addition, Wilshire's Investment Review presentations include universe comparisons for the Total Fund and its Policy versus all public funds as well as versus a subset of large public funds on a cumulative basis. This report also provides performance comparisons of the publicly traded asset classes versus the same public fund universes on a cumulative basis. The Board does not receive any peer universe comparisons on a consecutive basis or for any of the underlying investment managers. The staff however, does receive extensive reporting on universe comparisons for the Total Fund, each asset class and investment manager on a cumulative basis from Wilshire.

Recommendations IID-2 and IID-3	PSERS Response
PSERS Board should request from their consultant peer universe comparisons for each of the Fund's underlying public market investment managers, and possibly private market investment managers, on a cumulative and consecutive time period.	Board presentations by Wilshire have included and will continue to contain universe comparisons for the main composites and the total fund vs. peers.
PSERS Board and Staff should consider requesting from their consultant universe comparisons for the Total Fund and each of the Funds' Asset Class Composites on a consecutive time period basis (to supplement the cumulative data).	The Quarterly Investment Performance Analysis report provided by Wilshire addresses all of these issues on a rolling time period basis. PSERS' Board will consider the benefit of having Wilshire provide consecutive time periods in future reports.

g. Domestic Equity Style Analysis

A holdings based style analysis may help the Board determine if the Fund has taken any particular bets in structuring its domestic equity portfolio, such as focusing on growth versus value, or overweighing small cap stocks versus the market (see example Style Analysis at Exhibit E). Style analysis (holdings and/or returns based) for the domestic equity managers and the total domestic equity composite, preferably over time to show style drift, should be presented on a quarterly basis.

Style based analysis can be helpful in determining what, if any, particular style bets have been taken. Although the use of global macro strategies complicates this analysis, the System could address this concern by using a proxy portfolio of holdings that replicate S&P 500 for those specific portfolios. Using a proxy portfolio of the S&P 500 in combination with the System's other investment managers would give the Board a general idea of how the total domestic equity portfolio plots on an overall basis. Additionally, holdings based analysis may help the Board determine if the Fund has taken any particular bets, such as focusing on growth versus value, or overweighting small cap stocks versus the market. The Board currently does not receive any holdings or returns based style analysis regarding the equity allocation of their portfolio. Staff does, however, review this information on a manager level using the Wilshire Compass software system. Staff is also provided this information on a composite and manager basis in a separate report provided by Wilshire.

Recommendation
No recommendation necessary.

h. Portfolio Characteristics for each Equity Manager and Total Equity Composite

The quarterly report should include summary characteristics such as Price/Earnings, Price/Book, beta, dividend yield, average and median capitalization, number of holdings, best and worst performers, etc. as compared to the benchmark. An equity analytics summary page would allow the Board/Staff to evaluate how individual portfolios compare relative to their specific benchmark. For example, a portfolio with a lower dividend yield than its benchmark may have a style bias towards growth stocks. A portfolio with a low beta (a measure of risk relative to the broad market) may have a value bias relative to the broad market. The Staff currently receives extensive reporting from its consultant regarding the holdings of the equity portfolios. Equity sector attribution, top ten holdings, best and worst performers, and portfolio characteristics are some of the statistics provided in a report prepared by Wilshire, which is reviewed by Staff. The report the Board receives does not contain any equity analytics for either the equity composite or the underlying equity managers. IFS believes the Staff's review of this information is sufficient and the current report meets best practices.

Recommendation
No recommendation necessary.

i. Portfolio Characteristics for each Fixed Income Manager and Total Fixed Income Composite

The quarterly report should include fixed income portfolio characteristics such as duration, yield to maturity, time to maturity, average quality, etc. as compared to the benchmark; the Staff's ability to evaluate the underlying investment managers would be significantly enhanced by receiving the previous listed analytics. Statistics such as duration, a measure of interest rate sensitivity, would give the Staff better information to understand the specific strategies that a manager employees as well as how to expect the portfolio to react in certain interest rate environments. The report to the Board that we reviewed did not contain any fixed income analytics on either a composite or manager level. The Staff, however, receives a separate report from Wilshire that contains a thorough analysis of each of the fixed income portfolios. IFS believes the Staff's review of this information is sufficient and the current report meets best practices.

Recommendation
No recommendation necessary.

j. Risk and Return Analysis for the Total Fund and each Asset Class

It is important to evaluate performance on an absolute basis as well as a risk-adjusted basis to ensure that the System is following the prescribed investment policy and strategy of the Board. The quarterly report should show the risk-adjusted return or Sharpe ratio for the Total Fund, policy index and asset class benchmarks.

The Board currently receives minimal information on risk/return regarding the Total Fund in Wilshire's Investment Review presentation. The presentations we reviewed contained a risk/return plot of the Total Fund and the Policy Index as well as a "Skill Analysis" showing excess return vs. the Policy Index for five and seven-year periods. Additional risk/return analytics, such as a Sharpe Ratio exhibit, can be helpful in evaluating how much return the

System has earned for a given level of risk. The staff noted that they have the ability to get this information on a manager level basis using the Wilshire Compass software system, when appropriate.

Recommendation IID-4	PSERS Response
PSERS Board should request that its consultant provide additional risk/return exhibits for the Total Fund and each Asset Class.	The Board will consider requesting that its general investment consultant add this information to future reports.

3. Alternatives and Real Estate Performance Reporting

The System currently receives an extensive and through report from Portfolio Advisers regarding the investment performance of both their alternative and real estate investments. These reports provide information both at the composite and individual investment level. The System is provided with exhibits displaying the structure of the real estate portfolio by property type and region. Accounting cash flow charts are provided listing the size of the portfolio, amount of commitment and distributions to the System. Internal rate of returns are also provided by individual investment as well. The Alternative Investments report is constructed in a similar format as the Real Estate report. It contains additional information, such as historical performance and cash flows by investment vintage years. Overall, IFS finds this report to be extremely thorough and comprehensive regarding the System's alternative investment portfolio.

Recommendation
No recommendation necessary.

II-E. Performance Benchmarks

1. Overview

Performance benchmarks are objective standards used to assist in evaluating a manager or fund's investment performance. Institutional investors typically use at least two types of performance benchmarks: "policy" benchmarks and "strategic" benchmarks. As an additional measure, many funds also (as a matter of policy) establish an "Asset Allocation" index.

Policy benchmarks generally represent the investment opportunities of a broad asset class and are used as a reference point against which the investor can compare its total asset class returns. For example, a domestic equity investment structure designed to provide broad asset class exposure may use the Wilshire 5000 Index or the Russell 3000 Index (broad measures of the domestic stock market) as a policy benchmark as opposed to the S&P 500 Index, which is more concentrated in larger-capitalization stocks. Policy benchmarks also help define the types of investment managers that should be used to achieve the investment objectives for the asset class and the nature of the manager's investment mandate.

Strategic benchmarks are generally more narrowly defined and typically focus on a particular investment "style" within the asset class. They more clearly describe the expected range of investment opportunities for a given manager and more objectively measure the manager's value added, or the manager's return independent of its investment style. For example, an investor setting a strategic benchmark for a domestic equity investment manager that seeks to purchase large capitalization stocks that it believes will grow their earnings above the average rate relative to the market (a "large cap growth" manager) may select a large cap growth benchmark such as the Russell 1000 Growth Index as an appropriate strategic benchmark. Therefore, the manager's excess return above the "comparable style" strategic benchmark is generally due to its active decisions as opposed to its investment style being "in favor" relative to a style-neutral strategic benchmark.

As an additional measure, many funds also (as a matter of policy) establish an "Asset Allocation" index. This also is constructed using published market benchmarks. In contrast to the Policy Index, the Asset Allocation Index's asset class weights change to reflect the actual asset allocation of the fund as it "drifts" or as tactical decisions are made to overweight or underweight an asset class. Therefore, this benchmark adjusts for the asset allocation drift over time. A fund's excess or under-performance versus the Asset Allocation Index is mainly attributable to the performance of the underlying investment managers (internal or external).

PSERS Uses Generally Appropriate Benchmarks but Could Make Some Refinements

2. Domestic Equity

The System uses both the Russell 3000 Index and Dow Jones Wilshire 5000 Index to measure the overall domestic equity portfolio. The Wilshire 5000 is listed as the policy benchmark in the Investment Policy Statement. The Russell 3000 Index measures the performance of 3,000 U.S. companies based on total market capitalization, representing approximately 98% of the investable U.S. equity market. The Wilshire 5000 Index (as of 6/30/05) measures the performance of 4937 U.S. companies based on total market capitalization, representing approximately 100% of the investable U.S. equity market. IFS has found that the majority of public pension funds use either the Russell 3000 or the Wilshire 5000 as the benchmark to represent the broad domestic equity market. IFS finds the use of either the Wilshire 5000 or Russell 3000 to be an appropriate benchmark for its equity allocation.

The System also uses subset indices from the Russell 3000 as strategic benchmarks for managers that focus on a particular style. For example, the System uses the Russell 2500 Value Index to measure the performance of its small-mid cap value managers. While IFS did not analyze the investment strategies of the individual underlying investment managers, based on a holdings analysis prepared by IFS, it appears that the System is using the appropriate strategic benchmarks for each equity segment.

Recommendation
No recommendation necessary.

3. International Equity

According to the Investment Policy Statement, PSERS uses the MSCI ACWI ex US as the benchmark for international equities. The MSCI ACWI (All Country World Index) ex US[28] is a free float-adjusted market capitalization index that is structured to measure equity market performance in both the developed and emerging markets. As of May 2005, the MSCI ACWI ex US consisted of the 22 developed and 26 emerging market countries. PSERS additionally uses the MSCI Emerging Markets Index to measure a portion of the international equity portfolio, specifically for portfolios that focus on emerging markets. The MSCI Emerging Markets Index[29] is a free float-adjusted market capitalization index that is structured to measure equity market performance in the emerging markets. As of May 2005 the MSCI Emerging Markets Index consisted of 26 emerging market country indices.

[28] The underlying countries that make up the MSCI ACWI ex US are the following: Argentina, Australia, Austria, Belgium, Brazil, Canada, Chile, China, Colombia, Czech Republic, Denmark, Egypt, Finland, France, Germany, Greece, Hong Kong, Hungary, India, Indonesia, Ireland, Israel, Italy, Japan, Jordan, Korea, Malaysia, Mexico, Morocco, Netherlands, New Zealand, Norway, Pakistan, Peru, Philippines, Poland, Portugal, Russia, Singapore Free, South Africa, Spain, Sweden, Switzerland, Taiwan, Thailand, Turkey, the United Kingdom, and Venezuela. MSCI targets 85% of the free float-adjusted market capitalization in each industry, in each country for inclusion in the benchmark.

[29] The underlying countries that make up the MSCI Emerging Markets Index are the following: Argentina, Brazil, Chile, China, Colombia, Czech Republic, Egypt, Hungary, India, Indonesia, Israel, Jordan, Korea, Malaysia, Mexico, Morocco, Pakistan, Peru, Philippines, Poland, Russia, South Africa, Taiwan, Thailand, Turkey and Venezuela.

Historically, pension funds have typically benchmarked their international equity allocation of the portfolio against the MSCI EAFE Index.[30] The MSCI EAFE® Index (Europe, Australasia, Far East) is a free float-adjusted market capitalization index that is structured to measure the performance of the developed international equity markets, excluding the US & Canada. As of May 2005 the MSCI EAFE Index consisted of 21 developed market country indices. As public funds have broadened their investment horizons in the international equity markets to include emerging markets, the need for a more representative performance benchmark has become necessary. Since the MSCI ACWI ex-US encompasses both developed and emerging markets, it has become one of the most commonly used indices among Public Retirement Systems that have exposure to emerging markets in their international equity allocation.

PSERS recently made an allocation to a group of small cap international equity managers. This allocation has significantly broadened the investment universe of the PSERS international equity portfolio. While the MSCI ACWI ex-US does include a portion of small capitalization stocks, a significant portion of the small cap universe is excluded. IFS believes the System should consider using a broader international equity benchmark, such as the S&P/Citigroup BMI Global Index ex US, for its overall policy benchmark. The inclusion of small cap securities makes this benchmark more representative than the System's current policy benchmark, the MSCI ACWI ex-US. The S&P/Citigroup BMI Global Index ex US[31] is also a free float-adjusted market capitalization index that consists of 51 developed and emerging markets and includes 5,621 companies (as of 8/31/05). This index includes both developed and emerging markets, along with large and small cap securities.

[30] The underlying countries that make up the MSCI EAFE Index are the following: Australia, Austria, Belgium, Denmark, Finland, France, Germany, Greece, Hong Kong, Ireland, Italy, Japan, the Netherlands, New Zealand, Norway, Portugal, Singapore, Spain, Sweden, Switzerland and the United Kingdom.

[31] The underlying countries that make up the S&P/Citigroup BMI Global Index ex US Index are the following: Canada, Austria, Belgium/Luxembourg, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Netherlands, Norway, Portugal, Slovenia, Spain, Sweden, Switzerland, United Kingdom, Australia, Hong Kong, Japan, New Zealand, Singapore, South Korea, Czech Republic, Hungary, Poland, Russia, China, India, Indonesia,

Recommendation IIE-1	PSERS Response
PSERS should consider measuring the international equity portfolio against the S&P/Citigroup BMI Global Index ex-US.	PSERS will consider this recommendation when the Board next reviews the System's asset allocation.

4. Domestic Fixed Income

The System uses the Lehman Brothers Aggregate[32] Index to measure the domestic fixed income portfolio. The Lehman Brothers Aggregate Index is made up of four major segments: Treasury, Government Related, Corporate and Securitized securities. The System currently allows investment managers to invest in each of these segments along with other fixed income securities that are not included as part of the Lehman Brothers Aggregate Index. For example, the System has an allocation to high yield investment managers. These managers invest in non-investment grade securities that tend to offer a higher yield (at a higher risk level) when compared to the securities in the Lehman Brothers Aggregate Index. The system also has an allocation to "core plus" managers. Core plus managers typically invest the majority of their assets in securities that are included in the Lehman Brothers Aggregate Index; however these managers are permitted to invest a portion of their holdings in "plus" sectors such as below investment grade securities, foreign denominated bonds, and emerging market securities. Since the System invests in securities outside their current benchmark, IFS believes another benchmark should be considered as the policy benchmark.

The Lehman Brothers U.S. Universal Index[33] includes all of the securities that make up the Lehman Brothers Aggregate Index, but also includes other securities such as High Yield Corporate bonds, 144A securities and dollar denominated Emerging Market bonds. This broader

Malaysia, Pakistan, Philippines, Taiwan, Thailand, Argentina, Brazil, Chile, Colombia, Mexico, Peru, Venezuela, Egypt, Israel, Jordan, Morocco, Nigeria, South Africa, and Turkey.

[32] The Lehman Brothers U.S. Aggregate Index represents securities that are SEC-registered, taxable, and dollar denominated. The index covers the U.S. investment grade fixed rate bond market, with index components for government and corporate securities, mortgage pass-through securities, and asset-backed securities.

[33] The Lehman U.S. Universal Index represents the union of the U.S. Aggregate Index, the U.S. High-Yield Corporate Index, the 144A Index, the Eurodollar Index, the Emerging Markets Index, the non-ERISA portion of the CMBS Index, and the CMBS High-Yield Index

index is more representative of the types of securities that are held within the System's domestic fixed income portfolio. The use of the Lehman Brothers U.S. Universal Index would allow the Board to determine (1) if any sector "bets" are being taken, i.e., highlighting any structural differences between the portfolio and the market, and (2) how those "bets" have helped or hindered the funds overall performance.

Recommendation IIE-2	PSERS Response
PSERS should consider measuring the fixed income portfolio against the Lehman Brothers U.S. Universal Index.	PSERS will consider this recommendation when the Board next reviews the System's asset allocation.

5. Global Fixed Income

PSERS currently uses the Lehman Brothers Global Aggregate Index[34] to measure the performance of the global fixed income portfolio. The major components that make up this benchmark are investment grade securities from the U.S., European and Asian Pacific markets. According to the current investment manager guidelines, "global" managers are allowed to invest in securities that are both investment and non-investment grade. These non-investment grade securities are not a component of the System's current policy benchmark, the Lehman Brothers Global Aggregate Index. The Lehman Brothers Multiverse Index includes securities that are both investment and non-investment grade; therefore this alternate benchmark would be more representative of the investable universe for the PSERS Global Fixed Income portfolio.

Recommendation IIE-3	PSERS Response
PSERS should consider using a broader global index such as the Lehman Brothers Multiverse Index.	PSERS will consider this recommendation when the Board next reviews the System's asset allocation.

[34] The Lehman Brothers Global Aggregate Index provides a broad-based measure of the global investment-grade fixed income markets. The three major components of this index are the U.S. Aggregate, the Pan-European Aggregate, and the Asian-Pacific Aggregate Indices. The index also includes Eurodollar and Euro-Yen corporate bonds, Canadian government, agency and corporate securities, and USD investment grade 144A securities.

6. Public Real Estate

PSERS compares the performance of the Public Real Estate portfolio to two indices. These two indices are the Dow Jones Wilshire Real Estate Securities Index[35] and the Dow Jones Wilshire REIT Index[36]. The IPS designates the Wilshire Real Estate Securities Index as the policy benchmark. Both of these indices are broad measures of the U.S. Real Estate securities market and are representative of the investment universe available to PSERS. In IFS' opinion, the Dow Jones Wilshire Real Estate Securities Index is an appropriate benchmark for the Public Real Estate portion of the portfolio.

Recommendation
No recommendation necessary.

7. Private Real Estate

PSERS currently uses the NCREIF (National Council of Real Estate Investment Fiduciaries) Property Index to measure the private real estate portion of the portfolio. This index contains over 4,700 diversified properties, with a total market value over $189 billion, which have been acquired on behalf of tax-exempt institutions and held in a fiduciary environment. To date, this is the broadest most encompassing benchmark for the private real estate market. This benchmark is also widely accepted and utilized despite its few known "flaws," such as the fact that it does include the use of leverage, is gross of fees, which tend to be substantial in this asset class, and the appraisal valuation process decreases the volatility. IFS finds that PSERS uses an appropriate benchmark.

[35] The Dow Jones Wilshire Real Estate Securities Index represents publicly traded real estate securities such as Real Estate Investment Trusts (REITs) and Real Estate Operating Companies (REOCs).
[36] The Dow Jones Wilshire REIT Index is a subset of the Dow Jones Wilshire Real Estate Securities Index and includes only REITs.

Recommendation
No recommendation necessary.

8. Alternative Investments (Private Equity)

Benchmarking the performance of private equity investments can be a difficult task and some thought must be given to the evaluation of each investment. Private equity benchmarks are imperfect and the Board should be aware of the caveats that are associated with them. One issue common to all private equity benchmarks is the reliance on interim valuations of unrealized investments. There currently is no standard methodology to value private equity investments in the short-term, therefore similar investments may have significantly different values during the lifetime of the project. Another potential issue that the System should be aware of is comparing private equity investments that have different vintage years. Private Equity returns typically suffer from the J-Curve effect[37], which is an initial period of negative returns in the Fund's early years followed by a period of strong positive returns. Therefore, the System would not want to compare the performance of a new investment to that of a mature investment over the short term.

The benchmark currently used by PSERS to analyze the Alternative Investments Portfolio is the Venture Economics Index. The Venture Economics Index is made up of over 2000 Private Equity Investments around the globe with various vintage years. This index shows IRRs (dollar weighted returns) for each vintage year and offers the most comprehensive IRR comparison. IRR returns are generally considered to be a better measure of private equity investments than traditional time weighted returns due to the cashflow aspect of the investment. This index is currently one of the broadest measures of the Private Equity markets. An

[37] The curve realized by plotting the returns generated by a private equity fund against time (from inception to termination). The common practice of paying the management fee and start-up costs out of the first draw-down does not produce an equivalent book value. As a result, a private equity fund will initially show a negative return. When the first realizations are made, the fund returns start to rise quite steeply. After about three to five years, the interim (temporary) IRR will give a reasonable indication of the definitive (final) IRR. This period is generally shorter for buyout funds than for early-stage and expansion funds.

alternative benchmark used by some Public Retirement Systems is an Equity Index return, such as the Wilshire 5000 or S&P 500, plus 300-500 basis points above the selected index. IFS finds this alternative measure to be an appropriate target over the long run, but in the short run there typically is a significant discrepancy due to the valuation methodologies of Private Equity. Overall, IFS finds the use of the current benchmark, the Venture Economic Index, to be an appropriate measure for System.

Recommendation
No recommendation necessary.

9. Total Fund

The System's current policy index is composed of 40% Wilshire 5000 Index, 20% MSCI ACWI ex US, 13.7% Lehman Brothers Aggregate Index, 5% Lehman Brothers US TIPS Index, 3.3% Lehman Brothers Global Aggregate Index, 1.4% Wilshire Real Estate Securities Index, 5.6% NCREIF Index (one-quarter lagged), 11% Venture Economics Median (one-quarter lagged). IFS finds this policy index to be appropriate in that it represents the System's target weight for each asset class and uses broad market indices. If the System decides to replace any of the asset class policy benchmarks, the underlying benchmarks that make up the total fund should be reflected in the change as well. An additional benchmark for the Total Fund is an asset allocation index, which we believe should be utilized by PSERS.

Recommendation
No recommendation necessary.

II-F. Cost and Fees

1. Background – Costs and Fees in General

An investment fund's gross total return is a combination of the income the investments generate and net realized and unrealized gains and losses in investment value. The net return that flows to the "bottom line" and is available to pay benefits is the gross return reduced by the costs of achieving that return. The three main categories of costs that affect investment return are

- Costs of investment management, generally being amounts paid to entities or persons for selecting and managing the investments.

- Costs of professional advice supporting the effort of managing the fund, including various consultants and other professionals who assist in selecting, monitoring, and measuring the investment managers and their activities, as well as custodians, record keepers and others supporting the control of the process.

- Costs of transactions within the portfolio, principally the cost of executing trades in the portfolio.

Some of these costs are separately invoiced and some are charged directly to the fund's investment accounts. Some are variable costs tied to the amount of assets, transactions, or other activity and some are fixed costs per period. Some are easily measured and others are difficult to quantify. All are to some extent negotiable. Some cost savings are relatively easy to negotiate and put in place; others are either financially or administratively difficult to achieve.

2. PSERS' Investment Management Costs

PSERS' portfolio is invested through a combination of internally and externally managed portfolios. The ultimate investment objective is to maximize net return (at a reasonable level of risk) – return after all costs. The decision whether this can be achieved through internal management or by hiring an outside manager is complex. It includes not only measuring the direct and incremental indirect costs and the expected rates of return, but considering the operational risks. In this section we discuss only the process for measuring the costs portion of the analysis.

a. Measuring the Cost of Internal Asset Management

Internal asset management for at least some investment strategies is a common, but not universal, approach among large public pension funds.In a few jurisdictions internal management is mandated; in most it is an investment choice. The economic conclusion for many very large funds that can achieve economies of scale is that the explicit cost is considerably less than retaining similar outside managers, provided the returns that are achieved long term are not worse than the external managers would achieve net of costs. Measuring this benefit involves measuring costs and returns of each approach, factoring in risks to those returns including personnel turnover risk.

PSERS has Reached a Reasonable Conclusion to Use Internal Asset Management, but the Quantification of the Benefit May Overstate the Case

PSERS has developed an analysis of the cost of internal asset management compared to the estimated cost of that same management done by outside service providers. The result of this analysis demonstrates internal management materially reduces investment costs. This analysis appears to be a good starting point for this important metric, but we believe it needs some refinements.

As we understand the analysis, some adjustments appear to be needed. The cost computed includes salaries and incentive compensation for the staff directly involved in asset management and involved in oversight and supervision of that process, i.e., the entire investment office. It includes estimated benefits and other "miscellaneous expenses," which appears to be overhead. In addition, it appears to overstate costs by including all investment management costs, and not just those incremental to the internal management process.

In this analysis, measuring the savings from internal management, the costs that are or would be incurred to manage the funds externally should not be counted. In the equities and fixed income areas, for example, four investment professionals are counted in each asset class, allocating 100 percent of their cash compensation. If those two asset classes were fully externally managed, PSERS would still need one or two people to oversee the managers, conduct searches, and other duties, although there might be fewer people, and they might receive less compensation. The trading operation probably would not exist if no assets were managed internally, but the Alternatives unit (which includes real estate oversight) would probably be staffed very much as it is, since private equity and real estate are not directly managed internally. Administration and executive costs appear to be included in the basis point "Cost to Manage Internally" in full, but not to be included in the dollar benefit qualification at all.

PSERS has provided a worksheet quantifying several cost and revenue activities that affect the question whether internal investment management is financially attractive relative to external management. The worksheet calculates several discrete measures without reaching any combined quantification of benefit.

Internal investment management cost is calculated for salaries and bonuses of direct investment manager and indirect investment personnel, a benefits allocation, and a miscellaneous category not explained. This totaled $5,303,018 for the year ended June 30, 2004 and was calculated as being 2.97 basis points on the portfolio of $17.840 billion. PSERS' staff described this calculation as conservative and "including everything except the kitchen sink." We believe the number is reasonable (assuming the $1,766,000 of miscellaneous is reasonable and appropriate) as a measure of the cost of investment management in basis points and dollars. As a measure of the cost of internal management it is overstated. If this worksheet is intended to be a measure of internal management cost/benefit, only the incremental personnel costs should be included. Costs incurred in overseeing external managers, for example, should not be included.

A net savings/benefit from internal management is calculated by combining three elements: (1) salary and bonuses of investment management and trading personnel, excluding supervisory personnel, benefits, and miscellaneous, (2) presumed savings by not paying external investment managers, and (3) presumed savings from internal trading. The value claimed is $21.395 million or 12 basis points on the total portfolio.

Costs of portfolio manager and trader staff are probably understated in excluding benefits and overhead, but overstated in assuming that all personnel are incremental to internal management.

External manager costs for publicly traded securities appear reasonable, and perhaps conservative, given the low fee rates uses in some cases. Given PSERS' total assets and based on confirmable comparative investments, including manager costs at Pennsylvania SERS, these are likely to be good measures. The calculated benefit of this portion is $6.182 million.

External manager costs for alternative investments are shown as $2 million each for real estate and alternatives plus $350 thousand for the development fund. These amounts are not supported by data. Given that nearly all the assets in these areas are invested through external managers or partnerships, with the assistance of consultants for real estate and alternatives, the manager savings in this area is not demonstrated. This portion totals $3.839 million of the $21 million.

The remainder of the benefit is attributed to trading, with a trading benefit net of trader salaries of $11.374 million. The trading benefit is the result of comparing a measured value to an assumption. PSERS uses a well qualified quality of execution firm, Plexus, to measure the quality of its trading activities. This is a supportable statistic. However, in order to calculate the benefit, PSERS then assumed that external managers trading would yield only Plexus' average execution. This analysis reports the internal trading for the year ended June 2004 of $8.524 billion with an average savings of 13.7 basis points, or $11.7 million. This apparently includes trading for PSERS' internally managed portfolios and its internal trading for external managers. We were provided nothing beyond anecdotal evidence that the external managers PSERS has or would (absent internal management) hire would achieve only Plexus' average execution.

In this analysis, PSERS also calculates a return effect of internal management in the publicly traded equity and fixed income asset classes. The benefit shown is $35.3 million. While this is not added to the $21.4 million benefit from internal management, there is an implication that the two benefits are additive. In any case the $35.3 million "Incremental Dollar Return for Outperforming Benchmark" overstates the performance value generated by internal management by a significant amount in at least two ways:

- The excess dollar return is improperly calculated.
- The benchmark is not appropriate to the investment style being followed and the external manager fee being avoided.

The return in the worksheet is calculated by multiplying the asset value at year end by the excess return in basis points. This is incorrect in at least two significant ways.

- There is no adjustment made for cash flows into or out of the portfolio during the year. As an example, a large cash inflow (or conversely an outflow) just before year end would not have been invested at any time during the year, but the calculation would include an excess return on it as if it had been invested for the full year.

- In addition to the distortion of external cash flows, the excess return earned during the year is included in the year end balance. Since the excess rate is applied to this entire balance, that incremental income is treated for this calculation as if it were invested for the full year, i.e. as if it had been credited on the first day of the year rather than continually over the year.

The excess return over the benchmark in basis points is also flawed. While this rate is calculated by taking the rate reported by Wilshire for the internally managed portfolio and subtracting a benchmark rate, the choice of the benchmarks as passive indexes does not support the implication that this is the excess return PSERS' internal investment department achieved over what would have been earned by a comparable outside manager in the actively managed strategies. This worksheet claims fee savings applicable to active management, incurs the risks of active management, but attributes excess performance against a passive bogey. At a minimum the comparison should be made against a benchmark of similarly active managers. More accurately it should be made against the performance expectations of the quality of active manager PSERS' staff is capable of hiring, which should be one that outperforms its applicable active benchmark, not merely matches it.

There is no clear support for assuming that external managers would return the benchmark in each case. The largest portion of the excess return is in the active fixed income ($17.1 million) and the enhanced S&P 500 Index ($9.8 million). However, material excess performance is also claimed in the straight index areas.

The general principle supporting internal management absent laws precluding hiring external managers is that the cost of investing is lower than the fees for external managers over time and considering costs of turnover and discontinuity, less the cost or plus the benefit of not achieving equal performance to the external asset managers. Clearly there are assumptions to be made in quantifying this, which is in part why different investment systems reach different conclusions.

At PSERS there is probably a strong case justifying internal management and strong evidence it has been implemented profitably. However, the quantification presented does not appear to make the case in a supportable manner and probably overstates the benefit. If the strategy ever comes under scrutiny, PSERS will be in better position if they can point to an analysis fully supported by reasonable data that leads to a five or ten million dollar annual benefit than one that is questionable in several areas showing a $50 million annual benefit.

Recommendation IIF-1	PSERS Response
We recommend the cost-benefit calculation of internal management be re-engineered to confirm data and to include all significant costs and savings on an incremental cost basis. The design and measurement should be done with the assistance of a qualified cost accountant or consultant.	PSERS will consider this recommendation. PSERS' analysis reviewed by IFS was only a rough estimate of the benefits of internal management and was never meant to be an exact measure. PSERS believes that the majority of the costs are included in its analysis, including benefits. PSERS also believes that the benefits measured of internally managing assets and processes are reasonable, if not conservative. For alternative investments, real estate, and the Developmental Fund, PSERS conservatively used the $2 million estimate for alternative investments and real estate as well as the $350,000 estimate for the Developmental Fund. PSERS obtained a data point from Portfolio Advisors, its alternative investment consultant, which also manages a fund of funds business that includes these types of portfolios. Based on the beginning market values of the portfolios the fixed fees for outsourcing both PSERS' real estate portfolio and alternative investment portfolio would be

	approximately $11 million and $19 million, respectively. Given PSERS' size, it would most likely get some modest fee reduction from these stated rates, but nothing close to the conservative estimate of $2 million for each portfolio used by PSERS. Regarding the Developmental Fund cost of $350,000, if that were outsourced to a Developing Manager Fund of Funds, the fees would be at least $1.5 million as per the presentation material from the April 24-25, 2006 "Expanding Investment Opportunities Through Diversity" conference hosted by CalPERS and CalSTRS. Again, PSERS' estimate of $350,000 appears too low, not too high. Regarding trading, PSERS believes measuring its performance versus average trade executions as supplied by Plexus is reasonable. With respect to performance, if PSERS' active managers are generating returns in excess of the benchmark, PSERS believes that they are indeed adding value versus a passive alternative and that should be recognized.

b. Measuring the Cost of External Asset Management

Fees Paid to Outside Investment Managers Appear to be Under Control

i. Background

External manager fees are determined as a part of the process to hire managers. Most investment managers maintain set fee schedules, typically with break points applying lower fee rates to assets above particular levels. This results in lower average fees for larger accounts. While the explicit fee tables may be negotiable, often they are not if only because other clients may have negotiated fee provisions providing for parity with similar clients.

Large investors such as PSERS have opportunities to achieve additional fee savings in a couple of other ways. Many manager fee schedules cover only up to an asset level that captures the majority of the manager's clients. Accounts above that level have "negotiable" fees. These may result in discounts if assets exceed a given amount, very low incremental fee rates above a given amount, and similar structures.

PSERS maintains a schedule of manager fees that indicates such savings have been achieved in several cases. These savings mechanisms include somewhat innovative approaches. For example, certain managers discount the standard fee schedule if assets exceed agreed upon levels. Several fee structures also include performance components. In addition to the common performance fee structure in alternative asset and real estate investments, PSERS has performance components in certain enhanced index, global equity and fixed income strategies.

ii. Performance Fees

Performance fees are common, perhaps universal, in alternative asset structures such as hedge funds, private equity as well as private real estate. They are less common for managers following strategies investing in long-only positions in publicly traded securities. There are several reasons why performance fees are not commonly used in these strategies. Among the common criticisms are:

- Performance fees do not succeed in "incenting" managers to generate better returns (and may only encourage greater risk-taking on the manager's part);

- Managers are already motivated to earn superior returns under a traditional percentage of assets fee because as the market value of an account grows, the manager's total revenue from the account increases;

- Performance fees are more complicated to negotiate, to calculate and to monitor;

- Performance fee structures in practice prove not to be robust or sustainable (generally because either party may prefer to "drop out" during the term of the agreement if its effect is perceived to be adverse);

- The structure of these fees is rarely symmetrical (managers are typically rewarded for producing an excess return, but not as often penalized for underperformance and rarely to the same degree); and

- The appropriate reward for strong performance is the continuation of the business relationship, while the ultimate penalty for weak performance is the termination of the manager's services.

An effective performance fee should carefully define the period over which returns are calculated. The formula should link performance over multiple periods (as opposed to individual years) so that the investor is not paying a performance bonus for one good year when a manager's returns in other years failed to meet expectations. Techniques to accomplish this requirement include the use of a "high water mark" whereby a manager is rewarded only if performance over the entire life of the contract exceeds expectations (and not for temporary bursts of outperformance followed by periods of underperformance). Alternatively, payment of a performance bonus could be made contingent on the manager meeting expectations over rolling periods, requiring sustained success, rather than episodic or short lived success).

As part of our review, we analyzed an enhanced equity manager's performance fee calculation. It is a quarterly calculation based on rolling twelve month periods, so it includes a limited degree of multiple period or longer term perspective. The returns for the periods available did not generate returns that qualified for the incentive fee, so our ability to reach conclusions on the fee the provision generated was limited.

The question whether a performance fee for traditional investment approaches is financially beneficial remains open. Consideration of such a structure should be undertaken not only when a manager is hired, but periodically during the manager's tenure to reconfirm that the fee structure – whether or not the performance component was triggered – is on a net basis beneficial.

Recommendation IIF-2	PSERS Response
We recommend that PSERS review the fee amount and structure of all separate managers of publicly traded securities who have performance components with respect to the level of fees and the net returns achieved.	PSERS agrees. PSERS currently has performance fees on nine accounts. While it believes these fees are reasonable, PSERS will revisit them over the next year.

iii. Basic Manager Fees

Competitiveness of fee schedules is a complex matter. Data is predominately available only from surveys or inquiries of other managers either obtained directly or through an investment consultant who maintains such data. This research can generate a range in which similar mangers set their fees, but cannot identify the one "right" fee. At best it can identify outliers and give comfort that the fee is competitive. Ultimately, though, the goal is to achieve a net return, so a lower fee savings can be more than offset by poorer returns.

In actual practice the only mechanism to achieve the most beneficial fee structure relative to value added is the competitive process of searching for, selecting, and negotiating terms with investment managers. On a more generalized basis, fees for an investment management contract can be compared to general ranges of fees as computed in various surveys and other data collection efforts. This process can usually identify fees that appear to be outside normal ranges, but otherwise are not particularly useful in determining fee competitiveness within narrow ranges. All other factors being reasonably equal, active manager fees are higher than passive, small cap is higher than large cap, international is higher than domestic, equity is higher than fixed income.

We reviewed several PSERS manager fee schedules against broad market surveys and found the fees to be within reasonable expected ranges.

Domestic fixed income manager fees for three managers with no incentive component ranged from 13 to 16 basis points for a $700 million account. Greenwich Associates 2003 survey of pension funds reported that fees for large state funds average 14 to 15 basis points, while 80% of respondents paid 16 basis points or more for active fixed income. Another survey of manager fee schedules using 2003 data[38] reveals that the median fee for actively managed intermediate duration fixed income is 23 basis points for a $200 million portfolio.

PSERS' active domestic equity manager fees were generally in the 45-50 basis point range for the active small and mid cap managers and around 100 basis points for the micro cap managers; one would expect higher fees for a more specialized "aggressive" product. The Greenwich Associates 2003 study reports average active domestic equity managers fees to be 53.3 basis points and 9 basis points for passive domestic equity. The Casey Quirk & Acito study showed median manager fees for $100 million accounts to be in the 74-81 basis point range for "active" small cap strategies, depending on the investment style (core, growth or value). Fees were slightly lower for larger accounts, however most of PSERS' small cap accounts are in the $100 to $200 million size range.

PSERS' emerging market equity managers receive fees of approximately 60 basis points and 90 basis points depending on assets under management; per the Greenwich study fees paid by state public funds for this approach averaged just fewer than 60 basis points. However, 27% of emerging market managers received 90 basis points or more. In this latter area particularly,

[38] Casey, Quirk and Acito, data as of December 31, 2003.

comparison is difficult due to the broad range of markets and strategies from manager to manager.

PSERS' fees for large cap international equity managers were more variable, however they are low (e.g., the approximate fee for a global equity account is an average of 29 basis points) compared to the Casey Quirk & Acito median of 70 basis points for active international core accounts over $500 million. International small cap median manager fees are in the 85-90 basis point range and PSERS' fees generally compare favorably. The Greenwich Associates 2003 study reports 62.9 basis points as the mean fee for active international equity.

Peer survey response for management fees generated too little data for truly meaningful comparisons. We received four responses on overall manager fees measured in basis points, and only two responses for asset class fees. Neither sample is sufficient to be significant. Additionally, the dispersion of reported rates indicates that the funds being compared have materially different manager mixes even within asset classes. Moreover, there is no assurance that each respondent computed the fees in the same manner. Thus we have concluded that making a quantified conclusion would be distorting. Within these caveats we compared responses to PSERS' own responses to the same questions and did not identify any aspect that would indicate PSERS' fees are outside market norms.

Overall, PSERS' fees paid to investment managers are reasonable and competitive. The controls for verifying the asset based and performance based fees are appropriately designed and managed. We discuss PSERS' accounts payable process to verify fees below.

Recommendation
No recommendation necessary.

3. PSERS' Service Provider Costs

a. Investment Consultant Fees

PSERS' Investment Consultant Fees Appear to be Reasonable for the Mix of Assets

PSERS uses three investment consultants for various aspects of its investment program: a general investment consultant, a real estate specialty consultant and an alternatives consultant. Services to be provided and fee levels are specified in the contract, with fees fixed in dollar or formula terms and covering all services.

Per PSERS' 2005 budget, fees paid in 2004 for these consultants were:

- Wilshire Associates - $389,583
- Russell Real Estate Advisors - $193,319
- Portfolio Advisors - $875,000

The Greenwich Associates report referred to above shows investment consulting fees for public funds over $5 billion in assets averaged $748,000 in 2003. With its higher than typical allocation to real estate and alternative assets, we would expect PSERS to be at the high end of the range of consultant fees.

Consulting services, even more than investment management services, are sufficiently unique for each provider and each client that there is no feasible means to determine their reasonableness in absolute terms. PSERS' process for obtaining consulting services at appropriate fee levels is to competitively bid the services via RFP periodically. All current consulting contracts are for terms not exceeding five years. The five year term is based on

Commonwealth procurement regulations and on PSERS' policy to review and reassess these services periodically. This is a reasonable interval for revisiting the quality and cost of investment consultants.

Six public fund systems responded to the survey with respect to consultant cost and usage. Each of them uses at least one consultant in each of the general investment, real estate and alternative investment areas. In each of the three areas PSERS' consultant fees, as shown above, fall slightly below the average of the six peer funds. Survey averages are (in thousands per year) $438 for general consultant, $225 for real estate, and $1,051 for alternative investment.

Recommendation
No recommendation necessary.

b. Custodian

The Combined Custody Fee Arrangement for All Pennsylvania Funds is Highly Competitive

Custody is a vital service for every institutional investment fund. Custody costs can be complex and substantial. The range of services provided and the quality of service delivered can vary significantly, especially between the approximately half dozen top tier custody banks and other domestic banks offering a degree of institutional custody.

The Pennsylvania State Treasurer is statutory custodian and exercises authority to name and hire bank sub-custodians for the various state investment funds, including PSERS. The contractual custody arrangement in Pennsylvania is uncommon and advantageous. The State Treasurer has negotiated a single master contract with one top tier bank, Mellon Trust, to provide global custody services for all the Commonwealth's investment funds, including PSERS and SERS. This contract carries a single flat fee of $500,000 per year covering all services. This fee is in an absolute sense very attractive to the Commonwealth and its constituent investing agencies. Given the magnitude of business it provides, it is probably attractive and cost effective for the bank as well. The fee is charged proportionately to the various investing agencies.

Costs of custody have also been kept in check through Mellon's tenure. The current contract went into effect in November 1998 for a term of up to five years. It has been extended in one year increments until the end of 2005 and is currently being extended in one month increments during contract negotiations for an extension through 2008. It is apparently unusual in Pennsylvania for a single bank to be retained in this capacity that long. Part of the reason for the extension is to allow PSERS to complete its independent book of record project. Having a ready and unbroken record of portfolio holdings and activities is vital, particularly in an era where class action lawsuits are not uncommon. Among the costs of changing banks is the risk of loss of that continuity of information. As a safeguard against future custody bank changes, and to enhance internal controls, PSERS is developing an in-house portfolio accounting system that will transfer the official book of record from the custody bank to the system's computers. At this point in the process approximately 85% of PSERS' investment portfolio is being accounted through the in-house system as the official book of record.

Recommendation
No recommendation necessary.

4. PSERS' Trading Costs

Internal Trading Costs are Measured in a Sophisticated Manner

a. Brokerage Overview

Brokerage – defined broadly as the process of transacting purchases and sales of securities – is a material factor in a fund's investment rate of return. The visible and easily measurable part of trading cost is the broker's commission, but this tends to be the smallest part of total trading costs. More significant is the price paid or received for the security relative to the "market": ideally, a low price on a purchase, a high price on a sale. Part – but only part – of this execution cost is the bid-asked spread for the security. In addition, timing of the transaction within the ebb and flow of intra-day and day to day prices may affect the economics of the transaction to a greater extent. These factors beyond commissions are difficult to measure because they depend on a hazy baseline and because the effect is included in the transaction price rather than being separately stated.

Control over the price obtained for a security's purchase or sale (so-called "quality of execution") rests largely with the investment manager initiating the trade, whether an in-house portfolio manager or an external investment management firm, and partly with the broker effectuating the trade. Aspects of this control include (a) selecting as qualified brokers capable brokerage firms that employ capable "sell-side" traders, (b) placing each trade with the broker most likely to be able to make the trade at the best possible combination of pricing factors, and (c) staffing with capable "buy-side" traders to monitor and work the trade with the brokers. The process of effecting trades that on average achieve favorable price results under the relevant circumstances is called "best execution." This subsumes the interplay of commission, market impact, timing, ability to execute, additional services provided, etc. within the context of the urgency of the trade and the activity of the market. Thus, best execution, is more of a subjective goal than a measurable quantity and is more often recognizable in its absence than its presence.

Multiple firms offer various systems to measure cost and quality of execution. They use different models to establish the baseline against which the actual transaction price is measured. These vary from simple average prices for the day (e.g., average of open, high, low, close) to more complex averages (e.g., volume weighted average price) to highly complex algorithms that track price movements minute by minute and even for several days after the trade. Whether the complex methods yield more relevant results remains an open debate. In all cases, though, the system provides meaningful results only as averages over many transactions; there are too many variables in the market to measure definitively quality of execution on individual trades except in extraordinary circumstances.

Measuring trading costs is a common practice among public funds. Of the eight peer funds who answered our question regarding this practice, seven do so. About 60 percent of those who measure these costs use an outside trading measurement firm.

With an in-house investment management program, PSERS needs to maintain an internal trading operation. While bond trading often occurs directly between buy side portfolio managers and sell side brokerage traders, stocks are often traded between experienced traders who execute the portfolio managers' buy and sell orders. PSERS' trading desk has four traders.

PSERS has retained Plexus, a well known consulting firm offering one of the more complex and sophisticated methods of measuring quality of execution, to measure its internal trading costs. Plexus incorporates several variables into its analysis of the base against which each trade is evaluated. The basic benchmark incorporates several characteristics as separate variables: buy/sell, exchange/NASDAQ, market capitalization, share size, size vs. liquidity, and momentum. Trades are analyzed according to each of these characteristics, incorporating other factors such as when trades are released for execution and the effect of a trade not being executed. For PSERS, in addition to measuring trading quality for all trades as an aggregate, PLEXUS measures separately for internal, external, index and liquidation trades. For example, in the fourth quarter of 2004 external trades beat the benchmark by 11 basis points and internal by 9 basis points, with the other categories favorable as well.

For the year ended June 2004, based on Plexus' average quarterly savings against "average" transaction costs, PSERS reported its total trading added over $11 million in portfolio value. This calculation was incorporated into PSERS' investment office average cost and cost/benefit analysis. This added value assumes, of course, that any alternative trading operation would achieve no better than average.

b. Internal trading for external managers

Internal Trading for External Managers Generates some Quantifiable Benefits, but the Total Cost/Benefit has not been Measured

In addition to executing trades for its internal portfolio managers, PSERS has established arrangements for its outside equity managers to place trades through the PSERS trading desk, rather than through their own buy-side trading operations. The explicit justification for this is the lower commission schedules PSERS' traders have negotiated. The Plexus trading results (which in volume at least include trading for outside managers) also support the program. However, the actual value being added relative to the external managers handling their own trades has not been measured.

Successful investment managers usually need to have successful trading operations to enhance, and not diminish, investment results. Managers usually make buy and sell decisions for all or at least a large number of their accounts, and trade the security for all as a single program. The manager's traders are charged with obtaining best execution for the entire transaction. If the position is traded in pieces – which often occurs – each client is credited with the average price. When managers are required to carve out the trade for a particular client (for directed brokerage, for example, or in PSERS' case for in-house trading), those shares are traded separately from the trades for the pool of clients not directing. Directed trades handled by the manager's trading desk are frequently traded after the undirected trades, which can result in a less attractive price on both buy and sell transactions, being effected in a market already impacted by the earlier trading.

PSERS has instructed its managers to vary the time when trades directed to the internal trading desk are placed relative to when the trades are made for the managers' other accounts. Some are traded ahead of the rest, some concurrently, some later, typically on a rotating basis. This average effect on execution price of the trades done internally compared to those the manager did for its undirected clients has not been measured. In addition, the assumption that a manager's traders will achieve only average execution is unsupportable without empirical evidence. PSERS has provided information regarding its internal trading of external manager trades being done at a lower commission rate. The Plexus analysis of PSERS' trading of external manager activity shows value added at a rate similar to the value added for internal trades relative to the Plexus benchmark. What has not been measured is the quality of the same trades according to the same set of standards if traded by the managers.

PSERS uses two measures to evaluate its internal trading quality against the expected trading quality its external managers would achieve. While each of these provides a degree of valid input, we do not believe either clearly supports a conclusion.

Based on thorough Plexus measurement, PSERS has determined its quality of internal execution exceeds Plexus average execution by around 13 basis points. However, their comparison is the hypothetical manager trade would be done at the average. While this might be true, there is nothing empirical to support the conclusion. Given PSERS' investment expertise, they select particularly good performing managers; good managers often achieve part of their above average performance through above average trading results.

PSERS also evaluates its managers' performance with directed trading against the dispersion of the managers' other clients. If the managers' trading for its other clients is worse than PSERS' internal trading, the net would pull down the other clients relative to PSERS, skewing PSERS' results to the upper portion of the dispersion distribution. However, there are many factors that affect the results of each client portfolio, including individual investment guidelines, measurement of cash flows, etc. The full 13 basis point advantage could easily be lost in the noise of the other factors affecting the dispersion of client results.

A possible additional argument for bringing a substantial portion of external manager trades in-house is better utilization of PSERS' trading staff and absorption of its fixed costs. The current staff may be needed to handle peak periods and multiple markets for internal trades alone. However, we have not seen documentation substantiating current trading staff absent the external manager trading volume. PSERS considers other reasons for maintaining a high volume of internal trading to include access to market information to assist the internal portfolio managers, increased access to IPO allocations, support of an infrastructure to handle manager transitions, assurance that some portion of commission dollars is not being used to support the manager's expenses, ability to obtain lower absolute commission rates, and the ability to monitor the external managers' decision making processes on a real-time basis.

Staff believes it has sufficiently demonstrated the benefit of the internal program for external managers. In certain aspects their practice does avoid the specific trades where internal trading is apt to lose overall value relative to allowing the manager to aggregate the trades with its other clients. These aspects include micro cap equities where volume trading can significantly move the market and certain information based trades where timing is critical. An ancillary and probably unmeasurable benefit that PSERS considers important is the generation of sufficient trading volume to put PSERS in a favorable position to participate in IPOs. However, because the largest part of the measured benefit derives from the internal trade program's favorable execution compared to the external manager's merely achieving average execution, better measurement is justified.

In order to support continued in-house trading for external managers PSERS should arrange for independent measurement of the outside managers' trading costs and quality of execution for their matching trading activity for other clients. Only if PSERS can clearly demonstrate that internally trading this activity achieves better execution after consideration of incremental systems, services and personnel fixed costs, should the practice continue.

Recommendation IIF-3	PSERS Response
Undertake a comprehensive cost analysis and trading analysis of the incremental value of internally trading for outside investment managers including staff needs. This should include commissioning Plexus or another qualifies external execution measurement firm to quantify manager trading results against PSERS trading results on a significant set of actual trades.	PSERS will consider this recommendation. In doing so, PSERS notes it has reviewed this issue in two ways. First, PSERS uses Plexus to measure how effectively the Internal Trading Desk executes trades. The Internal Trading Desk has consistently exceeded the average execution compared to the Plexus universe (PAEG/L). Second, PSERS works closely with the external public market equity managers to ensure that its trading requirements do not adversely impact their performance. Given these items along with the trading done for the internal index portfolios and the additional income generated by the IPO Program, PSERS believes that it has justified the use of the Internal Trading Desk for the execution of external domestic public market equity manager trades. Finally, PSERS has allowed some external domestic public market managers to trade away from the Internal Trading Desk due to the type of account (e.g., micro cap equities) or the type of trade (e.g., an information trade would be permitted to be traded away from the Internal Trading Desk while a value trade would be expected to be placed with PSERS' Internal Trading Desk). PSERS will continue allowing external domestic public market managers to trade away from the Internal Trading Desk when they prove that using the PSERS' Internal Trading Desk is adversely affecting their performance.

b. Manager Transitions

The question whether to use a specialty transition manager to handle the process of moving assets from a terminated manger to its replacement is frequently debated. We believe that there are some situations in which it is justified and some in which it is not. Beyond that, there are considerations of manager transitions that do not apply to individual portfolio trades. One is the possibility of in-kind transfers, where the replacement manager may want to hold some of the same stocks the terminated manager held. Given the information-less nature of the trades coupled with the volume of trades and the time sensitivity, trading mechanisms not typically used by trading desks such as crossing networks may result in better execution. Coordination of sell and buy activity either in the securities market directly or using derivatives can be important in keeping the portfolio fully invested.

Trading Transitions through the Internal Trading Desk Generates Some Benefits, but May not Always be the Best Approach

PSERS has established a procedure to cover securities and trading issues associated with terminating an outside investment manager. Among the risks and potential costs of terminating a manager (and funding a successor) are the terminated manager's ability to trade after termination, the execution costs themselves (both selling the old portfolio and buying the new one), the possibility of selling and buying the same security for different managers, the risk of management gap between the terminated manager's cut off of authority and the effectuation of successor authority, and the possibility of being uninvested in the appropriate asset class during the transition. PSERS' procedure covers only the first of these and provides for a process to determine holdings. Quality and timing of execution and all other considerations are subsumed in the last listed activity, which gives PSERS' Trading Department full discretion to sell the portfolio.

The variety and importance of these issues affecting cost of manager transitions necessitates a policy and procedure that covers all aspects of this event, not just trading authority.

Recommendation IIF-4	PSERS Response
Expand the Termination and Liquidation Procedure to cover all aspects of manager transition.	PSERS agrees and will endeavor to expand the policies and procedures in this area.

c. Commission Recapture

PSERS' Commission Recapture Program is Well Structured and Priced to Generate as much Value as that Arrangement Can

PSERS entered into an agreement in 1998 (and as subsequently amended) with Lynch, Jones & Ryan (LJR) to recapture a portion of trading commissions generated by that firm and its correspondent brokers. Lynch, Jones & Ryan is a well known and capable broker providing this service.

In commission recapture programs, investment managers are charged market commission rates on trades going through or designated for the commission recapture broker. The commission recapture broker returns a designated portion of the commission in cash to the investor.

The contract provides for trades to be directed through LJR by both domestic and international stock and bond managers and by PSERS' internal trading desk. The contract specifies the recapture ratios for external manager trades and discount net commissions for internal manager trades. The resulting net commissions are attractive. The rebate amount on international trades is based on a percentage of the individual broker's normal commission. Depending on the broker and market LJR receives 65-75%, and passes on 95% of that to PSERS up to $6 million per year and 97.5% over that. Domestic trading initiated by PSERS' external managers is generally subject to a 75% recapture. Trades initiated by PSERS' internal trading desk are charged three cents per share gross, and recapture 2.25 cents for market orders and 2.00 cents for limit orders. Both the volume limit and the rate were amended on several occasions since inception of the arrangement.

As with any other trades, quality of execution is a more critical element of trading costs than commissions. A contract amendment requires Lynch, Jones & Ryan to retain an expert to monitor trading and report to PSERS' Board. PSERS receives an international Plexus report quarterly detailing the execution quality of the brokers and managers. PSERS reviews this report for any trading issues that need to be addressed, especially with the brokers in the directed commission network. Their stated objective is to recapture some costs net of other trading impact while operating the system seamlessly for the external managers by imposing only a best efforts requirement on the managers.

This appears to be an appropriately structured and monitored process that should provide a small net benefit with relatively little effort.

Recommendation
No recommendation necessary.

5. Accounts Payable Process – Manager Fees

a. Background

PSERS' policy of paying investment management fees directly from each manager's cash account at the custodian bank was authorized by the Board. Investment management fees are based upon the performance of the manager, as calculated by PSERS' investment consultant from the custodian bank records, which are reconciled monthly with the managers' records. Incentive fees are calculated on Wilshire's performance calculation, not the managers. All investment manager fee invoices are recalculated in accordance with the contract by the PSERS Investment Accounting Division (IA). Invoices require multiple approvals from within PSERS, including approval from the Investment Office.

PSERS' Process for Approval of Manager Fees is Thorough

The payment process begins with the receipt of periodic fee invoices to IA. Staff records the basic information from the invoice in the Manager Fee Database and then pulls the corresponding manager file from the manager fee files. Using the monthly net asset value and recalculation spreadsheets, staff verifies that the calculations used are in compliance with the current contract. Fee schedules for both traded securities managers and private partnership structures are summarized on Excel spreadsheets. If the invoice is correct, staff writes their approval, the amount approved, and initials and dates the invoice. If the invoice is incorrect and the amount exceeds the established thresholds, staff contacts the manager for resolution.

PSERS accepts the manager's computation if it falls within an asymmetrical tolerance around the computed amount. The manager's fee is accepted if is exceeds the calculated amount by no more than $100 and if it falls short by no more than $5,000. This is an effective approach, in that it provides for reasonable valuation differences while flagging situations where a large difference might occur. It also puts the onus on the manager to be accurate. There is a detailed process for reconciling the manager's holdings and values to the custody bank's records that keeps the fee process under control.

Depending on the outcome, the manager may be required to submit a revised invoice reflecting all corrections. Once resolved, the invoice is approved for payment by initialing and dating the invoice under the approved payment amount. Payment is completed through wire authorization after approvals are received from the Investment Office and Purchasing. Once these approvals are received, staff sends the documents to the supervisor of the Treasury and Manager Administration Section in Investment Accounting for signature and approval.

Once the wire request form is signed by the IA supervisor, the documents are copied and the log is updated to record the date sent to Treasury. The approved invoice package and wire request are sent to the Treasury Department, Securities Audit to approve and send the documents to the Treasury, Custody Bureau, who signs the form and faxes it to Mellon. This serves as Mellon's authorization to pay the invoice via wire to the investment manager. The Custody bank calls IA to verify the investment manager fee the day the wire is to be sent.

Involvement of Treasury in the Manager Fee Approval Process is Duplication of Effort

Involvement of Treasury in the manager fee approval process does not appear to be essential to the integrity of the process as a whole or necessary for sound internal control. In fact it appears to bring duplication of effort to sufficient levels of approval already applied by PSERS' employees. While we are aware the State Treasurer's authority in this regard is statutory, we recommend the Treasury Department look into whether any value or additional control results from their review. If they conclude the process is redundant, they may be able to improve the process within the requirements of the law.

Recommendation IIF-5	PSERS Response
Treasury should consider whether it can and should make payment based on PSERS approvals without the requirement for its own internal approvals.	PSERS agrees to discuss this recommendation with the Treasury Department.

On a quarterly basis, IA staff will prepare a report for the Board of Trustees showing cumulative expense totals for public and private managers for the current fiscal year.

Please see DAG's response at Exhibit I for comments on this section.

II-G. Investment Personnel Practices

1. Background – Principles of Staff Organizational Structure

A pension fund's organizational structure and staffing strategy should be designed to accomplish its statutorily defined stated purpose. To be successful, the roles and responsibilities of the pension fund staff must be aligned in a manner that does not conflict with or frustrate the pension fund's ability to achieve its mission, goals, and objectives, or its ability to operate in an effective and efficient manner. The design of a pension fund's organizational structure is ultimately controlled by its enabling laws. Some grant total autonomy, others grant autonomy in some areas but not in others, and some provide very little if any autonomy. (See Table II-G-1 – Pension Fund Autonomy.) If an organization does not have the autonomy to control its structure and staffing, its ability to accomplish its mission, goals, and objectives is diminished and placed at risk.

The level of autonomy of a public pension fund is typically measured by the extent to which it is authorized to (a) establish its budget (independent budgetary authority), (b) hire, evaluate and terminate its staff (independent personnel authority) and (c) expend money (independent procurement and contracting authority). Other factors to consider in evaluating a pension fund's autonomy are its ability to (a) retain its own legal counsel and (b) select the system's actuary and set the system's actuarial assumptions.[39]

Best practices advocate pension fund autonomy (e.g., independent management and control) as a fundamental principle necessary to ensure that boards are able to perform their duties effectively and efficiently, subject to strict fiduciary standards, clear reporting and legislative oversight.[40] Indicia of independence include not only exclusive authority and control over the assets of the pension fund, but also independent personnel authority (e.g., the ability to

[39] See National Association of State Retirement Administrators (NASRA)'s Model Practices for Trust Independence and Board Governance Identified in the Uniform Management of Public Employee Retirement Systems Act (UMPERSA) and the Uniform Prudent Investor Act (UPIA).

hire, evaluate, compensate, and reorganize staff), as well as independent procurement authority and independent budgetary authority.

As noted earlier in the introduction to this Report II, best practices are based on effectiveness and efficiency. The note to Section 7 of UMPERSA affirms trustee autonomy as a best practice. It states--,

> *the authority conferred upon the trustees is intended to ensure that retirement system trustees have a level of independence sufficient to permit them to perform their duties and to do so effectively and efficiently.*

We are aware of the fact that because PSERS is part of the Commonwealth, it receives services from a number of Commonwealth entities, including the Governor's Office of General Counsel, the Governor's Office of Administration (OA), the Governor's Office of Budget, the State Civil Service Commission (SCSC) and the Department of General Services. These services include legal advice and representation, human resources, recruiting of personnel, information technology, payroll, etc. An argument has been made that if PSERS were independent it would lose the benefit of the services it receives from other state agencies and have to develop these processes and systems internally to replace the services they would lose as an independent agency. However, based on the interview process it appears that personnel within PSERS already perform many of these functions and that the role of the other state entities is often more of an additional layer of review and approval rather than actual provision of services. Additionally, having to follow the requirements of the merit system for non-investment positions, which does affect the investment department because investment support staff is not exempt, and having to utilize the processes of SCSC and OA has in fact created delays in the filing of vacancies and on occasion the loss of quality staff (who decide to take another job during the period of delay).[41]

[40] Examples of states with such oversight entities include, but are not limited to, Ohio, Virginia, and Massachusetts.
[41] Specific examples include an Administrative Assistant I in the Investment Office and the Webmaster.

If certain services are needed (e.g., payroll) there is no reason, to the best of our knowledge and belief, that PSERS could not continue to utilize state services and reimburse the applicable state agency (as they currently do for the legal services they receive from the Governor's Office of General Counsel). The key is that unlike other states entities, it is the trustees who have fiduciary responsibility for the management of the trust and the cost of that management is paid out of the earnings of the assets they are responsible for managing.

As pointed out in the notes to UMPERSA, the pension fund and its trustees should be endowed with more independence than other agents of the state or other state employees, because in exercising that independence the trustees are subject to a more extensive and stringent set of fiduciary obligations than other agents of the state or other state employees. Further, it is also important to note that because the pension fund is a "trust" the board members, as fiduciaries, are obligated to see that the pension fund is managed in the exclusive interest of the participants and beneficiaries. As one recognized public pension fund executive director stated, "*in order to carry [its] mission and pursue excellence in service delivery and risk management, it is critical that fiduciaries who have ultimate legal responsibility for the trust also have ultimate authority for and programmatic control over all system activities.*" [42]

There are a number of state and municipal entities that have autonomy, i.e., exclusive authority and control over the management of the pension fund and the investment of assets, yet are still "instrumentalities of the state." As Table II-G-1, Pension Fund Autonomy, demonstrates, this is not a novel concept and is granted in varying degrees – a number of pension funds have total autonomy, while others have limited if any autonomy. Many pension funds did not initially have autonomy, their enabling laws, and in some cases the state constitution, had to be amended to grant or enhance autonomy (e.g., Indiana, North Carolina, Wyoming, California, Colorado).

Using other state laws where autonomy has been granted as examples, the Commonwealth can amend its laws in a manner that grants autonomy to PSERS, while requiring

[42] *Glass Houses – It's Never to Late to Change*, by Gary Findlay, Plan Sponsor Magazine, September 8, 2003.

accountability and oversight, and allowing them to utilize state services where the trustees deem appropriate.

In Table II-G-1 below, we reviewed PSERS' indicia of autonomy compared to 22 other funds that comprise PSERS' and SERS' custom peer group that received the Study prepared for this review, plus the Teachers Retirement System of Texas. The information is based on the information provided by the Survey Respondents, written and oral responses obtained, where possible, from members of the peer group that did not submit a response to the Survey, supplemented with research of applicable statutes. Pension Fund in bold are peers of both PSERS and SERS.

Table II-G-1 - Public Pension Fund Autonomy

Pension Fund	Trust	Independent Budgetary Authority	Independent Personnel Authority	Independent Procurement Authority
PSERS	Trust	No	Partial[43]	Partial[44]
SERS	Trust	No	Partial[45]	Partial[46]
California State Teachers' Retirement System	Trust	Yes	Yes	Yes
Colorado Public Employees Retirement Association[47]	Trust	Yes	Yes	Yes
State of Michigan Retirement System	Trust	No Legislature must approve	No	No
Maryland State Retirement and Pension System	Trust	No Legislature must approve	No	Partial[48]
New York State Teachers Retirement System	Trust	Yes	Yes	Yes
Ohio State Teachers Retirement System	Trust	Yes	Yes	Yes[49]
Ohio Public Employees Retirement System	Trust	Yes	Yes	Yes[50]

[43] The Board has authority over the Investment Office staff. The remaining employees are subject to civil service requirements.
[44] The Board has procurement over investment related services.
[45] Comparable to PSERS' authority.
46 Comparable to PSERS' authority.
[47] CoPERA is an instrumentality of the state of Colorado and is not subject to any department, omission, board, bureau or agency of the State.
[48] They do not have independent authority for general overhead, but they do have independent authority to retain investment managers, investment consultant law firms and the actuary.
[49] OPERS does not have independent authority to select law firms.
[50] STRS does not have independent authority to select law firms.

Table II-G-1 - Public Pension Fund Autonomy				
Pension Fund	**Trust**	**Independent Budgetary Authority**	**Independent Personnel Authority**	**Independent Procurement Authority**
Oregon Public Employee Retirement Fund	Trust	No Legislature must approve	No	Partial[51]
Virginia Retirement System	Trust	Partial[52]	Yes[53]	Yes[54]
Washington State Investment Board	Expense Fund	No Legislature must approve	yes[55]	Partial[56]
State of Wisconsin Investment Board	Trust	No[57]	yes[58]	Yes[59]
Illinois State Teachers Retirement System	Trust	Yes	Yes	Yes
Iowa Public Employees Retirement System[60]	Trust	Partial[61]	No	Partial
Los Angles County Employee Retirement Association	Trust	Yes	Yes	Yes
MA, *Pension Reserves Investment Management Board (MassPRIM)*	Trust	No[62]		
Minnesota State Investment Board	Trust	No[63]	No	No
Mississippi PERS	Trust	No Mississippi State Personnel Board must approve. Legislative approval is not required.	Partial[64]	Partial[65]

[51] The have independent authority to retain investment managers, investment consultants, IT services, and for general overhead. However, they do not have the authority to retain law firms, the auditor, or the actuary.
[52] §§ 51.1-145 and § 51.1-124.22. of the Virginia Code.
[53] § 51.1-124.27. of the Code of Virginia.
[54] § 51.1-124.32 of the Code of Virginia.
[55] Number of positions is subject to legislative approval as part of the budget process.
[56] Independent authority to retain investment managers and investment consultants, but not for general overhead or the ability to retain law firms.
[57] Legislature must approve the budget.
[58] Number of positions is subject to legislative approval as part of the budget process.
[59] Independent authority to retain law firms. However, office space and computers are subject to state purchasing.
[60] IPERS is an independent agency within the State Department of Personnel. The IPERS Investment Board and the Benefits Advisory Committee oversee IPERS. The Investment Board is designated the Fund's trustee. The Benefits Advisory Committee advises IPERS and the General Assembly on benefits and services.
[61] Chapter 97B.7 (2) embodies a "standing" appropriation, permitting expenditures (without further legislative approval) of up to 40 basis points ("bp") of the fund's value per year for investment management expenses. However, expenditures for other purposes (including "salaries, support, maintenance and other operational purposes") must be annually appropriated.
[62] The budget is subject to the approval of the Massachusetts House and Senate Committees on Ways and Means;
[63] Minnesota State Retirement System and the Minnesota Teachers' Retirement Association have independent budgetary authority. There budget is reported to the Legislature.
[64] Legislative approval is required for authorized number of positions. Number of positions is not subject to another governmental agency. The Board has the authority to hire and terminate investment managers and the consultant..
[65] Investment related –investment managers and consultants

Table II-G-1 - Public Pension Fund Autonomy				
Pension Fund	**Trust**	**Independent Budgetary Authority**	**Independent Personnel Authority**	**Independent Procurement Authority**
Missouri Public School Employees Retirement System	Trust	Yes	Yes	Yes
Missouri State Employees' Retirement System	Trust	Yes	yes	Yes
Nevada Public Employees	Trust	Partial[66]	Partial[67]	Yes
Texas Teachers Retirement System	Trust	Partial[68]	Yes	Yes

As Table II-G-1 reflects the concept of granting independence to a state or municipal fund is not a novel concept. The majority of the members of the custom peer groups have much more autonomy than PSERS. 54% of the funds identified in Table II-G-1 above have some level of independent budgetary authority. This is not the case however, when the comparison is limited to PSERS' custom peer group. Only 42% of the PSERS peer group has some form of independent budgetary authority when the comparison is limited to PSERS' custom peer group In our experience, gained from years of conducting this type of fiduciary review of public funds, the operating budget of the majority of public funds are subject to legislative approval. It is also our experience that the lack of independent budgetary authority (as an indicia of control by the plan sponsor) impedes the latitude of the members of the board to carry out their fiduciary responsibility because it subjects the pension fund to the same type of budgetary constraints imposed on other state agencies (e.g., spending caps, limitations on appropriated positions), without recognition that the expenses of the fund are paid out of earnings rather than general fund revenues. Consequently, there is no positive impact on the financial condition of the general fund revenues. The measure of the success of an investment program is its returns. To test whether lack of autonomy had an affects on investment performance, we compared PSERS to its custom peer group using the policy benchmark returns. Only two funds in the PSERS custom

[66] Per capita formula is set forth in statute.
[67] Board has the authority to retain staff, and fix the compensation of staff. However, the pay must be consistent with the pay plan of the State for classified service and removal must be consistent with State classified service plan.
[68] TRS is subject to the Texas General Appropriations Act only to the extent it receives appropriated funds. If it receives appropriated funds them the number of staff positions is subject to legislative approval. TRS' enabling statute gives the TRS Board the authority to utilize a "fiduciary finding" to justify expending assets of the trust beyond its legislative appropriation. It should be noted that TRS had complete autonomy. However, the legislature diminished it authority. In recent years, the System has been able to slowly regain its autonomy.

peer group that responded to the Survey had autonomy, Ohio PERS and Ohio Teachers, both outperformed PSERS. However, fund that did not have autonomy also outperformed PSERS (e.g., SERS and Oregon – the top performers for each measurement period are highlighted).

Table II-G- : Policy Benchmark Returns (%) - Annualized Cumulative Performance
As of June 30, 2005

	Independent Budgetary Authority	Independent Personnel Authority	1 Year	3 Year	5 Year
PSERS	**No**	**Partial**	**10.54%**	**9.89%**	**2.50%**
Penn. State Employees' Retirement System	No	Partial	13.36%	10.91%	2.42%
Maryland Retirement Agency	No	No	10.10%	9.95%	2.03%
Ohio Public Employees Retirement System	Yes	Yes	10.31%	9.93%	3.50%
Ohio State Teachers Retirement System	Yes	Yes	11.43%	9.79%	2.81%
Oregon Public Employee Retirement Fund	No	No	10.80%	10.03%	3.21%
State of Michigan Retirement System	No	No	10.00%	9.80%	4.05%
State of Wisconsin Investment Board	No	Yes	10.39%	10.01%	3.44%
Washington State Investment Board	No	Yes[69]	9.41%	10.06%	3.20%

A specific recommendation (Recommendation No. IIG-2) regarding autonomy is provided below.

2. Review of PSERS' Staff Organizational Structure

The organizational structure of PSERS is composed of seven principal sectors: an Executive Office, the Investment Office, the Office of Chief Counsel, the Office of Financial Management, the Benefits Administration division, the Operations division, the Internal Auditor's Office, and numerous sub-divisions. Except for the Chief Counsel, the heads of each of these sectors, as well as the Press Secretary, the Board Liaison, and Legislative Liaison, report to the Executive Director.

[69] But number is subject to legislative approval.

The Executive Director heads the Executive Office. The Executive Office is responsible for the overall management of PSERS. As part of this role, it is responsible for monitoring the operation of the investment portfolio, evaluating portfolio performance for consideration by the Board, and measuring the performance of professional individuals or firms with whom the Board contracts for specialized investment services.

The Chief Investment Officer (CIO) is hired by and provides counsel to the Board, but reports to the Executive Director. The Investment Office, administered by the CIO, is responsible for the investment activities of PSERS, compliant with the investment policies adopted by the Board of Trustees.

When one examines the documentation of PSERS' organizational structure (e.g., organizational chart, annual report, by-laws, etc.), it appears that the Board has exclusive control over the management of the agency. However, this is not the case. The Executive Director functionally reports to the Board of Trustees, however, the selection and compensation of the Executive Director must be approved by the Governor's Office and the compensation for the position must be approved by the Executive Board of the Governor's Office of Administration.. The PSERS Office of Chief Counsel advises PSERS on legal matters regarding the investment program and the overall administration of agency and functionally reports to the Executive Director. However, the attorneys within the unit are under the jurisdiction of the Governor's Office of General Counsel.

The Authority of Other Commonwealth Agencies Involved in the Management of PSERS is Not Set Forth in a Clear Governance Statement

Based on the interview process, it appeared that most "key players" (e.g., trustees, the executive director, CIO, Directors, legal staff, etc.) understand the interrelationship among their individual roles and responsibilities within PSERS. However, some are less clear regarding the specific roles and authority of other Commonwealth agencies over the management of PSERS and the effect of such authority on the management of the investment program. For example, there are a number of Commonwealth entities that must approve staffing levels, IT processes, procurements, the PSERS overall budget, and the custody bank that will be utilized by PSERS. Their authority can significantly influence the operations of the investment program. However, there is no distinct, all-inclusive, well-defined written document that sets forth how other Commonwealth entities affect the governance of PSERS.

Recommendation IIG-1	PSERS Response
A formal Statement of Governance Principles should identify the other Commonwealth entities that effect the management of PSERS and specifically define the agency's authority and interrelationships among the Board of Trustees, the Executive Director, Office of Chief Counsel, and Investment Office.	The Board agrees and will endeavor to institute this recommendation. It is noted, however, that much of the relationships with other Commonwealth entities, are already documented in numerous Executive Orders, Management Directives, and Administrative Circulars, or are otherwise set forth in statute.

Lack of Autonomy Constrains Optimal Management of the PSERS Investment Program

PSERS does not have the autonomy over its staff enjoyed by many other public pension funds. It must deal with the governmental limitations related to personnel, procurement, and its budget. Consequently, it cannot control the design of its organizational structure and staffing.

In the language of its governing statute, at 24 Pa.C.S. § 8501(a), PSERS is designated as an "independent administrative board." It is not an "independent instrumentality" or "independent agency" of the State. Rather, PSERS is an "executive agency" of the Commonwealth and thus with few exceptions,[70] PSERS is no different than any other Commonwealth agencies, it is a component unit of the Commonwealth of Pennsylvania. Consequently, its organizational structure and staffing is significantly controlled by Offices

[70] The Board does have autonomy over certain aspects of the personnel policies at PSERS, i.e., the establishment of investment staff pay schedules, including the ability to implement increases (even in the face of a pay freeze) and incentive compensation plan.

under the Governor's control rather than the control of the Board of Trustees. While the current structure has worked, the structure is not as effective and efficient as it should be and subjects PSERS to unnecessary risk and the possibility for political pressure. Although the trustees are subject to stringent statutory fiduciary responsibilities in the management of the pension fund – the duty of loyalty and duty of care – their authority to carry out these responsibilities are subject to the judgment and approval of others who are not held to this same standards and may have conflicting interests. For example:

- The Governor's Office of the Budget must approve any increase in PSERS' staffing complement – the Office of Budget may not want to increase authorized statewide staffing levels – preferring to treat the pension fund like all other executive agencies.This process hampers PSERS' ability practically (PSERS cannot effect the increase without approval) and psychologically (PSERS maybe reluctant to ask in the face of a statewide budget crisis) to increase the size of the investment staff. Additionally, the approval process is required notwithstanding the fact that staffing costs are paid out of the earnings of the Fund.

- The PSERS budget, (including investment staffing costs, procurement of information technology, and retaining outside experts to provide advice to the trustees) although paid out of the earnings of the Fund, must nevertheless be submitted through the Governor, and approved by the General Assembly – the budget typically must be developed 18 months in advance. This requirement could hinders PSERS' ability to increase investment staff needed to monitor or participate in a new investment vehicle (which may not have been anticipated 18 months earlier when the budget was being generated). If the required expertise can not be obtained in a timely fashion, the Board may have to forego the investment, which could result in lost investment opportunity. Even if the Board can ultimately make the investment, after the delay, the return may not be as attractive at a later date as it could have been 18 months earlier. *It has been* *estimated that investment program implementation obstacles can result in 50 to 100 basis points of underperformance, and that optimal performance, in large measure is dependent on the extent to which the board has the latitude to control its own destiny* (see, *Glass Houses – It's Never to Late to Change*, by Gary Findlay, Plan Sponsor Magazine, September 8, 2003).

- The Bureau of State Employment ("BSE"), a part of the Governor's Office of Administration has authority over non-civil service recruitments, including investment staff, therefore BSE can decide whether to permit PSERS to recruit investment professionals from outside the Commonwealth workforce. PSERS does have the authority to classify each position, whether or not BSE exercises the authority does not abdicate its authority over BSE's staffing decisions. BSE could elect to exercise its authority at an time because BSE rather than PSERS is vested with the authority. This is another example of an area where the *PSERS Board does not control the management of the fund because it does not have independent personnel authority.*

The following is a list of additional examples of how the PSERS Board's lack of autonomy from the plan sponsor (i.e., the Commonwealth) could impede its personnel practices and affect its capacity to carry out its fiduciary responsibilities.

- Non-civil service, non-investment, personnel compensation may also be established by the PSERS Board (e.g., the Executive Director), however, it must be consistent with the compensation standards established by the Executive Board of the Governor's Office of Administration. Thus, the Executive Board can reject the Board's request to increase the Executive Director's salary[71]. This is an example of *alignment of interests risk* – the threat that the interests of the

[71] The Office of Administration can decide that the Board cannot link the Executive Director's pay increase to increases in the Standard Pay Schedule and/or service time.

Executive Board in enforcing statewide compensation criteria (and thus rejecting a compensation request of the pension board) conflicts with the interests of PSERS in compensating its employees in a manner that facilitates their ability to attract, motivate and retain highly qualified professionals with the specialized skill set required to implement board policy and administer the pension fund in the most effective and efficient manner. This places the pension fund at risk because the trustees do not have the necessary authority to implement their decisions prudently.

- The position descriptions used by the Bureau of State Employment may not reflect the functions necessary for certain investment related personnel categories.

- Although paid by PSERS, the legal staff assigned to PSERS is subject to the control of the Governor's Office of the General Counsel[72]. This is also an example of alignment of interests risk. Many public pension funds are constitutionally or statutorily required to utilize the state attorney as their legal advisor. However, although the state's chief attorney may be constitutionally or statutorily designated as the legal representative of all state entities, in a number of states the pension fund is permitted to retain its own independent legal counsel (e.g., fiduciary counsel) or conflicts counsel has been permitted and has not been viewed as inconsistent with constitutional or statutory legal advisor designation.

UMPERSA Advocates Independence of a Retirement System from the Plan Sponsor

In order to protect the assets from the sponsoring employer, UMPERSA advocates a legal wall be created between the Governor and the Legislature and the pension fund by placing the

[72] The Governor's Office of General Counsel is the legal advisor of the Board. Thus, the Governor's Office of General Counsel determines who will be assigned to PSERS, performs performance evaluations of the Chief Counsel and Assistant Counsels, and decides their compensation. See, Commonwealth Attorneys Act.

retirement assets in a trust and by imposing a duty of loyalty exclusively to the interests of participants and beneficiaries. PSERS' assets are held in trust and the PSERS trustees have a duty of loyalty to the participants and beneficiaries. These actions help curtail politically motivated reversions. A number of state public pension funds, as a result of threatened or actual pension fund raids in the 90s, were successful in having legislation enacted to insure that pension fund were protected from political influence from the executive branch of the government or the legislature (in light of a constitutional amendment – e.g., Proposition 162 in California). The notes to UMPERSA suggest, and we agree, that independence minimizes political influence and pressure over the management of the pension fund. During the interview or document view process we did not find evidence of political influence or pressure. That said, such influence or pressure, because of its very nature, is rarely going to be documented or readily disclosed. Be that as it may, as noted earlier, our approach is prophylactic. We believe it is important to anticipate potential problems based on our knowledge of what can and does happen and make recommendations designed to create an organization structure that is not based on personalities but rather on the tenets of good governance and best practices. PSERS' current organizational structure, as an executive agency of the Commonwealth, makes it very dependent rather than independent and subjects it to the risk of political influence and pressure. It imposes fiduciary responsibility on the trustees for the management of the fund without exclusive authority and control to effectuate the management PSERS' assets efficiently and effectively.

Trustee Independence Aligns Well with the Interests and Prerogatives of the Legislature

As stated in the comments to the trustee powers section of UMPERSA –

> *…the Legislature has a strong interest in effective and efficient management of public retirement systems. Mismanagement presents obvious political hazards and, in the long run, may result in lower benefits, higher contribution levels, or both. The trustee is already under a fiduciary duty to act effectively and efficiently; [granting independent budgetary, contracting[73] and procurement authority]…removes*

[73]The independent contracting authority would include actuarial, auditing, custodial, investment, and legal services.

> *constraints that may interfere with the fulfillment of [the trustee fiduciary] duty. Second, the Legislature is interested in protecting its legitimate prerogatives (settlor functions).*[74]

Increased Authority and Autonomy Should be Offset by Legislative Oversight

To the extent PSERS is granted greater autonomy, we recommend that the Board be subject to both strict reporting requirements and continuing use of the prudent investor fiduciary standard of care. (See Recommendation II-G-5 below.) In our opinion, rather than imposing personnel, budgetary, procurement and other legal requirements, accountability can be ensured by requiring reasonable evidence that expenditures provide appropriate results

Recommendations IIG-2, IIG-3, IIG-4 and IIG-5	PSERS Response
The applicable statutes should be amended to provide PSERS with (1) independent personnel authority, (2) independent budgetary authority, (3) independent procurement authority, and (4) the ability to obtain independent legal counsel. This autonomy should be subject to the prudent investor standard of care and accountability and reporting process (including for example a copy of the budget, a listing of annual expenditures, staffing levels and service providers utilized, performance results, and changes to asset allocation) to the Governor and the legislature.	This recommendation is a summary recapitulation of previous recommendations calling for greater autonomy of the System. Consistent with its prior responses to those previous recommendations, which responses are incorporated herein by reference, the Board believes these are matters for the General Assembly since they require legislative action.
As an the alternative to total autonomy, the applicable statues should be amended to provide all or some combination of the following: (1) expand the current compensation setting authority the Board has over investment positions and exemption from classified service to include all senior level positions that are responsible for the day to	This recommendation is a summary recapitulation of previous recommendations calling for greater autonomy of the System. Consistent with its prior responses to those previous recommendations, which responses are incorporated herein by reference, the Board believes these are matters for the General

[74] Comments to Section 5 of UMPERS by the National Conference of Commissioners on Uniform State Laws (1997).

Recommendations IIG-2, IIG-3, IIG-4 and IIG-5	PSERS Response
day administration of PSERS – specifically the Executive Director, and the heads of the principal branches of PSERS (i.e., the Office of Financial Management, Benefits Administration, Operations, the Internal Audit), compensation for the remaining positions would be establish based on a separate classified pay scale developed specifically for PSERS; (2) grant the Board the authority to establish and retain the compliment of staff it deems prudent to effectively and efficiently carry out the management of the pension fund and the investment of its assets and require that the Board annually submit a report to the Governor and the Legislature setting forth their "fiduciary findings" of why any additional positions were required or eliminate; (3) grant the authority to expended such funds as it deems prudent to effectively and efficiently manage the operations of the pension fund board without prior approval of another state entity, i.e., independent procurement and contracting authority, and require an annual report to the Governor and Legislature setting forth PSERS' expenditures and the purpose of such expenditures; and (4) require the Board to annually submit its budget to the Governor and the Legislature for review and comment, but exempt the PSERS budget from the legislative appropriation process.	Assembly since they require legislative action.
As an alternative to granting independent authority to the Board to retain its own legal counsel, we recommend the execution of a memorandum of understanding between PSERS, the Office of General Counsel and the Office of Attorney General that would permit the Board,, subject to the approval of the Office of General Counsel, to retain its own fiduciary counsel (pursuant to predetermined selection criteria regarding experience and	The Board will consider this recommendation. Although this is a different recommendation than the previous recommendation calling for an MOU permitting the Board to retain its own counsel in the event of a conflict of interest, the Board's comments there are equally applicable here with respect to an MOU for fiduciary counsel.

Recommendations IIG-2, IIG-3, IIG-4 and IIG-5	PSERS Response
independence from the Commonwealth) for the purpose of providing PSERS with independent legal advice and when necessary, subject to the approval of the Office of General Counsel also permit the Board to obtain conflicts counsel.	
We recommend that an opinion be requested from PSERS Chief Counsel regarding the fiduciary standard of care applicable to the Board when making decisions regarding fund assets.	PSERS agrees and will endeavor to implement this recommendation. In doing so, PSERS notes that PSERS' Chief Counsel has already advised both IFS and the Department of the Auditor General of its conclusion that the fiduciary standard language in Section 8521 of the Public School Employees' Retirement Code translates to a prudent investor standard. PSERS' Chief Counsel also verbally advised the Board of the same at its meeting on January 20, 2006, as follows: "In connection with IFS' fiduciary review and the Auditor General's performance audit, the question came up as to what prudence standard the Board is held to. The standard itself is clearly set forth in Section 8521(a) of the Retirement Code, and it contains language that is slightly different than what was always known as the "prudent man" or "prudent person" standard. The precise language is that you shall: 'exercise of that degree of judgment, skill and care under the circumstances then prevailing which persons of prudence, discretion and intelligence <u>who are familiar with such matters</u> exercise in the management of their own affairs not in regard to speculation, but in regard to the permanent disposition of the fund, considering the probable income to be derived there from as

Recommendations IIG-2, IIG-3, IIG-4 and IIG-5	PSERS Response
	well as the probable safety of their capital.' We have worked with counsel for SERS and have concluded that the appropriate standard reflected in this language is the "prudent investor standard" since it is prudent investors who would be "familiar with such matters". Based on certain statutes, it is not entirely clear that there is a difference between that standard and the prudent person standard, but we believe it is more appropriate to use that terminology. For example, it would make clear that diversification, which is what a prudent investor would do, is important, even though there is an argument that a prudent person or prudent man might be judged by each separate investment. Importantly, this is not the "prudent expert standard," which would be one where the Board would, in effect, be holding itself out as experts. As "prudent investors," the Board retains and relies on experts. Accordingly, we will try to make sure that this is the terminology used in all Board and PSERS' documents."

3. Size of Professional and Administrative Staff

Appropriate Staffing is the Primary Determinant Of an Organization's Performance

a. Staffing Principles

Staffing is the process of attracting, organizing, and retaining employees that possess the skill sets, which in the aggregate, enable an organization to carry out its mission and objectives in an effective and efficient manner. Thus, whether or not an organization has adequate staffing is contingent on the sum and extent of tasks that are necessary to achieve its core business functions successfully and prudently.

b. PSERS' Staffing Review

The mission of PSERS is to serve the members and stakeholders of the System by prudently investing the contributions, maintaining a fully-funded, financially sound pension fund; providing timely and accurate payment of benefits, clearly communicating members' and employers' rights and responsibilities, and effectively managing the resources of the System.

PSERS' core business functions are primarily providing retirement benefits and investing retirement assets, for approximately 255,465 active members and 156,519 annuitants.[75] To effectuate its purpose, the Board has reasoned that certain investment strategies and operating processes are prudent and should be implemented. Examples include, but are not limited to, use of extensive internal management, an internal trading desk running both a buy and sell side operation for PSERS' internal as well as external managers, use of hedge funds (global macro), and participation on the advisory boards of PSERS' private market investments. Thus, PSERS' staffing needs are driven by the fact that internal management and an internal trading desk, as well as its private market advisory participation requires an extensive set of functions and thus requires more investment professional with specialized skills and expertise, as well as administrative staff to support their efforts.

Currently, PSERS is administered by a total authorized complement of 290 employees.[76] The Investment Office is composed of a workforce of 27 employees – 21 investment professionals and six administrative staff members. There are numerous other staff members within PSERS' workforce that are essential to the operations of the Investment Office. However,

[75] Based on the June 30, 2005 actuarial valuation data provided by PSERS.
[76] As of March 9, 2006.

for purposes of discussing staff size (as well as compensation and other subjects discussed in PSERS' Objective), the only non-investment positions we will include in our review are the Executive Director, the Office of Chief Counsel, the Internal Auditor, and the Investment Accounting Division.

Since the Board is only independent with regard to investment decision making authority, PSERS' ability to staff its investment operations is constrained since investment staff hiring is subject to the approval of another Commonwealth agency, as well as the legislature of the Commonwealth. In our experience, pension funds such as PSERS that do not have independent budget or independent personnel authority tend to have less staff and lower compensation.[77] To aid in making a determination regarding the adequacy of PSERS' staffing (and later compensation) we analyzed the characteristics of PSERS' investment management program compared to the characteristic of its customized peer group (e.g., asset size, types and extent of asset classes utilized, internal vs. external management, and number of external managers utilized by asset class). (See Tables II-G-2 and II-G-3, and II-G-40.)

Comparative Information Should Be Utilized Only as General Background

Making comparisons to staffing levels at other pension funds is not an ironclad basis for determining what PSERS needs, particularly if the goal is to function as a world-class pension fund that operates consistent with best practices. Further, one must recognize that the staffing levels of public pension funds are often lower than optimal due to governmental budgetary pressures and/or their inability to attract and retain productive, qualified staff. All the same, this type of comparative information is typically used as a reference point by governmental oversight entities that may not be aware of the nuts and bolts of pension fund operations. Further, some believe that since no two pension funds are identical, asset size is the appropriate measure of

[77] See Annual MOSERS Compensation Study of Public Pension Funds – findings support conclusion that pension funds that are not budget to state budget approval process are more highly compensation than those that are subject to the process.

comparability because the various differences among the pension funds cancel each other out, e.g., Washington State Investment Board statute requires a periodic compensation study of comparable pension funds, based on similar asset size.[78] Consequently, since such comparisons are customary, it is advantageous for PSERS to be informed regarding how it compares to its "peers" and knowledgeable of the distinctive features that may necessitate nonconforming staffing levels.

Using Asset Size as the Principal Determinant of Comparability is Overly Simplistic

As noted in the introduction to this Report and discussed in more detail here, while no two pension funds are identical, some have more characteristics in common than others. The greater the number of shared characteristics, the greater the level of comparability. In our experience using asset size as the principal determinant of comparability is too one-dimensional overly simplistic. Callan Associates, Inc.[79] in its "Fund Sponsor Cost of Doing Business" surveys indicates there is a moderate correlation between the size of the fund and the number of professionals responsible for administering the investment portion of the fund (0.42), there is a much higher correlation between the percentage of the fund managed internally and the number of professionals responsible for the investment aspects of the fund (0.75). An annual compensation study of 72 public pension funds conducted by the Missouri State Employees' Retirement, most recently released September 3, 2005, points out that there is also very little correlation between compensation levels and fund size (the correlation for directors was only .33).

Taking multiple characteristics into consideration when making comparisons renders a more robust analysis. For that reason, when constructing PSERS' "custom peer group" we considered the following factors:

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[78] However, the actual study took other factors into consideration.
[79] Callan Associates is one of the largest institutional consulting firms in the U.S.

- **Fund Type** - The type of investment fund: public versus private; state investment versus retirement system with investment responsibility as a component of its operations; independent instrumentality versus inextricable governmental unit.

- **Asset Size** – Asset values comparable to those for which the Investment Division has responsibility.

- **Level of External versus Internal Management** – Generally, an investment staff that only assists in the selection and monitoring of external managers, i.e., whose funds use significant external management, has a narrower set of functions and required expertise (as well as less impact on the ultimate investment results of an organization) than staff who manage assets themselves, either solely or in conjunction with external managers. Internal management requires a much broader set of functions and expertise. Consequently, all other things being equal, more internal asset management, particularly using an active approach, tends to require more investment professionals with specialized skills, and thus can demand greater compensation, to perform the asset management functions. Then again, new innovative investment strategies have been developed in an effort to enhance returns at reduced risk levels and using internal staff to monitor these strategies, although they may be externally managed, as well as private market assets (as distinct from publicly-traded securities) and real estate, also requires specialized skills, extensive effort, and greater compensation.

- **Active versus Passive Investment Style** – Active investment management utilizes fundamental research and/or quantitative analysis. Active management tends to involve more "active" risk and therefore requires greater scrutiny and closer monitoring. Typically, monitoring external active asset management requires more staff, e.g., to perform due diligence and risk management with specialized skills and knowledge. By contrast, passive management involves constructing portfolios designed to track a market benchmark precisely. Consequently, the level of analysis required for monitoring external passive management is more straightforward and much less time consuming. Thus, monitoring external passive management requires less staff. While, active internal management requires more staff, with a specialized skill set and enhanced resources.

- **Labor Intensity and Complexity of Asset Classes** – All other things being equal, a fund investing only in publicly traded securities typically requires fewer staff than a fund that also invests in appraised assets such as real estate and private equity. The latter types of assets are labor intensive to manage and monitor and require distinct, specialized skills.

Using commonality of the characteristics identified above to measure comparability, we compiled PSERS' custom "peer group." The "peer group" is based on the public pension funds with the greatest number of shared characteristics in common with PSERS. It has been suggested that the private sector funds should be included in the customized peer group. We agree that inclusion of private sector institutional investor information in combination with public sector pension fund information would highlight the disparity between the public and private sector not only in terms of staffing and compensation, but also in terms board governance and autonomy to implement decisions. However, staffing and compensation information regarding private sector institutional investors, such as endowment and corporate pension funds, is not public information and is typically considered confidential.[80]

[80] There are a couple of firms that are able to obtain confidential compensation information because of the annual surveys they conduct in which the private sector firms participate -- e.g., McLagan Partners, Watson Wyatt, and Mercer

IFS then designed a survey to solicit very detailed information about each “peer group” member’s investment related positions and its operating environment, including the decision making process, level of staff independence, and complexity of investment programs (asset classes invested in, allocation to each class, etc). To promote participation, IFS agreed, if requested, to maintain the confidentiality of each entity and to provide participants with a summary copy of the survey results. A couple of the pension funds that responded to the survey requested confidentiality for their compensation information. Therefore, in our discussion of staffing (and later compensation) we do not attribute information to any specific pension fund. Rather, each survey participant was assigned a code letter. SERS is included for purposes of this study as a peer because it’s PSERS’ sister fund and we were requested to include it. However, because of the difference in the characteristics of the two funds (primarily the asset size and the amount of internal passive management used at PSERS), we would not typically consider the two funds as peers.

Table II-G-2, II-G-3, and II-G-4 reflect the characteristics of the custom peer group compared to PSERS.

Table II-G-2 below reflects the asset size and various types of assets classes in which the custom peer group invests.

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Table II-G-2 – Comparison of Peer Group Characteristics

Asset Class	PSERS	SERS	Fund A	Fund B	Fund C	Fund D	Fund E	Fund F	Fund G
Defined Benefit Assets ($ billions)	$52	$27	$33	$65	$56	$49	$49	$64	$47
U.S. Stocks	42.0%	34.6%	48.8%	46.2%	44.0%	36.0%	48.2%	41.4%	32.8%
Non-U.S. Stocks	20.6%	20.5%	15.9%	20.0%	21.1%	21.6%	11.4%	21.1%	16.4%
Total Publicly-Traded Stocks	*62.6%*	*55.1%*	*64.7%*	*66.2%*	*65.1%*	*57.6%*	*59.6%*	*62.5%*	*49.2%*
U.S. Fixed Income	15.9%	12.5%	29.6%	24.0%	18.0%	27.9%	16.9%	20.5%	25.9%
Int'l Fixed Income	5.6%	4.4%	0.0%	1.1%	1.0%	0.0%	0.0%	7.8%	0.0%
Total Fixed Income	*21.1%*	*16.9%*	*29.6%*	*25.1%*	*19.0%*	*27.9%*	*16.9%*	*28.3%*	*25.9%*
Real Estate Equity	5.2%	5.7%	2.4%	4.6%	7.0%	0.0%	7.9%	3.0%	9.4%
REITS	1.9%	1.7%	2.7%	1.3%	1.0%	5.7%	0.0%	0.0%	0.0%
Real Estate Mortgages	--	0.1%	--	--	--	--	0.0%	0.0%	0.0%
Alternatives/Private Equity	9.6%	12.3%	0.5%	0.7%	3.0%	8.8%	11.6%	2.3%	14.5%
Hedge Funds	--	--	--	--	--	--	--	--	--
Short-Term/Cash	-0.8%	0.3%	0.0%	1.1%	4.0%	0.0%	4.0%	2.2%	1.0%
Commodities/Inflation Protection	[5% TIPS]	7.2%	0.0%	0.9%	0.0%	0.0%	0.0%	0.0%	0.0%
Other	-	0.6%	--	0.1%	1.0%	--	--	1.7%	--
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
% of Internal Management	33%	0%	0%	64.75%	72.56%	0%[81]	86.5%	32%	25.9%

Table II-G-3 reflects the peer group's use of active vs. passive management.

Table II-G-3 — Peer Group's Use of Active vs. Passive Management

Table II-G-3	% of Domestic Equities	% of International Equities	% of Emerging Market Equity	% of Domestic Fixed Income	% of International Fixed Income
Passively Invested	47.6%	34.8%	3.9%	10.0%	4.3%
Actively Invested	52.4%	65.2%	96.1%	90.0%	95.7%

[81] The major of the assets are DB assets and are 100% externally. However, this fund manages an additionally $13 million of which 63% (about 30% of its total asset under management) is managed internally.

Table II-G-4 compares the number of asset managers utilized for various types of assets classes in which the custom peer group invests.

Table II-G-4: Number of Investment Managers		
Asset Class	**PSERS**	**Custom Peer Group External Managers**
U.S. Stocks	38[82]	10.1
International Stocks	14	14.5
Domestic Fixed Income	10	6.2
Global Fixed Income	3	4.25[83]

Observations from Tables II-G 2 though II-G-4:

- The majority of PSERS' custom peer group use internal management. However, several funds with no internal management were included to determine whether staffing was affected. Internal management requires more staff, with a skill sets that is different from the skill set required by staff with responsibility for due diligence and monitoring of external asset managers. Active internal requires more resources and staff than passive management.

- PSERS uses a significant number of domestic equity managers – three times more than its custom peer group. The due diligence and ongoing monitoring of this number of external manager requires sufficient staffing resources.

- PSERS uses a significant amount of passive management in its domestic equity portfolio – it internally manages three index funds corresponding to the S&P 500, S&P 400 and S&P 600 Indexes, covering the capitalization spectrum.

[82] This number includes 19 external managers, 4 internal portfolios and 15 developmental managers.
[83] Average number of international fixed income managers, for only those peers who invest in this asset class.

- Five of the eight custom peer funds use at least a small amount of passive fixed income and the average passive allocation is approximately 10% of the asset class. However, PSERS does not use any passive management for its fixed income portfolio.

- Overall PSERS' asset class allocation is fairly representative of its customized peer group.

A Pension Fund's Investment Management Methods Significantly Influence the Functions, Skills, and Staffing Levels Required

Table II-G-5 compares PSERS' current staffing levels to those of its "peer group" and Table II-G-5 compares the characteristics of PSERS' investment management methods to those of its custom peer group. The numbers reflected are based of the full time employees (FTEs) reported and subsequently updated by the pension fund in response to the written survey prepared by IFS for this review. (Blanks in the Table occur because some respondents did not provide the information for all categories.)

Table II-G-5 – PSERS Staff Size Comparisons by Pension Fund

Categories	PSERS	SERS	Fund A	Fund B	Fund C	Fund D	Fund E	Fund F	Fund G	Median for Peer group
Asset Size (in billions)	$52	$27	$33	$65	$56	$49	$49	$64	$47	$49.5
Total Staff	290[84]	181	172	553	594	14	72	104.5	55[85]	138.5
Office of the Executive[86]	**22**	**4**	**29**	**10**	**9**[87]	[88]			**6**	

[84] As of June 30, 2005, based on filled positions. The authorized agency compliment is 290.
[85] 46 professionals and nine support staff.
[86] The Office of the Executive would generally include the Executive Director, Chief Investment Chief Operating Officer, Internal Auditor, Chief Financial Officer, and their respective administrative support staff.
[87] Legal counsel is in the Office of the Executive but was separately identified.

Table II-G-5 – PSERS Staff Size Comparisons by Pension Fund

Categories	PSERS	SERS	Fund A	Fund B	Fund C	Fund D	Fund E	Fund F	Fund G	Median for Peer group
Total Investment Staff	25	16	10	44	104	11	46	55.3	20	25
Total Investment Professional	20	13	10	39	87	9	41	51.8	20	20
Total Investment Administrative Staff	5	3	-	5	17	2	5	3.5	0	
Public Markets						4 professionals and 1 support for Public markets				
Total Public Equities Staff	3	1	-	20	29		17	23.5	2	18.5
▪ Professionals	3	1	-	18	27		16	22	2	17
▪ Support	1	0	-	2	2		1	1.5	0	1.25
Total International Equity	1	1	-	2	13		4	3	0	2.5
▪ Professionals	1	1	-	2	13		4	3	0	2.5
▪ Support	0	0	-	0	0		0	0	0	0
Total Fixed Income Staff	5	1	-	8	7	3	3	9	8	7
• Professionals	4	1	-	7	7	2	3	9	8	7
• Support	1	0	-	1	0	1	0	0	0	0
Private Markets										
Total Real Estate	3	2		9	36	3	10	5	4	5
▪ **Professionals**	2	2		8	27	3	8	4	4	4
▪ **Support**	1			1	9	0	2	1	0	1
Total Private Equities	5	3		4	n/a	-	9	9	5	5

[88] Did not report information.

Table II-G-5 – PSERS Staff Size Comparisons by Pension Fund

Categories	PSERS	SERS	Fund A	Fund B	Fund C	Fund D	Fund E	Fund F	Fund G	Median for Peer group
▪ **Professionals**	**4**	**3**		**3**	**n/a**		**7**	**8**	**5**	**5**
▪ **Support**	**1**			**1**	**n/a**		**2**	**1**	**0**	**1**
Other	**8**[89]	**8**		**1**	**19**	**-**	**-**	**5.8**	**1**	**5.8**
Professionals	**7**	**5**		**1**	**13**		**-**	**5.8**[90]	**1**[91]	**5**
Support	**1**	**3**		**0**	**6**		**-**	**0**	**0**	**0**
Related Non-Investment-Staff										
Legal	**10**	**16**	**7**	**6**	**3**	State DOJ	**-**	**3.2**	**0**	**4.6**[92]
▪ **Professionals**	**6**[93]	**11**[94]		**4**	**2**		**-**	**2.5**	**0**	**2.5**
▪ **Support**	**4**	**5**[95]		**2**	**1**		**-**	**0.7**	**0**	**1**
Audit Staff[96]	**1**	**2**	**5**	**6**	**2**	**0**	**-**	**2**	**11**	**2**
Information Management and Technology - Total	**67**	**13**	**30**	**102**	**261**	**15**	**4**	**11**	**7**	**14**
▪ **Professionals**	**51**	**12**		**94**	**173**	**15**	**4**	**11**	**4**	**12**
▪ **Supports**	**16**	**1**		**8**	**88**	**0**	**0**	**0**	**3**	**1**
Investment Accounting Total	**16**	**3**	**3**	**9**	**NP**	**5**[97]	**17**	**10.8**	**5**	**5**

89 Trading Staff - four professionals; External Manager Oversight/Compliance/Proxy – two professionals and one support person.

90 Cash and Equivalents, Risk Analysts, asset allocation, and performance.

91 Asset Allocation

92 The survey requested number of legal staff, not legal staff related solely to investment functions. Consequently, the median is based on the total number of legal staff reported in response to the survey (SERS also reported the total number in response to the survey) and does not reflect the breakdown between staff allocated primarily or solely to investment function and legal staff allocated to benefits administration or other non-investment related functions. Further, is should be noted that although the investment entities that reported zero do not have in-house legal staff, they do utilize the state attorney's office general's office or external legal counsel.

93 Three of the six work primarily (but not exclusively) on investment matters. Additionally, one of the attorneys that is primarily responsible for is also the principal liaison with the Pennsylvania Municipal Retirement System.

94 Subsequent to the survey, staff clarified that four of the 11 professional are responsible for investment related functions.

95 Subsequent to the survey, staff clarified that two of the five investment administrative staff are responsible for investment related functions.

96 The internal audit function (IA) is part of Audit, Reporting and Compliance (ARC).

97 This is the number that was provided. However, the functions are not really comparable to the PSERS investment accounting function. Therefore, it is not included in the calculation of the median.

Table II-G-5 – PSERS Staff Size Comparisons by Pension Fund

Categories	PSERS	SERS	Fund A	Fund B	Fund C	Fund D	Fund E	Fund F	Fund G	Median for Peer group
▪ **Professionals**	**14**	**3**	[redacted]	**6**	**NP**	**5**	**13**	**9.8**	**5**	**5.5**
▪ **Support**	**2**	**0**	[redacted]	**2**	**-**	**0**	**5**	**1**	**-**	**1**
Total Non-Investment Staff	**243**	**161**	[redacted]	**509**	**490**	**0**	**18**	**42.2**	**35**	**42.2**

Observations:

- The total asset size has doubled and the investment instruments in which PSERS participates has become more complicated, yet the PSERS total authorized investment staff complement of 25 has not increased since 1994. Notwithstanding PSERS' total investment staff level is consistent with the custom peer group median for total investment staff.

- The PSERS staffing level for domestic public equities is much lower than the majority of the custom peer group. PSERS utilize significant passive management for domestic public equities; passive management does not require as much staffing as active management. However, the members of the peer group also use passive management, but the majority the average allocation to active management is higher. PSERS also has a significant number of external managers in this asset class – three times that of the peer group average – external managers require ongoing monitoring.

- PSERS' staffing for each public market asset class is lower than the peer group staffing levels.

- PSERS' legal staff is larger than many of its custom peer group members and more than twice the median size. However, it is lower than SERS.

- Staffing levels for information management and technology and investment accounting are materially higher than the median of the custom peer group. Investment Technology staffing levels are materially higher than all but two of the funds in the peer group (Funds B and C). Investment Accounting staffing is comparable with Fund E, but in general, is also over twice the size of the median peer. In evaluating these observations, it is important to recognize that the staffing needs of each peer group related to information technology and investment accounting should be dictated by the pension fund's operational requirements. We believe the staffing differences among PSERS and its peers are attributable to (a) the fact that PSERS has elected to manage a sizable portion of its assets internally; (b) the complexity of the assets under management (e.g. private equity and real estate are more labor intensive asset classes); (c) the fact that the investment accounting staff, in addition to performing typical "back office" functions, has some "middle office" functions (e.g., the Class Action Revenue Recovery Program); but most notably (d) PSERS decided in 2002 to maintain it own internal independent accounting book of record.[98] The multi-year project to move to an independent accounting book of record commenced in August 2002. It is our understanding that the decision was significantly driven by PSERS' desire to mitigate the risk associated with its lack of control in the selection or termination of its custodial bank. PSERS does not want to rely primarily on the historical information maintained by the custodial bank.

- Maintaining an internal independent investment accounting book of record is atypical for public pension funds. Prior to 2002, PSERS, like most public pension funds, utilized the custodian as its independent source for records. [99]

[98] For portions of the investment portfolio, PSERS has made the FCS investment database the official Investment Book of Record (IBOR) to facilitate control of investment accounting records.

[99] A fund may have more than one set of investment records for the same transactions and assets, e.g., the custodian's records, the fund's records, and the manager's records. One set should be deemed the official set upon which reports are based. For portions of the investment portfolio, PSERS has made the FCS investment database

- Two peer group members (Funds B and C) have IT staffing levels over twice the size of PSERS. Both of these Funds manage significant assets internally and carry out extensive investment accounting functions. However, Fund B's investment accounting staffing level is notably lower than that of PSERS. (Fund C did not provide complete investment accounting staffing level information.) Fund B (as well as Fund C) also does not control the selection or termination of its custodial bank. However, neither Fund B nor C maintains a fully independent investment accounting book of record. The Director of Investment Accounting at Fund B has indicated that investment accounting staffing has become a challenge and that they will be looking closely for "possible additions to staffing in the future."

- The Investment Accounting staff complement of 16 has not increased since 1995. Since 1995, PSERS' assets have doubled and are invested in more complicated investment instruments. Until the independent accounting book of record project is complete and the level of reliance on FCS has been determined, a determination regarding whether additional investment accounting staff is required is premature.

Recommendation IIG-6	PSERS Response
Once the independent accounting book of record project is complete, a staffing adequacy assessment should be performed for the investment accounting function.	PSERS agrees and will endeavor to implement this recommendation.

See additional PSERS response to this section at Exhibit H.

the official Investment Book of Record to facilitate control of investment accounting records when such control points are needed, e.g., when the custody bank changes.

Additional Investment Staff is Needed

The Board has determined that its mission is advanced by participation on the advisory boards of its alternative investments partnerships (e.g., private markets investments, such as real estate and private equity). For that reason, PSERS has a seat on the advisory boards of all of its private markets investments. Currently, the Alternative Investments Unit has a staff complement of eight – six investment professionals and two administrative staff (one IP14; three IP10s; two IP9s; one ST5; and one ST3[100]).

PSERS has 241 private equity investments, and 43 real estate investments managed by 23 real estate firms. We do not believe that the current staffing levels are sufficient to conduct the necessary due diligence and monitoring of this labor intensive asset class.

Recommendations IIG-7, IIG-8 and IIG-9	PSERS Response
We recommend that PSERS consider whether it would be beneficial to increase its staffing levels for public equity.	PSERS will consider this recommendation. In fact, the Investment Office will be undergoing a comprehensive compensation and personnel policy review in the near future where this issue can be addressed.
We recommend the addition of at least one investment staff member to the Alternative Investments Unit.	PSERS will consider this recommendation. In fact, the Investment Office will be undergoing a comprehensive compensation and personnel policy review in the near future where this issue can be addressed.
We recommend the addition of administrative support to the Trading Unit.	PSERS will consider this recommendation. In fact, the Investment Office will be undergoing a comprehensive compensation and personnel policy review in the near future where this issue can be addressed.

[100] These descriptions are personnel position designations.

PSERS Does Not Have Adequate Internal Audit Resources

Periodically the Association of Public Pension Fund Auditors (APPFA) reviews the internal audit resources of public pension funds. APFFA's 2005 survey covered the internal audit staffing at over 40 public retirement systems. The APPFA 2005 survey results found that the average size of the internal auditing professional staff is approximately 2% of total staff size.

Using the 2% average from the APFFA survey results, PSERS' internal audit function is significantly understaffed. Currently, PSERS has only one person assigned to carry out the internal audit functions for an agency with an authorized complement of 290 employees that utilizes approximately 33% internal management. It does not have adequate internal audit resources to meet its professional responsibilities in this area, particularly given its use of extensive internal management, its internal trading desk, and its investment performance based incentive compensation program.

Recommendation IIG-10	PSERS Response
We recommend that the internal audit staff be increased at least to the level of the 2% average of total staff size reflected in APFFA's 2005 survey.	PSERS will consider this recommendation. In doing so, PSERS does recognize the need to increase its internal audit staff.

4. Adequacy of Compensation and Training

a. Compensation

i. Base Compensation

The Board has determined it is prudent to use both internal and external investment management of the assets under its control. Therefore, the staff of the Investment Office is responsible for the internal investment of assets as well as the monitoring of numerous outside public and private market investment managers.

The Skill Set Required to Manage or Monitor a Particular Asset Class Effectively Differs from Asset Class to Asset Class

The compensation of private sector investment management professionals is not subject to the public sector "fish bowl" complications and frustrations of government bureaucracy. As a result, private sector professionals are much better compensated relative to the value they create. While it is generally expected and accepted that public pension funds will not be able to compete with the salaries offered by private investment management firms, these private sector firms are still competition for at least some of PSERS' staff.

PSERS must employ investment professionals with highly specialized skills. Individuals with such skills are in great demand. If PSERS does not provide competitive compensation, it runs the risk of not being able to attract individuals with the necessary skills and/or serving as a training ground for the private sector. This is a costly situation in that PSERS could have a staff largely composed of employees in training – with lower skills and productivity – and then face losing them just as they reach the peak of their productivity and skill. The inability to fill positions exposes PSERS to potential governance and implementation risk that should be avoided.

ii. Comparison of Current PSERS' Investment Professional Compensation Levels to Public Peers

Table II-G-6 compares PSERS' compensation ranges as well as PSERS' actual compensation to SERS' compensation and the median and mean bottom, midpoint, and top of the custom peer group compensation ranges. Table II-G-6, Parts I and Part II, is a summary of Exhibit D – PSERS Custom Peer Group Compensation – which provides more detail regarding the compensation ranges at the custom peer group. This data should be read in conjunction with the characteristics identified in Table II-G-2 through II-G-4 above.

Table II-G-6-Part I

Customized Peer Group Compensation Comparisons-Executive Office and SIOs

PSERS & PEERS	CIO	Executive Director	SIO Public Equity	SIO Fixed Income	SIO Private Equity	SIO Real Estate	SIO Cash & Equivalents
PSERS Actual Compensation	$169,742	$170,289	$132,949	$132,949	$132,949	-	-
PSERS Incentive Comp.	$65,878	N/A	$45,505	$45,505	$45,505		
SERS Range	$144,333-$200,901	$154,504	$110,768-$168,412	$110,768-$168,412	$97,018-$147,541	$97,018-$147,541	
SERS Actual Compensation	$192,236	$154,504	$154,172	$154,172	$135,081	$129,213	-
Mean (range midpoint)	$176,518	$175,524	$140,205	$153,222	$138,688	$139,050	$116,059
Median(range midpoint)	$172,617	$174,606	$129,965	$136,045	$126,123	$129,965	$116,059
Mean (Top of Range)	$191,047	$175,524	$157,975	$170,242	$151,417	$152,700	$131,309
Mean (Bottom of Range)	$161,989	$175,524	$122,435	$136,204	$125,960	$125,399	$100,809
Median (Top of Range)	$185,377	$174,606	$152,075	$165,706	$146,456	$152,075	$131,309
Median (Bottom of Range)	$159,745	$174,606	$107,855	$109,312	$103,737	$107,855	$100,809

Observations:

- The actual compensation level of the CIO is significantly above the actual compensation of his counterpart at SERS when incentive compensation is included as well as above all measurement points of the custom peer group.

- With the exception of the Executive Director, the base compensation levels, without incentive compensation, of the CIO and all Senior Investment Officer are below their counterparts at SERS. Actual compensation, without incentive compensation, is somewhat **below** the median range midpoint of the custom peer group for the CIO, the Executive Director, and the SIO for fixed income. Actual compensation, without incentive compensation, is below the mean range midpoint for and senior investment positions. Incentive compensation is not guaranteed.

- The Executive Director's compensation is materially above that of the SERS Executive Director.

Table II-G-6-Part II

Customized Peer Group Compensation Comparisons-IOs and Portfolio Managers

PSERS & PEERS	IO Cash & Equivalent	IO Fixed Income	IO Public Equity	IO Real Estate	IO Private Equity	Cash & Equivalent Analyst	Fixed Income Analyst	Public Equity Analyst	Real Estate Equity Analyst	Private Equity Analyst
PSERS Investments Base Compensation Ranges	-	$88,802-$102,827	$106,348-$106,348	-	-	-	$69,771	$84,851	$66,113-$81,487	$65,780-$78,260
PSERS Incentive Comp. Ranges		$25,458-$30,167	31,200	-	-	-	$12,921	$20,748	$15,860-$19,580	$16,545-$19,135
Penn SERS	-	$85,047-$129,213	$85,047-$129,213	-	$85,047-$129,213	-	-	-	$74,524-$113,253	$74,524-$113,253
Mean (range midpoint)	$116,613	$100,139	$109,582	$98,374	$101,956	$63,109	$70,377	$67,315	$68,412	$68,017
Median(range midpoint)	$108,183	$107,130	$107,130	$98,848	$81,696	$58,708	$81,598	$64,769	$71,329	$68,965
Mean (Top of Range)	$121,940	$113,663	$124,586	$112,198	$117,154	$67,322	$77,606	$75,893	$76,430	$75,088
Mean (Bottom of Range)	$112,835	$86,718	$96,161	$86,396	$88,958	$59,085	$62,841	$59,365	$60,139	$61,074
Median (Top of Range)	$108,183	$125,238	$129,213	$106,299	$95,292	$64,868	$81,598	$70,155	$80,329	$75,124
Median (Bottom of Range)	$108,183	$85,047	$85,047	$77,550	$68,100	$55,371	$62,000	$50,248	$56,204	$56,204

Observations:

- The compensation ranges for PSERS' investment officers and analysts, with incentive compensation, are fairly comparable to their counterparts at SERS. The bottom of the base compensation ranges for PSERS' investment officers and analysts are generally below that of SERS, but higher than the bottom of the median bottom of the range for the custom peer group. With the exception of the public market analyst, the real estate analyst and the private equity analyst, PSERS' top of the range compensation is below the median top of the range

- Incentive compensation is not guaranteed. Consequently, the base compensation levels of SERS' investment officers and analysts are higher than their counterparts at PSERS, although PSERS manages 33% of its assets internally. Further, since the commencement of this review, SERS adopted an incentive compensation plan for its investment professional. This could result in PSERS' compensation being less competitive with SERS, particularly if SERS incentive program is more generous, and give rise to an attraction and retention problem.

- With the exception of the private equity analyst, the bottom of the PSERS' investment officers' compensation range, without incentive compensation, is consistent with the median bottom of the range for the custom peer group.

Recommendation IIG-11	PSERS Response
Increase the PSERS top of the compensation range for the IO Fixed income, and the IO for Public Equity and the fixed income analyst to be consistent with the median midpoint range of the custom peer group.	The Board will consider this recommendation. In fact, the Investment Office will be undergoing a comprehensive compensation and personnel policy review in the near future where this issue can be addressed.

- Because it is a critical support function to asset management, we also reviewed the compensation levels of the PSERS investment accounting function. The initial survey did not focus on information related to investment accounting. Accordingly, we requested supplemental information from members of the customized peer group, as well as from several additional funds which were known to provide more analogous investment accounting functions to those provided by PSERS. We also requested position descriptions, educational requirements, and information regarding the incumbent's credentials and tenure to determine comparability. As Table II-G 6-Part III reflects, comparable data was limited for all positions except the Director of Investment Accounting.

Table II-G6-Part III - Customized Peer Group Compensation Comparisons – Investment Accounting

	Positions					
Fund	Dir of Invest Acct	Asst. Dir. of Invest. Acct.	Supervisor/ Mgr. Private Mkt.	Supervisor/ Mgr. Public Mkt.	Supervisor of Treasury Ops.	Is compensation under the control of the Board
PSERS Investments Base Compensation Ranges	$57,100 To $$86,900	N/A	$50,100 To $76,100	$50,100 To $76,100	$43,900 To $66,700	
PSERS Actual Compensation	**$86,900**	**-**	**$71,000**	**$56,000**	**$61,000**	**No**
PA SERS Actual		$86,900				No
Fund B Base Compensation Ranges	$99,715-$139,609	$63,336-$88,670				
Fund B Actual Compensation	$109,137	$66,560				Yes
Fund C Base Compensation Ranges	60,000 – 137,000	52,000 – 96,000				
Fund C Actual Compensation	85,000[101]	60,010				Yes

[101] The incumbent has a CPA designation.

Table II-G6-Part III - Customized Peer Group Compensation Comparisons – Investment Accounting

	Positions					
Fund	Dir of Invest Acct	Asst. Dir. of Invest. Acct.	Supervisor/ Mgr. Private Mkt.	Supervisor/ Mgr. Public Mkt.	Supervisor of Treasury Ops.	Is compensation under the control of the Board
Fund F Ranges	[102]					
Fund F Actual[103]	$111,000 $18,000 (IC)	$90,000 $15,000 (IC)	$69,000 $7,000 (IC)	$69,000 $7,000 (IC)	N/A	[104]
Fund G Ranges	$72,678 – $93,028	$55,362 – 70,863				
Fund G Actual	$93,028	$70,863				[105]
Fund 1 Ranges[106]	$59,750 – $ 123,391				$45,460- $98,713	
Fund 1 Actual	82,350[107]				62,200	Yes
Fund 2 Ranges[108]	$54,400- $95,600					
Fund 2 Actual	$74,943[109]					Yes[110]

[102] Pay ranges are benchmarked against the state's pay schedule and McLagan data, although they are not subject to state civil service requirements as they relate to salary. However, scrutiny from the Legislature, the Administration, taxpayers, the press, etc. is considered in setting salaries.
[103] All incumbents have CPA designations.
[104] The Budget is based on 2.75 basis points of assets under management. Any salary adjustments and bonuses must be budgeted for along with the rest of the budgeted expenses.
[105] The noted investment accounting positions are part of the Fund's management level and are subject to fewer compensation rules than the professional level and support level positions (flexibility within established bands rather than fixed steps)
[106] This fund was not part of the initial custom peer group. However, it was included for purposes of compensation and staffing considerations because of its internal investment accounting operations. Fund 1 reported seven positions related to investment accounting operations.
[107] The incumbent is a CPA.
[108] This fund was part of the customized survey group. However, it did not respond to the larger survey. It did respond to the request for information related to its investment accounting operations. Fund 2 identified five positions related to investment accounting.
[109] The incumbent is a CPA.
[110] The Fund is an independent state agency and has its own compensation plan.

Observations:

- Back office functions are typically part of the Financial Accounting operations and not contained within the investment division. (The majority of the respondents identified in Table II-G6- Part III reported that the positions related to investment accounting/operation are within the Finance Department.)

- The boards of the majority of the funds identified in Table II- G6- Part III (exclusive of the PA funds) have the authority to establish compensation for the investment accounting positions.

- The incumbents at a number of the reporting funds have CPA designations.

- Compensation levels for the investment accounting positions reviewed at PSERS are at or near the top of the permissible compensation range.

- Compensation for the PSERS Director of Investment Accounting position is lower than Funds B, F, and G, but higher than the actual compensation of Funds 1, 2, and C.

- The compensation data points available for the Supervisor/Manager of Private and Public Markets, and Treasury Operations Supervisor positions, are too limited to make a determination regarding whether such compensation is competitive. Comparable positions do not exist at SERS.

- Unlike investment professionals, the Board does not have authority to establish compensation for investment accounting staff. Instead they must use the Commonwealth's standardized pay scales. As a consequence, it was reported that PSERS is having difficulty attracting and retaining investment accounting staff because it is unable to offer competitive salaries. To address the problem, an argument has been made that investment accounting positions should be re-classified as investment positions, on the theory that investment accounting professionals perform "investment-related" functions.

- In our view, the term "investment-related" is very broad and, to be equitable, PSERS would have to apply this new designation to all positions that provide investment-related critical support, including legal and information technology. Rather than differentiate among positions, we believe the better approach is to authorize the Board to establish compensation for all PSERS positions.

- The investment accounting staff is typically not part of the incentive compensation pool (only Fund F provides incentive compensation to its investment accounting personal).

iii. Incentive Compensation

Background

As discussed earlier, asset management requires highly specialized skills and PSERS manages a significant portion of investment assets internally. Internal management allows PSERS to realize certain economies of scale; however, such economies of scale are possible only insofar as the organization can attract and retain sufficiently qualified individuals to provide high quality asset management. As mentioned earlier, the competitive demand for the individuals who possess the skills set to actually invest assets internally as well as monitor complex investment strategies is greater than for other non-investment positions. To attract and retain proficient investment professionals, PSERS must compete with its local sister pension fund as well as other public and private institutional investors. Harrisburg is not a major financial center. However, there are investment management and consulting firms, banks and insurance companies close by.

PSERS recognizes that they must be competitive in order to obtain and maintain qualified, high caliber, skilled individuals. To accomplish this goal and diminish the risk of losing the talent they have, in addition to base compensation, the Board of PSERS instituted an incentive compensation plan for its investment professional. The current plan was approved August 15, 2003. The first incentive compensation plan was adopted for fiscal year 1993/1994 following a compensation study conducted by the HayGroup in 1992. So the plan has been in place a little over ten years. For fiscal year 2004 approximately $567,000 was paid to 20 of the 21 eligible investment professionals. Investment support staff is not eligible.

Model Elements of an Incentive Compensation Plan Structure

To be an effective incentive compensation plan, the benchmarks used to evaluate performance should be relatively straightforward, directly tied to the investment professional's area of accountability, and be linked to the Fund's overall strategy. Incentive compensation rewards should be commensurate with the investment professional's effort and contributions and contain elements relating to both organizational and individual goals. Incentive plans should include a "top-down" component – senior management incentive plans should be tied directly to key, overall Fund objectives. The plan should include a bonus range, incorporating a minimum payment, a target or threshold award, and a maximum level. It is appropriate for these levels to be expressed as a percentage of base salary. It is critical that employees understand the "cause-and-effect" component of these awards – if the Fund or employee does not attain a minimum performance target, there is no award.

To Be Successful, the Interests of Staff and the Pension Fund Must be Aligned

An incentive compensation program should be designed and administered to produce payments that are fair, rather than discriminatory or capricious. The program should be designed to align the interests of the organization (e.g., attractive rates of return, consistent with PSERS' investment policy approved by the Board) with those of each covered employee (the reward of higher payment if goals are achieved). In short, the program should be reasonably designed and administered so as to provide covered employees attainable, consistent, clear standards for achieving awards, in light of and consistent with the investment program's structure and objectives, as well as PSERS' overall governance.

Elements of an Incentive Compensation Plan

To reflect best practices, an incentive plan should contain at least the following elements.

- **Plan Objective** – Identify the purpose of the plan (e.g., staff attraction and retention, maintain competitive compensation range[111]).

- **Eligibility** – The plan should specify the eligible group of employees who may participate in the plan. Eligibility does not necessarily mean employees will participate in every distribution paid. Rather, in order to participate, the employee must meet other criteria.

- **Participation** – The plan should specify the participation criteria. Participation criteria may include, for example, continued employment in a covered position; and achievement of minimum job standards.

- **Alignment of Interest** - Everyone eligible for incentive compensation should have some portion of their incentive compensation tied to how well the total fund performs and not just exclusively on their respective segment or asset class.

[111] Example: Board's compensation philosophy may be to pay at the 40th percentile or the 80th percentile.

- **Plan Components**

  - **Initial quantitative benchmark component** – Non-discretionary award for beating a predetermined investment benchmark, based strictly on quantitative criteria.

  - **Further quantitative benchmark component** – If performance exceeds the predetermined benchmark, a further discretionary award may be granted for superior investment performance based upon such further quantitative measures as: the degree the performance exceeds the benchmark, while considering the risk associated with the performance; the difficulty of achieving performance relative to a peer group; and the economic value the performance added to the fund.

  - **Qualitative component** – Discretionary, based upon predetermined goals and objectives, consistent with the employee's position description.

The quantitative components should dominate qualitative components, especially when success is measured against established market indicators, such as equity benchmarks. Quantitative incentives include the "Total Fund Incentive" based on absolute and relative performance of the total fund.

  - **Deferral component** – The portion of the incentive compensation which is paid in future time periods. A vesting schedule is developed, as well as the interest rate or return which is applied to the amount deferred.

iv. Incentive Compensation Pitfalls to Avoid

- **Uncertainty Regarding the Application of the Program -** Some programs grant senior management the authority to identify annually the positions which will be eligible for the program for the year. In our opinion, the uncertainty associated with this practice is counterproductive. We believe it is preferable to designate at the outset all positions eligible for the program. The identification and selection of incentive-eligible positions should be based upon a detailed review and analysis of the Fund's objectives. In addition, to ensure the integrity and effectiveness of the incentive program, it is critical that the public fund clearly specify, in advance, the performance measures against which the incumbent's actual performance will be measured.

- **Program Components that Promote Undue Risk Taking -** Another pitfall to avoid is incentives which promote undue investment risk-taking. An example is the length of the measurement period for determining excess investment performance. If too short, this can promote such undue risk-taking. Using a single year as a measurement period may mean that an investment professional who caused significant under-performance by taking undue investment risk that year could nevertheless qualify for incentive compensation the next year. Similarly, with a single year measurement period, a professional who enjoyed great success in year one and accordingly received incentive compensation, could under perform in year two by even more. Even if the cumulative two-year return fell shy of the benchmark, that individual could receive an incentive payment. On the other hand, using a multi-year period tends to discourage excessive risk-taking, does not unduly reward short-term success and encourages a longer term view. A caveat is that in a multi-year period, maintaining a consistent benchmark – rather than "changing the rules in the middle of the game" – is essential for fairness to the investment personnel involved.

v. Comparison of PSERS' Incentive Plan to Best Practice Elements

All professional investment staff personnel are eligible for incentive pay. The criteria of the PSERS incentive plan are set forth annually in the PSERS Investment Incentive Plan Policy Guidelines. We examined the PSERS Investment Incentive Plan Policy Guidelines for 2003 – 2004.

Table II-G-8 – Analysis of PSERS Incentive Plan Policy Guidelines

Positives	Negatives
A quantitative payout criteria, for all but three positions[112], ties a percentage of the payout[113] to the absolute and relative performance of the total fund	Comparable positions do not have the same quantitative payout criteria.[114]
Positions that have staff oversight functions also a quantitative supervisory incentive component a percentage of their maximum payout[115] tied to the performance of the employees under their supervision	Only three of the 21 investment positions eligible for incentive compensation contain a qualitative performance criteria. All positions should have a qualitative component as part of their incentive plan criteria.
The maximum total incentive pay possible is expressed as a percentage of total base salary[116]	For the positions with qualitative performance criteria, 50% (and in one case a higher percentage) of the total maximum payout is tied to a subjective factor, their annual performance review.
The measurement period for most of the positions is three years.	There is no deferral vesting component
Positive performance is rewarded and negative performance is punished.[117]	There is no minimum, target or threshold award, only a maximum level.
	The percentage of the maximum bonus of senior management tied to qualitative criteria is too high.
	The plan defines "absolute" as the performance of the fund compared to its policy index.. This is really a relative measure since you are

[112] The international equity portfolio manager, the real estate portfolio senior investment analyst, private equity senior equity analyst.
[113] 5%.
[114] Specifically one private equity senior investment analyst has a quantitative payout criteria tied the entire amount of their maximum incentive to portfolio level performance while the other has a higher maximum (25%) of which 20% is tied to the same portfolio level performance as the other analyst and 5% is tied to total fund performance.
[115] 5%.
[116] That is, whether or not their staff earned their respective quantitative incentives.
[117] Investment staff who under-perform their identified performance measures for three consecutive years may be terminated from employment.

Table II-G-8 – Analysis of PSERS Incentive Plan Policy Guidelines	
Positives	**Negatives**
	comparing one return to another. A true absolute measure would be just an amount standing alone.
	The plan defines a relative measure, comparing PSERS to a peer group universe of other public funds. As we noted earlier in this Objective it is very difficult to compare one fund to another because commonality of feature is difficult to assess.
	Incentive pay for internal equity managers is based on performance of passive index funds as well as equity substitution program. We understand that internal staff does the separate calculation for the equity substitution program and this is not calculated or reported by a third party (e.g., Wilshire).

Recommendations IIG-12 and IIG-13	PSERS Response
We recommend that (1) the qualitative payout percentage for the CIO and the Director of External Public Market be decreased (2) the total Fund quantitative incentive for the CIO and the Director of External Public Market positions be increased in order to better aligned the interests of these senior positions with the overall Fund objectives	The Board will consider this recommendation. In fact, the Investment Office will be undergoing a comprehensive compensation and personnel policy review in the near future where this issue can be addressed.
We recommend adding qualitative criteria to the incentive plan policy and guidelines for all investment professionals.	The Board will consider this recommendation. In fact, the Investment Office will be undergoing a comprehensive compensation and personnel policy review in the near future where this issue can be addressed.

Staff provides a memorandum to their respective supervisor regarding whether and to what extent they have achieved the criteria for payment of a performance bonus. The Internal Auditor is then utilized as the independent confirmation.

Recommendation IIG-14	PSERS Response
We recommend the use of an external, independent accounting firm to review and verify the performance calculations of staff and verify whether or not a particular investment professional has met the established quantitative criteria	PSERS agrees that the Investment Office incentive compensation calculations should be reviewed and verified by an independent third party not included in the incentive plan. PSERS, however, believes that it complies with this recommendation by having PSERS Internal Auditor review and approve the incentive calculations annually. Additionally, the quantitative calculations are prepared by an external third party independent of PSERS (i.e., Wilshire Associates). Given the participation of these independent third parties in calculating the quantitative returns, PSERS believes the need to hire an external party is not necessary.

We sampled the incentive compensation criteria for several randomly selected positions and had the following observations:

Director of External Public Markets, Risk and Compliance

- 35% total potential seems high for an individual that is not managing money.
- In our opinion, too much of the incentive plan for this position is tied to qualitative factors (20% out of 35%). We suggest consideration be given to increasing the quantitative component – 25-30 quantitative, 5-10 qualitative.
- Section 1 (a) – the Total Fund incentive component is too small a percentage. We suggest that the bulk of this performance (15-20%) should be tied to the Total Fund rather than just 5%.

- Section 1 (b) – the multiplier creates flawed incentives. Instead of using a formula to determine the number of managers that outperform, it is better to use the total segment results. The current procedure treats all managers equally regardless of their market value. Segment performance would get around this problem. Additionally, the current procedure creates the possibility that a full bonus would be paid if the managers in aggregate under perform. For example, assuming equal weights, if nine managers outperform each by 10 basis points, and one manager underperforms by 200 basis points, the fund underperforms its benchmark by 11 basis points but the full incentive would be paid as currently designed.

- Section 1 (c) – the supervisory incentive allows for payment based on how the compliance officer performs relative to his quantitative incentive. But, the compliance officer's quantitative incentives are the same formula as the Director of External Public Markets, Risk and Compliance has in 1(a) and 1(b). Thus, there is double counting.

Compliance Officer

- 20% total potential seems high for a compliance officer. The position is described as "junior," "assisting" and "monitoring for compliance."

- It is unclear whether the position is responsible for the selection of investment managers.

- Section 1 (a) – if there is to be incentive, then the comparison should be tied to the total fund.

- Section 1 (b) – there is no evidence that the position has an impact on the manager structure which should be the case for this component to be appropriate; the calculation is also flawed (see discussion above regarding Section1(b) of the incentive compensation plan for the Director of External Public Markets, Risk and Compliance's).

- Section 2 – Qualitative Component – 10% relates to the annual review of the Compliance Officer's performance.

Senior Investment Analyst Real Estate

- 25% total potential appears high based on the job description functions (e.g., "processing capital calls," "verification of calculations" and "maintaining financial records").

- In order to be eligible for incentive compensation, there should be a justification regarding how this position impacts the performance of the real estate portfolio.

- Section 1(a) – this component of the plan ties incentive to the performance of the real estate partnership portfolio. If the position deemed eligible, then the formula used to calculate the incentive appears reasonable.

- Section 1 (b) – this component ties incentive to staying within a budget. In our opinion this criteria is not suitable, it is more appropriate to tie the incentive to coming in below budget (i.e., "more than 10% below budget").

Senior Investment Analyst: Private Equity/Venture Capital/Private Debt (1)

- It appears that this is a senior level position. If the employee is instrumental in the actual investments selected, than tying incentive to the performance of this segment is appropriate.

- The benchmark seems reasonable.

- In our opinion, the threshold level appears generous. If you achieve the 45th percentile in the universe comparison, half of the incentive kicks in. If you achieve the 40th percentile, the full amount kicks in. We suggest implementing a tougher bogey to beat, for example: achieving the 40th percentile in the universe comparison triggers half, and 25th gives trigger the full amount.

- Trailing one year periods are used in the calculation (vintage-year weighted). We suggest using a longer measurement period.

- Based on the information provided, we found no component that relates to the performance of the Total Fund. However, we were subsequently informed that the position now has a component that relates to the performance of the Fund.

Senior Investment Analyst: Private Equity/Venture Capital/Private Debt (2)

- The benchmark seems reasonable.

- Again, the threshold level where incentive kicks in appears very generous. Hitting the 45th percentile in the universe comparison causes half of the incentive to kick in. Hitting the 40th percentile triggers the full amount. IFS believes this position should have a tougher bogey to beat, such as 40th percentile leads to half the incentive and 25th percentile triggers the full amount.

- Trailing one year periods are used in the calculation (vintage-year weighted). We suggest using a longer measurement period.

- Based on the information provided, we found no component that relates to the performance of the Total Fund. However, we were subsequently informed that the position now has a component that relates to the performance of the Fund.

Recommendation IIG-15	PSERS Response
We recommend that the incentive compensation program be reviewed to insure that the interest of the staff are properly aligned with the Fund and among each other and that the criteria for obtaining the incentive are equitable, reasonable and appropriate.	The Board agrees and will endeavor to implement this recommendation. In fact, the Investment Office will be undergoing a comprehensive compensation and personnel policy review in the near future where this issue can be addressed.

b. Personnel Turnover

Personnel turnover is often used as a measure of adequacy of compensation. However, factors other than non-competitive compensation can contribute to turnover. These include high stress, lack of job challenge (e.g., monotony), dealing with government bureaucracy, poor working conditions (e.g., insufficient resources) and poor supervision.

Significant Turnover Creates Undue Governance Risk

Whatever the reason, significant turnover would subject PSERS' investment activities to unnecessary and avoidable "governance risk." Governance risk refers to the risk that staff (or the Board or agents of a public pension fund) will, either intentionally or unintentionally, through their management actions or lack thereof, cause the assets of the pension fund to under perform expectations[118]. New staff must be trained to become well-versed in the processes, policies and procedures used by PSERS. During this learning period, a new employee's (even a highly qualified one) lack of knowledge places the pension fund at risk. Further, it distracts the

[118] Public Pension Systems Statements of Key Risks and Common Practices to Address Those Risks, July 2000. Endorsed by the Association of Public Pension Fund Auditors (APPFA), the National Association of State Retirement Administrators (NASRA), and the National Council on Teacher Retirement (NCTR).

employees, who must provide the training, from their normal functions, which subjects the pension fund's operations to further risk.

Table II-G-9 below examines PSERS' investment staff turnover in comparison to the agency as a whole as well as to its peers. It confirms that the turnover at PSERS over the last hour years has been very low.

Table II-G-9

Name of Pension Fund	Total Non-Investment Staff	Total Non-Investment Staff Departures	Percentage of Turnover	Total Investment Staff	Total Investment Staff Departures	Percentage of Turnover	**Total Staff on Payroll**
Turnovers	**2002**						
PSERS	**243**	**18**	**7.41%**	**27**	**2**	**7.41%**	**270**
SERS	172	5	2.91%	15	0	0.00%	187
OH Public Employees Retirement System	468	24	5.13%	60	2	3.33%	528
OH State Teachers Retirement System	580	21	3.62%	131	4	3.05%	711
OR Public Employee Retirement Fund	0	0	0.00%	11	1	9.09%	11
State of Michigan Retirement System	-	-	-	-	-	-	-
State of Wisconsin Investment Board	0	0	0.00%	104.5	8	7.66%	104.5
Turnovers	**2003**						
PSERS	**244**	**21**	**8.61%**	**27**	**1**	**3.70%**	**271**
SERS	163	13	7.98%	16	0	0.00%	179
OH Public Employees Retirement System	493	36	7.30%	55	5	9.09%	548
OH State Teachers Retirement System	538	52	9.67%	124	6	4.84%	662
OR Public Employee Retirement Fund	0	0	0.00%	11	0	0.00%	11
State of Michigan Retirement System	-	-	-	-	-	-	-
State of Wisconsin Investment Board	0	0	0%	104.5	9	8.61%	104.5

Table II-G-9

Name of Pension Fund	Total Non-Investment Staff	Total Non-Investment Staff Departures	Percentage of Turnover	Total Investment Staff	Total Investment Staff Departures	Percentage of Turnover	**Total Staff on Payroll**
Turnovers	**2004**						
PSERS	**243**	**13**	**5.35%**	**27**	**1**	**3.70%**	**270**
SERS	155	23	14.84%	16	1	6.25%	171
OH Public Employees Retirement System	496	32	6.45%	55	5	9.09%	551
OH State Teachers Retirement System	512	41	8.01%	111	17	15.32%	623
OR Public Employee Retirement Fund	1	0	0.00%	11	2	18.18%	12
State of Michigan Retirement System	-	-	-	-	-	-	-
State of Wisconsin Investment Board	0	0	0.00%	104.5	9	8.61%	104.5
Turnovers	**1/1/2005 through 6/30/2005**						
PSERS	**248**	**15**	**6.05%**	**27**	**0**	**0.00%**	**275**
OH Public Employees Retirement System	501	15	2.99%	54	5	9.26%	555
OH State Teachers Retirement System	509	23	4.52%	107	6	5.61%	616
OR Public Employee Retirement Fund	3	0	0.00%	11	1	9.09%	14
State of Michigan Retirement System	18	0	0.00%	54	0	0.00%	72
State of Wisconsin Investment Board	0	0	0.00%	105	5	4.78%	104.5

c. Training

Training can Provide Staff with the Skill Set Required To Perform Their Functions and Enhance Performance and Productivity

Principles of Training

To enhance the likelihood that the organization will operate effectively and efficiently, it is vital that staff has the appropriate skill set, experience, and training to perform their assigned job functions. If they do not, it exposes PSERS to operational risk. Training affords staff the opportunity to gain knowledge and tools that enhance their ability to perform their job functions.

Training can take many forms. It can be provided in-house (e.g., using staff or pension fund service provider), or through the use of external providers (e.g., academic institutions or industry conferences).

PSERS Does Not have a Formal Continuing Education or Training Policy

Ongoing training and development should be an integral part of every professional organization. While PSERS does provide resources to assist its staff in obtaining training and career development, there is currently no formalized training policy or continuing education policy. Hence, there is no requirement that the training be relevant to their particular area or an area for which they may be crossed trained; there is no policy encouraging the use of internal training (e.g. brown bag lunch sessions to share information put on by staff that has expertise in a particular area); and there is no list of recommended conferences or programs.

We reviewed the "Out Service Training Report" for the period January 2003 through September 2005. The report included attendance at industry conferences as well as professional certification preparatory courses. Only slightly over half of the professional investment staff participated in some form of training. Alternative Investments is the only unit within the PSERS Investment Office where all of the professional staff attended at least one program. In the other units, typically only one member attended any out service training. The Chief Investment Officer and the Director of Public Markets engaged in most of the training.

Recommendation IIG-16	PSERS Response
We recommend that the Investment Office develop a training and education policy. The policy should require continuing education for PSERS investment professionals, provide for periodic internal training (provided by staff or PSERS service providers) on select investment topics.	PSERS agrees with the recommendation and will endeavor to develop a reasonable policy. In fact, the Investment Office will be undergoing a comprehensive compensation and personnel policy review in the near future where this issue can be addressed. PSERS also believes that a training and education program should formally address employees wishing to pursue professional designations such as the CFA, CAIA, etc. and provide reimbursement for the costs incurred in doing so.

5. Personnel Practices

a. Performance Evaluations

Performance evaluations are an essential management tool as well as an instructional tool, helping staff to develop their goals and objectives for the coming year and providing feedback on work performance during the year. At a minimum, personnel evaluations should be done on an annual basis. Updates should also be done on a quarterly or semi-annual basis to provide an overview of each employee’s work for the time period since the last evaluation and to determine whether the employee is on the right track toward meeting their goals and objectives. The annual evaluation should not contain any surprises for either the staff member or the supervisor. If the employee has not been working to their potential, do not wait until the annual evaluation to discuss the issue. However, if the issue has been frequently discussed during the year, it needs to be included in the evaluation.

Performance Guidelines for Investment Staff Should be Tailored to Their Functions

The current performance evaluation forms used for PSERS for the investment staff are neither geared to their specific investment functions nor performance based. Rather, they are standard, somewhat general, government wide performance forms. For example, the current form provides no mechanism for the investment staff person and their supervisor to mutually agree upon priorities for the upcoming performance period. That being said, the incentive compensation plan does have performance based criteria upon which to judge whether an investment staff person is functioning in a manner that assists PSERS in accomplishing its mission. For example, the policy provides that investment staff who under-perform their identified performance measures for three consecutive years may be terminated from employment. The plan however for virtually all of the investment professionals does not contain a qualitative measure of performance. Further, a significant portion of a few investment professionals' incentive compensation is tied to their performance evaluation. However, the performance evaluations are not tailored to their specific job functions.

b. Succession Planning

Succession planning requires determining what the pension fund's management and skill set needs are going to be in the future, knowing which professionals could potentially assume the needed roles and responsibilities, and preparing them to assume the position (e.g., through mentoring, leadership training, professional certification courses, etc.).

Current leadership must be strategic and proactive in their succession planning effort. If they are not the pension fund is subjected to possible governance and implementation risk.

PSERS Does Not Have a Formal Succession Plan

Current PSERS' leadership is aware of the importance of succession planning and minimal turnover appear to have reduced their prioritization of this to an informal process at best. However, they do not have a formal policy or process to address the potential gaps in the organizations workforce functions. Succession is a critical need, particularly in light of the specialized skill set required in the investment office.

Recommendation IIG-17	PSERS Response
We recommend that the Board develop a succession plan and implementation protocol.	The Board agrees and will endeavor to implement this recommendation. In fact, the Investment Office will be undergoing a comprehensive compensation and personnel policy review in the near future where this issue can be addressed.

Please see DAG's response at Exhibit I for comments on this section.

II-H. Investment Manager Structure

1. Background

The investment manager structure is the allocation of fund assets to various investment managers and styles within an asset class. Separate and distinct from asset allocation, it relates to the following:

- The investment style(s) employed within an asset allocation
- The number of managers used;
- The use of active and passive strategies; and
- The use of internal versus external management

Generally, the proper allocation to various sub-asset classes, or investment "styles," is guided by the asset class "Policy Benchmark." For example, if a fund's equity policy benchmark is the Wilshire 5000 index, that fund's style allocations would normally be done in such a way that the overall exposure to different styles would be roughly similar to the Wilshire 5000 Index. Thus, if the Wilshire 5000 Index consisted of 80% large capitalization stocks and 20% small to mid capitalization stocks, a disciplined investment structure would have roughly those same percentage allocations. Similarly, if the Wilshire 5000 Index consisted of 60% growth stocks and 40% value stocks, a disciplined investment structure would have roughly those same percentage allocations to those different styles.

An investment structure which is significantly different from the policy benchmark introduces a "bias" or "bet" both to and away from another style within that benchmark:

- An "overweight" to any one style (e.g., overweight to large-cap growth) must also include an "underweight" in another style (e.g., underweight to small cap or to value) relative to the overall equity benchmark.

- The result of the above is a "bet" that the overweight style will outperform the underweight styles.

Historical analysis suggests that all styles come into and out of favor over time, with no one style consistently outperforming others. Therefore, a bias to any style may introduce added "risk" (i.e., performance which varies significantly from the benchmark adopted by the Trustees) to the fund with no expected additional long-term return. Thus, a "style neutral" approach is often sought by many funds.

2. Number of Managers

"Best practices" suggest that a fund should use enough investment managers to achieve proper diversification in each asset class in which it has chosen to invest. Having too few managers can cause a fund to bear unnecessary risks, such as lack of diversification and organizational risk (i.e., if a fund has a large amount of assets invested with one organization and that manager has problems). On the other hand, too many managers can result in higher overall investment management fees; multiple managers with similar styles can actually cause a fund to lose the benefits of active management by becoming too index like overall; and a large number of managers increases the complexity of due diligence and monitoring.

Generally, a fund should seek a mix of equity, fixed income and other managers, (separate accounts and/or commingled funds) with complementary styles (as opposed to duplicative styles).

- Complementary styles increase overall diversification.

- Duplicative styles can create administrative burdens and increase investment management costs.

- The number of managers required is somewhat dependent upon the asset allocation.

- Generally, a fund should have the number and variety of investment managers necessary to achieve the fund's stated investment objective and to control risk while incurring reasonable costs.

The average number of managers used by the custom peer group IFS surveyed and public fund sponsors with over $5 billion in assets, as reported in the 2005 Greenwich Associates survey (data as of 2004), is shown in Table II-H-1 below. We discuss each asset class separately in the narrative below.

Table II-H-1: Number of Investment Managers

Asset Class	PSERS	Custom Peer Group External Managers	2005 Greenwich Associates Survey
U.S. Stocks	38[119]	10.1	6.8
International Stocks	14	14.5	5.4
Domestic Fixed Income	10	6.2	5.1
Global Fixed Income	3	4.25[120]	NA

[119] This number includes 19 external managers, 4 internal portfolios and 15 developmental managers.
[120] Average number of international fixed income managers, for only those peers who invest in this asset class.

3. Overview of PSERS' Investment Manager Structure

PSERS Takes a Disciplined Approach to its Investment Manager Structure

PSERS' general investment consultant conducts an annual investment review that includes recommendations on revisions to the investment structure. PSERS has made the decision to use internal asset management for approximately one third of its assets and external management for the remainder (including the alternative asset classes). Table II-H-2 below outlines the investment structure for the overall fund. We discuss each asset class in a separate section that follows.

Table II-H-2: Total Fund Investment Structure as of June 30, 2005

Manager	Product Style	% of Total Fund	% of Asset Class
Domestic Equity			
PSERS S&P 500 Index Fund	Internal Passive Core	20.9	50.0
PSERS Enh S&P 500 Fund	Internal Enhanced Core	2.6	6.2
PIMCO Enh S&P 500	Enhanced Core	2.7	6.5
Smith Breeden Enh S&P 500	Enhanced Core	2.6	6.2
Acorn S&P 500 Options	Derivatives	0.0	0.0
Bridgewater	Global Macro	2.6	6.2
Total Large Cap		**31.4**	**75.1**
PSERS S&P 400 Index Fund	Internal Passive Core	2.2	5.3
PSERS S&P 600 Index Fund	Internal Passive Core	2.1	5.0
Mellon Equity Extended (W4500)	Enhanced Index	0.2	0.5
Barclays Global Investors (S&P 400)	Enhanced Index Mid Cap	0.4	1.0
Wellington Small Core	Active Small Core	0.5	1.2
First Pacific Advisors	Active Smid Value	1.0	2.4
Northpointe Capital	Active Small Value	0.7	1.7
Emerald Advisors	Active Small Growth	0.3	0.7
Longwood Inv. Advisor	Active Small Growth	0.2	0.5
Boston Company	Active Small Growth	0.3	0.7
Wellington Emerging Growth	Active Small Growth	0.4	1.0
William Blair & Co.	Active Smid Growth	0.2	0.5
Northpointe Capital Micro Cap	Micro Cap Active	0.2	0.5
Donald Smith Micro Cap	Micro Cap Active	0.1	0.2
Thomson, Horstman & Bryant	Micro Cap Active	0.1	0.2

Table II-H-2: Total Fund Investment Structure as of June 30, 2005			
Manager	**Product Style**	**% of Total Fund**	**% of Asset Class**
Turner Micro Cap	Micro Cap Active	0.2	0.5
Oberweiss	Micro Cap Active	0.2	0.5
Total Small Cap		**9.3**	**22.2**
Developmental Equity Composite	Emerging/Minority	1.1	**2.6**
Misc Equity		0.0	0.0
Total Domestic Equity		**41.8**	**100.0**
International Equity			
PSERS ACWI ex-US	Internal Passive Core	1.0	4.9
Alliance Bernstein	Active Large Cap	2.3	11.3
Baillie Gifford	Active Large Cap	2.3	11.3
Barclays Global	Active Large Cap	2.3	11.3
Boston Co. Asset Mgmt	Active Large Cap	2.2	10.8
Marathon Asset Management	Active Large Cap	2.3	11.3
Martin Currie, Inc.	Active Large Cap	2.3	11.3
Mercator Asset Management	Active Large Cap	2.2	10.8
Total Large Cap International		**16.9**	**82.5**
Boston Co.	Active Emerging	1.0	4.9
Templeton Co. Asset Mgmt	Active Emerging	1.4	4.9
Total Emerging Markets		**2.4**	**11.7**
Boston Co. Asset Mgmt	Active Small Cap	0.3	1.5
Acadian Asset Mgmt	Active Small Cap	0.3	1.5
AXA Rosenberg	Active Small Cap	0.3	1.5
GlobeFlex Capital	Active Small Cap	0.3	1.5
Total Small Cap International		**1.2**	**5.9**
Total Non-US Equity		**20.3**	**100.0**
Total Publicly Traded Equity		**62.3**	**-**
U.S. Fixed Income			
PSERS Active	Active Core	2.2	10.3
Blackrock	Active Core	2.1	9.9
Delaware	Active Core	1.0	4.7
Deutsche Asset Mgmt	Active Core	2.3	10.8
PIMCO	Active Core	2.4	11.3
Western Asset Mgmt	Active Core	0.6	2.8
Total Core Fixed Income		**10.6**	**49.8**
Mackay Shields High Yield	High Yield	1.0	4.7
W.R. Huff High Yield (Terminated)	High Yield	0.9	4.2
Total High Yield		**1.9**	**8.9**
PSERS TIPS	Internal TIPS	1.7	8.0
Brown Brothers	TIPS	1.6	7.5
Bridgewater Associates	TIPS	1.6	7.5
Total TIPS		**4.9**	**23.0**

Table II-H-2: Total Fund Investment Structure as of June 30, 2005			
Manager	**Product Style**	**% of Total Fund**	**% of Asset Class**
Developmental Fixed Composite	Emerging/Minority	0.0	0.0
Total U.S. Fixed Income		**17.4**	**81.7**
Global Fixed Income			
Fischer Francis Tree Watts	Active Global	1.2	5.6
Deutsche Asset Mgmt	Active Global	1.3	6.1
Rogge Global Partners	Active Global	1.4	6.6
Total Global Fixed Income		**3.9**	**18.3**
Total Fixed Income		**21.3**	**100.0**
STIF	Unallocated Cash	**-0.8**	**-**
REITs			
Morgan Stanley	REIT	0.6	8.3
ProLogis Trust	REIT Shares	0.2	2.8
Security Cap-Glob US	REIT	1.2	16.7
Total REITs		**1.9**	**26.4**
Private Real Estate		5.3	**73.6**
Total Real Estate		**7.2**	**100.0**
Managed Stock Distribution	Special	0.0	-
Private Equity Composite	Alternatives	6.9	**68.3**
Private Debt Composite	Alternatives	2.4	**23.8**
Venture Capital Composite	Alternatives	0.8	**7.9**
Total Alternatives		**10.1**	**100.0**
Total Fund		**100.0**	**100.0**

a. Domestic Equity Structure

Based on our experience, most large institutional investors seek to structure and maintain a broadly diversified domestic equity portfolio. The Wilshire 5000 Index and the Russell 3000 Index are the two most commonly used broad market policy indices for domestic equity. As noted in that section, the Wilshire 5000 and Russell 3000 Indices represent approximately 100% and 98% of the entire U.S. equity market capitalization, respectively, whereas the S&P 500 represents only about 80% (S&P also publishes the S&P 1500 Index – composed of the S&P 500, 400 and 600 indexes – which is not quite as inclusive as the Wilshire and Russell Indices, but whose design lends itself towards passive management of each discreet S&P index). More broadly diversified equity portfolios generally offer less volatility of returns than portfolios "concentrated" in one style or capitalization.

PSERS' Domestic Equity Portfolio is Structured to Match the Wilshire 5000 Index

Wilshire, as the Fund's consultant, produces an annual Investment Review that includes "Investment Structure and Manager Recommendations" where they recommend how much PSERS should invest by style, strategy (passive vs. active) and capitalization. In March 2005 they recommended decreasing the amount in small cap stocks to 20% from 25% (including 2% in Micro Cap stocks) with the remainder in large cap stocks. An outline of the current structure policy of the domestic equity portfolio is as follows:

Table II-H-3 – Domestic Equity Structure Recommendations as of March 2005

Style	Recommended Policy	Number of Portfolios	Capitalization	Recommended Policy
Active Core (Small/Mid)	2.0%	3	Large Cap	80.0%
Active Growth (Small/Mid Cap)	3.0%	5	Small Cap	20.0%
Active Value (Small Cap)	3.0%	2	*Small/Mid Cap*	*18.0%*
Active Micro Cap	2.0%	5	*Micro Cap*	*2.0%*
Passive/Index	62.5%	3	Total	100.0%
Enhanced Index – Derivatives Based	18.0%	3		
Enhanced Index – Global Macro	9.5%	1[121]		
S&P 500 Overlay	NA	1		
Developmental	NA	15		
Total	100.0%	38		

The actual amounts invested per manager (as shown in Table II-H-3 above) are fairly close to the policy weights so the System does not deviate significantly from its policy. In addition, we entered the equity holdings into the Wilshire Co-op system in order to compare the total combined equity portfolio to the Wilshire 5000[122].

[121] As of 6/30/05 one global macro manager was funded, three additional global macro managers have been retained – Barclays Global Investors, First Quadrant and AQR Capital Management for a total of approximately $2.1 billion.
[122] We used the S&P 500 stocks as a proxy for the derivatives based managers.

Table II-H-4 – Equity Style Allocation of Holdings As of June 30, 2005[123]		
Style	**Portfolio (%)**	**Wilshire 5000 (%)**
Large Value	35.8	35.7
Large Neutral	5.4	7.6
Large Growth	34.8	34.4
Large Cap Total	***76.0***	***77.7***
Mid Value	5.2	5.2
Mid Neutral	0.8	2.0
Mid Growth	2.8	2.8
Mid Cap Total	***8.8***	***10.0***
Small Value	5.3	4.7
Small Neutral	2.8	3.5
Small Growth	4.4	3.1
Small Cap Total	***12.5***	***11.3***
Unclassified	*2.7*	*1.1*

As the above table shows, when compared to the broad market Wilshire 5000 Index as of June 30, 2005, the System's actual style and capitalization distribution is very similar to the Wilshire 5000 and close to the recommended policy split of 80% Large Cap and 20% Small Cap. In other words, PSERS is not taking any significant active bets away from its policy benchmark in either style or capitalization.

As shown in the above tables, PSERS uses a large number of domestic equity managers – 19 external portfolios, four internally managed portfolios and the Developmental Equity composite, which includes 15 firms. The Developmental Equity managers are selected (with the concurrence of the CIO) and monitored by the Alternatives Investment staff. At first glance, this seems like an unwieldy number of managers; however, the equity portfolio is highly structured and very well diversified. In addition, the external managers are primarily in the small and micro cap areas, as well as the Developmental composite, where managers tend to keep their product offerings small so they can be more nimble. However, this large number of managers does create difficulties for the ongoing monitoring and due diligence, thus stretching staff resources.

[123] Numbers may not add due to rounding.

Within the domestic equity structure, IFS analyzed each equity manager's holdings in order to:

- Verify the true equity investment style of each manager;
- Seek to identify any instances where the Fund has more than one investment manager with the same or substantially similar style exposure (e.g., overlap).

IFS primarily uses two analytical tools in performing the Fund's investment manager style analysis:

- "Holdings-based" style analysis that assigns a range of growth-value and large-small metric scores to each stock held in each portfolio and for the portfolio as a whole based on the specific characteristics of each stock (see Exhibit E).
- "Common Holdings Matrix" which shows both the number of stocks managers hold in common as well as the percentage of each portfolio that is held in common (Exhibit F).

As can be seen in the style maps, PSERS' total domestic equity composite maps very closely to the Wilshire 5000, as we would expect given the statistics presented above. None of the other active managers directly overlaps another manager, although a few are very close, e.g., the Donald Smith and the Oberweiss micro cap portfolios. If we look at the Common Holdings Matrix for the micro cap managers, however, we see that these two managers do not own any stocks in common. There is very little overlap amongst any of the micro cap managers. The two domestic equity managers that have the most overlap are the Barclays Global Investors S&P 400 Enhanced Index product and the Mellon Equity Extended (W4500 Index) product: they have 57 stocks in common, representing 32% of BGI's portfolio and 26% of Mellon's. Given the overlap in stocks between the Wilshire 4500 (a small-mid cap index) and the S&P 400 (a mid cap index) the holdings overlap would be expected. As noted above, PSERS manages its internal indexed portfolios to the various pieces of the S&P 1500 – the S&P 500, 400 and 600. An enhanced index product managed to the S&P 600 would not have the same overlap and PSERS might want to consider this option if a satisfactory product exists in the marketplace.

Recommendation
No recommendation necessary.

b. International Equity Structure

International equity exposure provides increased return opportunities and reduces total risk by diversifying the equity program. Funds that exclude international equity exposure risk missing certain return opportunities and the benefits of risk reduction through diversification.

PSERS Has a Well Diversified International Equity Portfolio

Table II-H-5 – International Equity Structure Recommendations of March 2005

Style	**Recommended Policy**	**Number of Managers**
Passive Core ACWI ex-US	5.0%	1
Active ACWI ex-US (Large Cap)	80.0%	7
Active Small Cap	7.5%	4
Emerging Markets	7.5%	2
Total	100.0%	14

As can be seen in Table II-H-5 above, the majority of PSERS' international equity portfolio is invested in large cap stocks from developed countries, with a smaller amount in small cap and emerging markets. The ACWI ex-US includes some, but not all, emerging markets that comprise approximately 10% of the total index. The benchmarks for the international small cap portfolio are the S&P/Citigroup Extended Market Index (EMI) World and Global ex-US benchmarks. The EMI World covers small cap in developed markets, and EMI Global also includes emerging markets (we understand that two managers are measured versus the developed benchmark and the others versus the global benchmark). Although there is some overlap with the ACWI ex-US benchmark, this dedicated international small cap portfolio should broaden the opportunity set for investing in the international equity markets significantly, the EMI index contains over 3000 stocks. The five managers in this area were funded in 2005.

As with the domestic equity portfolio, the total number of international equity managers appears high at first glance. However, PSERS has over $1 billion invested with each of the large cap ACWI ex-US managers and uses two specialist emerging markets managers for diversification. Five international small cap managers is on the high side, but given that this is a new program the System may be a bit cautious as well as the fact that these managers are generally capacity constrained at fairly low asset levels. Using 15 international managers is also in line with the average number of managers used by its public fund peers who invest in developed and emerging markets.

Recommendation
No recommendation necessary.

c. Fixed Income Structure

A well diversified fixed income portfolio should be invested across the various sectors of the fixed income market as well as in diversified security types and credit risk categories.

PSERS' Fixed Income Portfolio is Highly Diversified

As can be seen in the table below, the majority of PSERS' fixed income portfolio is invested with active core and "core plus" fixed income managers (who are typically given latitude to invest outside a benchmark such as the Lehman Aggregate in below investment grade securities, dollar denominated non-U.S. securities, etc.), with the remainder spread between high yield, TIPS and global fixed income.

Table II-H-6 – Fixed Income Structure Recommendations of March 2005

Style	Recommended Policy	Number of Managers
Passive	0.0%	0
Active Core	57.25%	6
High Yield	5.00%	1[124]
TIPS	22.75%	3
Global	15.00%	3
Developmental	NA	1
Total	100.0%	14

The high yield allocation was trimmed in 2005 from 10% to 5% of the portfolio, so it is no longer overweighted versus the total bond market[125], and one high yield manager was terminated. The number of active core fixed income managers appears large (6) as they all have substantial mandates ranging from $300 million with the newly hired manager, Western Asset Management (WAMCO) to over a billion dollars. We agree that using a relatively large number of managers can reduce risk and increase diversification, but it does increase monitoring responsibilities and may not be necessary in the core (or core plus) fixed income arena where all six of these portfolios have the same mandate. However, we understand that the managers are expected to offer diversification through their varying portfolio management techniques, and that PSERS' staff and the investment consultant have examined the correlation of returns among the portfolios and found that the Fund should experience diversification benefits. In addition, PSERS does not believe that they would experience any significant reduction in fees by cutting the number of managers.

124 W.R. Huff was terminated as a high yield bond manager on March 11, 2005.
125 For reference, U.S. Corporate High Yield bonds make up approximately 6% of the Lehman Universal Index.

Recommendation
No recommendation necessary.

PSERS has a significant allocation to Treasury Inflation Protected Securities (TIPS), approximately 23% of the fixed income portfolio, and 5% of the total Fund; these securities are often considered to be a distinct asset class and are not represented in the broad market bond indexes such as the Lehman Aggregate or the Lehman Universal. IFS concurs that TIPS are a sound investment for pension funds and PSERS has been proactive in this asset class. PSERS now diversifies its TIPS allocation further by investing in global inflation protected securities.

d. Private Equity and Real Estate Structure

Assets that are relatively illiquid and not traded on an exchange that provides objective, readily ascertainable prices are often known as "appraised assets." Such assets – including real estate and private equity – pose special risks, distinct from publicly traded securities. Because of these special risks, investors in appraised assets should adopt special investment policies and procedures to help structure and manage their portfolios of real estate and private equity. The real estate allocation does include some public securities, as can be seen in Table II-H-2 above, and we understand that REITS are used as a substitute for private real estate when necessary and funds to be invested in alternatives are held in publicly traded equities.

Recommendation
No recommendation necessary.

4. Active vs. Passive Management

a. Overview

The use of active versus passive investment management is a major issue for institutional investors. Active investment managers, through fundamental research, quantitative analysis or a combination of both, seek to build portfolios that provide a rate of return (after fees) in excess of an appropriate market benchmark. Passive managers, on the other hand, construct portfolios designed to track a market benchmark closely. Since they involve no active investment management decisions, passive portfolios are implemented at very little cost and require a much smaller staff.

Empirical research suggests that for developed, "efficient" markets, passive investing makes sense. Efficiency is the concept that market information disseminates so quickly that, in the absence of illegal insider information, no investor can achieve a greater than market return consistently over time. This leads to the premise that investing in such markets is a "zero-sum" game wherein for every winner, who beats the market, there must also be a loser. Research suggests that, over the long term, after investment-related fees and transaction costs are paid, the majority of investment managers are unlikely to provide added value over a passive portfolio. Nevertheless, many institutional investors still believe they can identify investment managers, or develop a team internally, with the active management skills necessary to provide above-benchmark performance.

b. Background

The debate among investment academics and practitioners whether active or passive portfolio investing is more effective has raged unsettled since the concept first arose. It is unlikely that a provable conclusion will ever be reached, but the question, when juxtaposed against particular portfolio objectives and risk preferences, is a valid one.

The concept of passive investing was created as a result of the development of indexes – sets of securities assembled for the purpose of generating a standard measure of market performance. Passive investing is the practice of creating and maintaining a portfolio that duplicates or replicates the index. Changes in mix and relative weights of securities in the portfolio are made only when the same changes are made in the index.

Active investing is any investment strategy in which securities are selected in an attempt to achieve a higher investment return. Thus changes are made in the portfolio when the investment manager believes they will generate more attractive returns.

The debate centers on whether active management can achieve a more attractive long term net return after costs than passive management. Passive management is clearly capable of achieving a return very close to the return of an index, with a degree of deviation (tracking error) from the index that is very small, as long as the index is investable. In addition, because stock selection in an index is provided to the manager at essentially no cost, and because management of the portfolio can be largely automated, fees on index investing are lower than fees on active investing in the same market.

In summary, the case for passive management includes the following arguments:

- Markets are inherently efficient. In an efficient market, prices adjust to their fair value almost immediately, so it is nearly impossible to invest in mispriced securities.

- While active managers outperform the market at some times, no active manager consistently outperforms the market forever. Active management requires vigilance to replace managers before they turn bad and lose whatever gains they have achieved, which is an impossible task.

- Even where managers can achieve a rate of return higher than the market, the higher fees and trading costs of active management consume the over performance.

In summary, the case for active management includes the following arguments:

- Markets are irrational, not efficient. Astute research can identify securities that are mispriced due to investors in the market who act emotionally.

- Discipline in identifying, buying and selling securities unemotionally can lead to higher returns than can be achieved by merely duplicating the index.

- Passive management can not reduce the volatility of returns, since it by definition matches the volatility of the market. Active management offers the opportunity to reduce risk as well as increase it in pursuit of higher return.

- Passive management cannot achieve the index return, since trading costs and friction in the portfolio (that are not in the index) diminish the results. Additional activity such as securities lending or derivative use, which increase costs, is needed to make up for the shortfall.

- Indexes are restructured either periodically (e.g., Russell) or continually (S&P) to reflect changes in security characteristics or existence. The process for recomposing indexes creates trading costs. More critically, the coordinated demand to buy securities being put into an index and to sell securities being taken out of an index affects prices adversely, while disguising the effect within the index return.

As discussed above, additional investment management risk is inherent with active management strategies over passive strategies. Using all passive management, however, would not allow an investor ever to achieve above market returns.

To varying degrees, institutional investors utilize passive management for at least a portion of their investment portfolios. The percentages of international and domestic equity assets of public plans over $5 billion invested passively and actively reported in the 2004 Greenwich Associates survey of pension funds are set forth in Table II-H-7 below.

Table II-H-7 : Active vs. Passive Public Fund Greenwich Associates 2004 Survey Averages

	% of Domestic Equities	% of International Equities
Passively Invested	56.25%	27.95%
Actively Invested	43.75%	72.05%

The percentages above suggest that many public funds believe domestic equity markets are fairly efficient, as represented by the fact that over 50% of the domestic equity portfolios are passively managed. Conversely, the data also suggest that public funds tend to believe greater value added can be achieved by actively managing portfolios of international equities, traded in less efficient markets, although on average they manage a significant portion passively.

There is no one correct amount of assets that should be actively or passively managed. However, as noted above, most large public pension funds use passive management for a significant portion of at least their domestic equity assets

Table II-H-8 below shows that PSERS' custom peer group invests almost half of their domestic equity allocation passively. The peers also use a fairly significant amount (approximately 31% and 14%, respectively) for both international developed market equities and domestic fixed income.

Table II-H-8	% of Domestic Equities	% of International Equities	% of Emerging Market Equity	% of Domestic Fixed Income	% of International Fixed Income
Passively Invested	47.6%	34.8%	3.9%	10.0%	4.3%
Actively Invested	52.4%	65.2%	96.1%	90.0%	95.7%

In addition, passive exposure can be achieved at very low cost (in many cases, less than five basis points). Incorporating the use of some passive equity investment funds helps reduce overall fees and the total costs of the Fund's investment program.

c. PSERS' Use of Passive and Active Management

PSERS Uses a Significant Amount of Passive Management in Domestic Equity, but Focuses on Active Management for International Equity and Fixed Income

- **Domestic Equity**

As noted above, PSERS uses a significant amount of passive management in its domestic equity portfolio: the policy calls for 62.5% passive, 27.5% enhanced index and 10% active. Although the amount passively invested is somewhat greater than most of its peers, PSERS follows a well thought out investment plan for its portfolio, utilizing active and enhanced strategies where they believe they can add the most alpha. PSERS internally manages three index funds corresponding to the S&P 500, S&P 400 and S&P 600 Indexes, covering the capitalization spectrum.

PSERS Takes a Progressive Approach to Its Large Cap Equity

In addition to the more common use of fixed income/derivative based enhanced index managers, PSERS has expanded its use of derivative based strategies with its Global Macro program. Given the lack of perceived inefficiencies in the large cap domestic equity market, and the subsequent inability to add significant value through traditional active management, it is appropriate for a large fund such as PSERS to pursue innovative strategies. The Global Macro program is relatively new and in the process of expanding from one manager to four (as of the drafting of this report). PSERS expects the program to add 40 basis points of alpha to the return of the total fund, which if it is successful, should help the Fund meet its actuarial rate of return.

Recommendation
No recommendation necessary.

- **International Equity**

PSERS uses a small amount of passive management in its international equity portfolio (5%), less than that used by its peers in the third party and custom surveys. The passive ACWI ex-US portfolio matched or outperformed the active large cap international equity managers over one and three years. Many of the current managers do not have a long performance history with the fund. Staff and the consultant should evaluate their international equity portfolio and consider passively managing a greater portion of it. We understand that as of the writing of this report, PSERS is exploring increasing the passively managed portion of the international equity allocation given the change by the MSCI ACWI ex-US to a free float index.

- **Fixed Income**

PSERS does not use any passive management for its fixed income portfolio. Five of the eight custom peer funds use at least a small amount of passive fixed income and the average passive allocation is approximately 10% of the asset class, as mentioned above. Passive exposure can be achieved at very low-cost, and provides broad fixed income market exposure; however many investors believe that it is easier to add value in the fixed income market place and more beneficial, or cost effective, to use active management for fixed income portfolios. IFS believes that passive fixed income can play a role in a well-diversified fixed income portfolio; however, we agree that at least the majority of a fixed income portfolio should be actively managed.

Recommendation IIH-1	PSERS Response
Consider using additional passive management for a portion of international equity and fixed income portfolios.	PSERS will consider this recommendation. It should be noted that with the MSCI movement to a free-float index, the MSCI ACWI ex. U.S. has become a more difficult index to beat on a consistent basis. Given this change in the index, PSERS has increased the passive percentage of non-U.S. equities from 5% to 30% of the non-U.S. equity allocation. Regarding fixed income, however, PSERS believes active management can consistently add value and has added value. Should the fixed income indexes become more efficient and difficult to beat, PSERS would consider moving assets to passive alternatives.

5. Internal vs. External Management

a. General Considerations

In determining whether and to what extent a public fund's assets are better managed internally (hiring employees to operate an investment operation) or externally (hiring professional investment management companies), several general considerations are essential. These include legal, cost, continuity and investment performance. We discuss each of these below as well as other advantages and disadvantages of internal management.

Legal – does applicable law prohibit hiring external managers, prohibit managing assets in house, or prohibit certain essential structures such as incentive compensation?

Cost – what is the relative cost for the particular asset class and overall, given the size of the portfolios? For example, passive management is less expensive to manage both internally and externally, the costs should be weighed.

Continuity – is the System able to retain experienced investment managers in-house? High turnover creates substantial investment risk for an internally managed portfolio.

Value achieved – what is the relative return? Have the internal portfolio managers beaten their benchmarks? How does their performance compare to their peers?

b. Advantages of Internal Management

There are several advantages to managing assets internally. These include:

- Internal management can be less costly. External managers must be compensated well to attract and retain highly qualified professionals, cover overhead for facilities that serve as well as portfolio management, and earn a profit, thus management fees are relatively high.

- There can be greater control over the investment process and compliance with guidelines. Monitoring compliance with external manager guidelines may be complex, and often can be done only after the fact, sometimes weeks after. Understanding the investment process may also be difficult.

- There can be greater control over trading and brokerage usage.

- At least for certain types of assets and strategies, the performance of external managers (net of all fees and expenses) is often disappointing relative to index returns. Internal management can reasonably be expected to do as well for these strategies, at least if properly structured and administered.

In addition, cost considerations may differ for a very large fund versus a smaller fund. As the value of fund assets increases, the possibilities of enjoying substantial economies of scale from internal management also increase. These economies may include:

- greater clout in negotiating and controlling transactions costs;
- lower unit costs for acquiring and maintaining investment hardware and software; and
- staffing costs and related matters.

c. Advantages of External Management

On the other hand, external management has its advantages. Given the limited resources often faced by many public pension funds, their ability to attract and retain qualified professional investment staff with the skills necessary to manage assets is typically frustrated.

- Lower compensation at public funds may lead to higher turnover, especially among the most qualified professionals. Proven investment managers can command large compensation packages in the private sector and be lured away from public funds.
- The pension fund must still pay the many costs of investment management firms that are fixed or largely fixed, requiring a sizable asset base to maintain cost competitiveness. These include salaries and support systems: internal asset

management requires sufficient securities processing, order management/routing systems, trade entry systems and overall investment accounting systems.

- Staff needs are significant, particularly for asset classes requiring significant hands on management such as directly owned real estate.

- Greater direct control by the Board over the investment process may expose the Board to greater fiduciary risk as well as create the potential for political interference. Effectively controlling an internal asset management department requires significant internal discipline and organization, including proper separation of functions and internal controls, e.g., portfolio management versus measurement and evaluation, and portfolio management (front office) versus accounting and settlement (back office). Tighter ethical controls may also be needed for concerns such as personal trading policies.

- All asset classes, sub classes, types of securities, and geographic locations can be covered by external management.

- Replacement of a poorly performing external manager, or one whose firm structure, focus or staffing has changed, is relatively easy, and bears little risk of wrongful discharge suits, whereas it can be difficult to terminate an internal investment manager.

- Most investment managers are subject to regulation and oversight by the SEC and various security exchanges.

- An external manager relationship can be clearly and precisely crafted through a commercial contract with the manager.

The vast majority of assets managed internally by public pension funds appear to be publicly traded domestic stocks and bonds – relatively traditional and straightforward assets, traded in relatively efficient markets. By contrast, strategies or assets that require more esoteric expertise or research, with substantial prospects of materially outperforming (or underperforming) the relevant benchmarks often are better managed externally. One example would be a portfolio of equities of companies in emerging international markets, which may require unusual research, including foreign travel. Another example would be a portfolio of equities of fast-growing, newly formed companies with low capitalization, where very prompt, specialized information and delicate trading strategies may be essential to success. In that instance, purchased research may be insufficiently timely, detailed or insightful, while the cost of a capable, in-house staff may be prohibitive.

Another possible hazard of internal management is homogenization, i.e., the dominance of a single investment discipline running across all parts of the fund. By contrast, outside management by distinct firms may help diversify a fund's overall investment program through a true diversity of investment disciplines.

d. PSERS' Use of Internal Management

Given its Resources, PSERS Uses an Appropriate Amount of Internal Management

PSERS' current stated goal is to manage approximately one-third of its investments internally and two-thirds externally. Including investments in domestic and international equity and fixed income, the total managed internally as of June 30. 2005 was approximately 32.9% - or very close to the one-third goal. This compares to an average of approximately 32% of its custom peer group managed internally. In addition, of those peers who use internal management, the majority of them use active internal management. For domestic equity, approximately 63% of the internally managed assets are actively managed, while 67% of the developed market international equity assets are internally and actively managed. Almost 100% of the internally managed fixed income assets are actively managed. Only a few peer funds internally manage international fixed income and emerging markets equity and they use virtually 100% active management.

- **Domestic Equity**

As can be seen in the tables above, PSERS manages three domestic equity index portfolios internally and one enhanced S&P 500 index portfolio internally (by the fixed income staff), totaling approximately 66.5% of the domestic equity portfolio. In addition, PSERS employs two external enhanced S&P 500 Index managers as well as a variety of active small and mid cap managers. On average, the custom peer group manages 37% of its domestic equity internally.

Since the equity assets managed internally are designed to track the benchmarks very closely, there is little room for significant outperformance. The incentive for staff to outperform the passive benchmarks comes through the Equity Substitution program. Staff is measured on a risk adjusted return basis to qualify for incentive compensation. The PSERS staff has added a marginal amount of value over the index returns for all of its passively managed portfolios.

We believe it is appropriate for a large fund such as PSERS to continue to manage its passive and enhanced domestic equity assets internally.

Recommendation
No recommendation necessary.

- **International Equity**

PSERS only manages a small portion of its international equity portfolio internally – the passive component that makes up approximately 5% of the asset class. Given the additional resources required for active international equity management, for items such as research and international travel, managing only the passive portion of the asset class internally makes sense for PSERS. On average, the custom peer group manages approximately 20% of their international developed markets equity internally and 7% of their emerging markets equity internally (of those who use that asset class).

Recommendation
No recommendation necessary.

- **Fixed Income Equity**

PSERS takes a more active approach to its internal management of fixed income than to its management of equities. PSERS' fixed income personnel manage the S&P 500 Enhanced Index portfolio as well as an active core portfolio and a domestic TIPS portfolio. They manage approximately 18% of the fixed income asset class internally – 21% of the core fixed income and 35% of the TIPS portfolio. The internally managed core portfolio has beaten its benchmark, as well as some of the external managers, over the short and longer-terms. The PSERS' TIPS portfolio has also performed favorably for the one-year history of the product. The PSERS' Enhanced S&P 500 portfolio has beaten the S&P 500 over shorter and longer timeframes, but lags its peers over the five-year timeframe.

We believe it is appropriate for a large fund such as PSERS to continue to manage a portion of its fixed income assets internally. The custom peer group manages an average of 53% of their domestic fixed income internally and 21% of their developed market international fixed income internally (of those who use that asset class). One area it could potentially expand its internal management is in cash (or STIF investments), however additional personnel and technological resources would be required. PSERS would need to conduct an analysis to see whether or not this would be cost effective. Approximately two-thirds of the peers manage all or most of their cash and equivalents internally as well.

Recommendation
No recommendation necessary.

II-I. Trust and Custody Arrangements

1. Background

Custody banking services are provided to SERS and PSERS under a master custody agreement dated as of November 2, 1998 between the Commonwealth of Pennsylvania, acting by and through its Treasury Department as Custodian for the assets of various funds of the Commonwealth and Mellon Bank, N.A., based in Pittsburgh. The original term of the agreement was five years and has since been extended by two one-year terms. The current custody term expires on December 31, 2005, although we understand that the contract is being renegotiated.

Mellon was selected based on its response to a competitive bidding process (RFP) for master custody, securities settlement and safekeeping, and securities lending services for seven state funds, including SERS and PSERS. A subsequent amendment added four more state funds to the agreement.

The Pennsylvania State Treasurer Selects the Custody Bank for Numerous State Funds, Including SERS and PSERS

The current custody relationship whereby the elected State Treasurer is the statutory custodian for the retirement system assets has worked well so far in that past State Treasurers have not made frequent or uninformed changes in selection of the custody bank. However, in any situation where the selection authority is not vested in the Boards and/or managements of the pension systems, but rather with an elected official, there is a potential danger that future custodian changes might not be driven by an objective to improve the quality and breadth of services received or by the cash and productivity costs of effecting the changes.

A Bank's Status as a Top-tier Global Custodian and its Capability to Excel at the Work Should Remain the Basis for Selection and Retention as Custody Bank for the Retirement Systems Going Forward

Pension master trust and custody is a highly systems intensive business that requires continual investment in hardware, software, communications systems and personnel. As the need to automate the process has increased, dozens of major regional banks have limited their services to the low volume, limited reporting needs of local personal and corporate trusts. In addition global investment activities require operational relationships to provide custody and clearing services outside the United States. Only about six or seven U.S. banks have made the strategic decision and continue to make the investment to develop and maintain a competitive position in this market and attract the volume of business necessary to support it.

Changing Custodial Banks is Costly in Time, Disruption, and Money

Changing custodian banks is a very complex and expensive process. Putting aside the cost of selecting and contracting with a new custody bank, the logistics of moving securities, records, receivables, data, reporting, controlling and monitoring processes, securities loans, sub-custody agreements, communications links to investment managers, brokers, sponsors, beneficiaries, and hundreds of other large and small relationships are immensely complicated. Costs incurred include actual transactions and change of registration costs, data transfer and reformatting, many hours of staff time, and weeks if not months of dual processing and maintaining access to records.

Even when moving from one top tier custody bank to another, where both have highly sophisticated recordkeeping systems, transition is an enormously complex task. Custody is largely a network of highly automated, tightly controlled communications and reporting systems. Not only electronic links, but interpersonal relationships among the fund, the investment managers, the brokers, and the governmental and private agencies that hold securities must be working flawlessly to avoid trade fails and other loss of value.

Given that the visible and hidden costs of transitioning from one custodian to another are easily hundreds of thousands of dollars, most institutional investors change custodians infrequently and only for material cause. Going forward, SERS' and PSERS' operational concerns should continue to be reflected in custody decisions and they should use, if at all possible, the negotiating leverage afforded by the securities lending program to achieve their desired objectives regarding selection of the custodian. We understand that the Systems are given an opportunity to perform due diligence on any new custodian candidate and to consider the expense required to transition and recreate systems and controls before it is selected. Ultimately however, the State Treasurer makes the decision.

Recommendation III-1	PSERS Response
Although SERS and PSERS have no direct authority over the bank custody selection, we recommend that they exert whatever effort is reasonable to have the explicit and hidden costs of custody conversion factored into the decision on replacing or retaining Mellon as the Commonwealth's master custody bank.	PSERS agrees and will endeavor to implement this recommendation. In fact, information to this effect has already been shared with and accepted by the Treasury Department.

Mellon Appears to Provide All Services Required By the Custody Agreement

Table II-I-1: Custody Bank Level of Service

Service Required by Contract	Service Provided by Mellon	Observations on Mellon's Level of Service
Settlement, receipt, delivery, exchange of securities	X X	Provides adequate domestic and international services in these areas. Custody Management System offers on-line, real time security movement and control for internal bank operations. Maintains daily communication with investment managers.
Corporate actions; proxy support	X	Provides automated corporate actions processing on ex-date[126], based on trade date position.
Securities lending	X	Provides a diversified program, which lends governments, equities, corporate bonds, and international securities to 67 borrowers in 25 countries.
Settle real property and leasehold investments	X	None
Settle futures and other derivatives	X	Has its own f/x[127] desk if needed by the funds investment managers.
Appoint sub-custodians	X	Maintains a subcustodian network in 78 markets.
Safekeeping	X	▪ Maintains memberships in industry depositaries and clearing organizations. ▪ Has a security clearing agency in NYC to handle physical exchange of securities. ▪ Has vaults in its Pittsburgh and Boston offices.
Income, dividend and other proceeds collection	X	Provides adequate domestic and international services in these areas
Price securities at fair market value	X	Provides adequate domestic and international services in these areas.
Provide periodic account statements	X	Provides integrated international and domestic accounting reports in real time from the custody management system.

[126] Date on or after which the security trades without the associated action
[127] Foreign exchange

In addition to the services required by contract, Mellon also provides or makes available the following services to SERS and PSERS:

- Performance Measurement and Analytics (Russell/Mellon)
- Internet/Electronic Information Delivery (Workbench)
- Compliance Monitoring (Investment Monitor)
- Training and Education

Mellon also provides benefit disbursement services to various Commonwealth funds in the form of expense payments and other non periodic payments. However, Mellon does not issue periodic benefit payments to retirees and beneficiaries on behalf of PSERS and SERS.

Mellon Clearing Trades for Investment Managers Presents a Potential Conflict

Mellon also provides clearance and settlement (back office) functions for some investment management firms. To the extent that Mellon receives revenues from investment management firms that also manage money for PSERS a potential conflict of interest exists because Mellon also provides back office and account reconciliation services for the System. In such cases, where Mellon's interests could be in conflict with the System's interests, full disclosure is in order.

Recommendation III-2	PSERS Response
Mellon should disclose any such relationship to the System that involves clearing for investment managers that manage money for the System. Such disclosure should include the nature of services provided, revenues received, and controls in place to mitigate conflicts.	PSERS agrees and will endeavor to implement this recommendation in conjunction with the Treasury Department.

2. Cash Management

We reviewed Mellon's cash sweeping procedures that include:

- A daily projection and determination of cash inflows and requirements for settlement of transactions for each account.

- A monthly summary report of all daily cash transfers to or from the accounts prepared and transmitted (to SERS and PSERS and the Investment Managers), as part of the monthly account statements.

- A daily sweep of all funds received into the accounts subsequent to cutoff into the Mellon Short Term Investment Account ("STIF") for the purpose of investing such funds overnight.

- A monthly summary report of all the daily cash transfers to or from the Bank's STIF prepared and transmitted to SERS and PSERS.

We understand that in October 2005 the State Treasurer assumed responsibility for cash management and the investment of cash swept nightly from the accounts.

3. Securities Lending

The SERS and PSERS Securities Lending Programs Contain the Essential Activities and Elements that We Expect to See

The SERS and PSERS securities lending programs are managed by the custody bank, Mellon, as Lending Agent. Its essential features and elements include:

- Global securities lending capabilities
- Significant critical mass to attract borrowers and maintain viability
- A thorough borrower selection, approval and monitoring process
- Sophisticated electronic securities lending and support systems
- Adequate internal control systems
- Dedicated securities lending desk
- Equitable allocation of lending opportunities
- Comprehensive reporting capabilities

The Borrower Approval and Review Process Appears Reasonable and Adequate

Mellon initiates its examination of each borrower prior to approval for the securities lending program to ensure that it lends to the most creditworthy borrowers. The approval process and subsequent establishment of credit limits involves the client relationship officer, credit approval officers, and its global securities lending officers according to the following steps:

- Initial credit analysis performed by the domestic or international financial institutions groups within the Mellon Institutional Banking Department. A proprietary credit rating system is utilized to establish an internal rating of the borrower. A specific credit limit is then recommended.

- A credit approval officer, within the Risk Management Department considers the borrower's overall relationship with Mellon (as well as Mellon's exposure to the borrower), and approves, modifies or denies the recommended credit limit.

- Final approval of the borrower is given by a Global Securities Lending committee of Mellon. The committee includes the Risk Management Department credit approval officers and the senior corporate risk manager of the securities lending business line.

- Quarterly meetings are held to review the full list of borrowers.

- Borrower credit limits are hard-coded into the lending system to provide compliance at the time of the loan.

Each approved borrower is monitored by Mellon's Institutional Banking credit officers, who are in regular contact with the borrowers. The credit relationship officers access public rating services and other external sources for information related to borrowers' credit standing. Domestic borrowers are required to submit financial statements each quarter. (Semi-annual financial statements are required for international borrowers.) Credit limits are also reviewed quarterly by the Global Securities Lending Credit Committee.

Mellon has the ability to remove a borrower from its approved list based upon a request from the pension fund. PSERS and SERS have not imposed any modifications to the list of borrowers. This is typical with clients where Mellon is offering borrower default indemnification. (Please see our report section below on indemnification.)

Securities on Loan can be Recalled Timely for Voting and Settlement Purposes

We understand that Mellon works closely with SERS and PSERS to identify in advance securities which will be voted. In such instances, Mellon will restrict the lending of those securities. If a security is on loan prior to Mellon being notified of the Fund's desire to vote the proxy, it will take a best efforts approach to recall the loan prior to record date. We understand that when a securities transaction fails because the securities are on loan, Mellon's securities lending unit will be notified automatically and re-allocate or re-call the securities.

Securities Lending Program Policies and Guidelines of the State Treasurer and Mellon Appear to Provide Sufficient Protection Against Risks

a. Securities Lending Risks

Table II-I-2: Securities Lending Risks

Primary Risks	Mitigating Factor(s)
Insufficient collateral	▪ Required levels of collateral exceed initial market value of loaned securities (102% domestic;105% international) ▪ Collateral is marked to market daily
Borrower default	▪ Lending agent screens banks for creditworthiness ▪ SERS & PSERS are contractually indemnified by the bank against borrower default
Collateral investment fails to earn its expected return	Mellon applies the specified investment guidelines for the collateral pool.
Collateral investment loses value	Mellon employs on-going credit monitoring and oversight and invests in securities with ratings that are within the specified credit guidelines. Guidelines provide for very short duration and very high quality.

Criteria Utilized for Reinvestment of Cash Collateral Appear to Meet Established Objectives

The State Treasurer has established these primary objectives for the management of cash collateral supporting securities loans:

- Safeguard principal;
- Assure all cash collateral is invested in a timely manner;
- Maintain a diversified portfolio of investments;
- Maintain adequate liquidity to meet the anticipated maturities of security loans; and
- Consistent with the objectives, to optimize the spread between the collateral earnings and the rebate rate paid to the borrower of securities.

b. Collateral Investment Side Risks

Collateral on loans for SERS and PSERS is separately managed in a collateral investment account for the Commonwealth. Mellon applies the State Treasurer's general and specific investment guidelines and employs a generally conservative investment approach, e.g., preserving principal by investing in high-quality, short-term instruments; providing ample market liquidity by keeping the average maturity of the investment pool very short, currently only 30 days; and earning a yield sufficient to cover the rebate obligation to the borrower.[128]

[128] Mellon's securities lending reports to management as of April 30, 2005 indicated a weighted average maturity for the portfolio of 27 days and a yield of 2.99%.

Mellon also hard-codes[129] the State Treasurer's investment guidelines to provide compliance at point-of-entry[130] of the investment. In addition, Mellon employs on-going credit monitoring and oversight within a dedicated Credit Research group, which is independent of the securities lending and collateral investment functions. There is also a dedicated oversight committee of management to monitor the collateral investment process, strategy, and compliance areas. Detailed guidelines for the investment of cash and non-cash collateral are attached to and incorporated into the Securities Lending Authorization.

Indemnification Offered by Mellon to SERS and PSERS is Typical of that Available to the Larger Lending Institutions

Mellon indemnifies the State Treasurer against two areas of potential loss as follows:

1. Operational Errors

   Mellon indemnifies and agrees to defend and hold harmless the State Treasurer and SERS' and PSERS' accounts, and each of their respective employees, officers, Boards against all claims, suits, actions, liabilities, losses and costs resulting from the negligence or intentional misconduct in its administration of the securities lending program or the performance of its obligations.[131]

2. Borrower Default

   Mellon indemnifies the State Treasurer for any loss resulting from Borrower default to the extent that it shall (i) at its expense promptly replace the loaned securities, or any portion thereof, not so returned with other securities of the same issuer, class, and denomination and with the same dividend rights and other economic benefits as such securities possessed at the close of business on the date as of which the loaned

[129] The guideline is programmed into the computer system to prevent manual calculation errors.
[130] Non compliant trades would be rejected before execution.

securities should have been returned, or (ii) if it is unable to purchase such securities on the open market, credit the Funds with the market value of such unreturned loaned securities.[132]

The Securities Lending Fee Split is Favorable and Competitive

The fee split between Treasury and Mellon is 86/14. Considering that Mellon offers the indemnifications discussed above, for which some funds typically accept a less favorable fee split, the current fee arrangement for securities lending is very favorable and highly competitive for Treasury (and the Systems).

Mellon's Securities Lending System Appears to Allocate Lending Opportunities Equitably

Lending opportunities fall into a trading queue that uses an automated mathematical algorithm to allocate them to a lender. Queue order is determined by ranking a lender based on a comparison of its "entitlement" to its actual loans. The queue is rebuilt nightly, taking into consideration the loans and the securities holdings of all lenders in the program.

Lendable securities become part of a "pool." Each lender's security within the pool is assigned a "priority level" depending upon the country, class, and security type. The priority level determines each pool's placement within the lending queue. To allocate a loan, the queue is scanned from the highest priority pool to progressively lower priority pools until a loan is fully allocated.

[131] Securities Lending Authorization. November 2, 1998
[132] ibid

The automated algorithm awards "credits" that represent the ability of each lender to fulfill an outstanding loan. The credits take into account all outstanding loans in which the lender currently participates. A lender receives credits if they could have taken part in a loan, but were not selected to do so because the loan was filled prior to the lender moving to the top of the queue. The loan is allocated from the top of the queue, splitting the quantity among multiple lenders if the first cannot accommodate the entire loan.

Custody Services are Provided under a Flat Fee for All Accounts of the Commonwealth

Mellon receives a flat $500,000 custodial fee from the Commonwealth of Pennsylvania which includes PSERS and SERS. The fee is allocated to the Systems and funds by Treasury on the basis of assets in custody. PSERS' share of the fee was $302,355 for 2004.

While the flat fee arrangement is reasonable based on the magnitude of assets under custody and services provided, evaluation of the overall custody services must include the fees earned by Mellon for loaning the Funds' securities.

The Income Derived from the Securities Lending Program and the Fee Arrangement is Reasonable Compared to Other Public Funds

All collateral is managed by Mellon. Mellon does not charge the Commonwealth additional fees to maintain a separately managed collateral pool. While there may be performance differences based on the specified investment guidelines and liquidity requirements and resultant level of acceptable risk in the collateral investment portfolio when compared to other similar investment vehicles, the income and fee arrangement appears reasonable when compared to other public funds.

Table II-I-3: Securities Lending Revenue

Net Securities Lending Revenue Break Point	Split to Custodian	Split to State Treasurer	Income from Securities Lending July 1, 2004 to June 30, 2005[133]	
			To SERS	To PSERS
$0 to $18,000,000	0%	100%	$10.1 million	$16.1 million
$18,000,001 to $33,000,000	20%	80%		
$33,000,001 and up	10%	90%		

Total net securities lending income earned by Treasury after fees for the fiscal year ending June 2005 was approximately $28.2 million. Mellon's net total fee from the securities lending program was approximately $4.5 million. SERS' and PSERS' net total revenues from the securities lending program were approximately $10.1 million and $16.1 million, respectively.

Recommendation
No recommendation necessary.

[133] Rounded to nearest $100,000

II-J. Fiduciary Liability Insurance

1. Background

Fiduciary liability insurance provides a source of compensation to a pension fund which has suffered losses due to a breach of fiduciary duty by the fund's trustees or staff. Absent such insurance, a fund's ability to recover such losses is limited by the extent of the personal net worth of the breaching fiduciaries. Fiduciary liability insurance also protects the breaching trustee or staff member from personal exposure to such losses by permitting the insured fiduciary to purchase, for a nominal annual premium as low as $25, a "waiver of recourse." Under a waiver of recourse rider, the insurance company waives its right to assert a claim against the fiduciary to recover any amount the carrier pays to the fund on account of a claim arising out of the fiduciary's breaches. Finally, fiduciary liability insurance typically provides coverage for the legal fees and expenses that will be incurred in defending a claim for breach of fiduciary duty.

Notwithstanding that fiduciary liability insurance provides these benefits to individual trustees and staff, it has become accepted within the industry to recognize that the protection that such insurance provides to the fund itself renders the cost of such insurance a legitimate expense for the fund to incur.[134] Of course, the decision concerning whether to use fund assets to purchase such insurance, and at what cost, is a matter of discretionary judgment, subject to the same standards of prudence as other decisions regarding the use of fund assets. Attached as Exhibit G is a list IFS obtained from an insurance broker in 2003 of nine public employee retirement systems of varying sizes in terms of assets, showing the amount of private fiduciary liability insurance coverage each has purchased.

Two alternatives to fiduciary liability insurance available to a public pension fund typically exist. One is to rely on any statutory indemnification which the governing jurisdiction

[134] See, e.g., ERISA Sec. 410(b) and UMPERSA Sec. 11(c).

provides to its officials. Because the source of that indemnification is the applicable governmental unit's general treasury, it resembles private insurance in that it is a source of recovery other than the public pension fund itself. However such indemnification policies are often vaguely written, or exclude certain claims or defense costs, which can render the coverage incomplete. In addition, the decision whether to provide coverage under the statutory indemnity is generally made by the chief legal officer of the governmental unit (e.g., the attorney general) who inherently has a conflict in that he or she is the lawyer for the entity that will have to fund the losses. The second alternative is for the pension fund to self-insure. While self-insurance has the advantage of avoiding the expense of premiums to a private insurance carrier, it also means that the fund is foregoing any prospect of recovering its losses from a third party.

Some of the factors relevant to a public fund board's consideration of whether to obtain third party fiduciary liability insurance coverage include the following:

- The nature of the fund's investment program, in terms of the overall riskiness of the program and the riskiness of particular asset classes,

- The extent to which assets are managed externally by managers with substantial assets and/or their own insurance coverage,

- The scope of any sovereign immunity defense immunizing board members and staff from liability,

- The extent to which trustees and staff believe that a statutory indemnity protects them from liability,

- The cost of premiums for private insurance versus the amount of coverage and the nature of the exclusions from coverage under a proposed insurance policy,

- The financial strength of the private insurance carriers from whom insurance is available, and

- Whether trustees and staff are empowered to select their own legal counsel under the insurance policy, the statutory indemnification or any self-insurance the pension fund itself provides.

PSERS Self-Insures for Breaches of Fiduciary Liability

Effective January 1, 2004, the PSERS Board amended Article VII of the Bylaws to provide that PSERS will indemnify current or former Board members and designees and PSERS' officers and employees (including attorneys assigned to PSERS by the Office of General Counsel) (each, an "Indemnitee" or a "Covered Party") "for all actions taken by such Indemnitee and for all failures to take action . . . to the fullest extent permitted by Pennsylvania law. . . ."[135] Prior to the amendment, the Bylaws had provided for indemnification for Board members by the Commonwealth under Chapter 39 of the Commonwealth Executive Board Regulations. Under that regime, the Office of General Counsel decided whether, and to what extent, the Commonwealth would indemnify particular claims. In addition, PSERS had purchased fiduciary liability insurance coverage.

Under the amended Bylaws, indemnification is not available "where the act or failure to act giving rise to the claim for indemnification is determined by a court to have constituted criminal conduct, willful misconduct or recklessness." The indemnification includes coverage for defense costs, which are to be advanced if the Indemnitee agrees to refund the advances if it is determined that the Indemnitee was not entitled to indemnification. The indemnification is limited to $25 million, and outside counsel has been selected and engaged by PSERS pursuant to the Commonwealth Attorneys Act as "Standing Counsel" to advise on issues of coverage under the indemnification policy and to defend claims covered under the policy.

[135] Bylaws Sec. 7.1(a), as amended by PSERS Board Resolution 2003-59, Dec. 11, 2003.

Section 7.1(e) of the Bylaws permits PSERS to either self insure or purchase insurance to insure its indemnification obligations. PSERS has decided to self-insure the $25 million indemnification obligation, and adopted a "Coverage Memorandum" setting forth the terms of that self-insurance.[136] The Coverage Memorandum waives recourse against Covered Parties. We understand that the principal reasons that the Board adopted the indemnification policy and self-insurance were the following:

- The high, and increasing, cost of purchasing private fiduciary liability insurance coverage,[137]

- Disputes with the private insurance carrier regarding coverage for the litigation with the Auditor General,

- The availability of sovereign immunity to most possible claims for breach of fiduciary duty,

- The fact that since PSERS benefits are effectively guaranteed by the Commonwealth, exposure to suits by PSERS' members for investment losses are perceived to be unlikely, and

- The Board's preference that issues concerning the availability for indemnification of a particular claim be decided by counsel other than the Office of General Counsel.

[136] PSERS Board Resolution 2003-60, Dec. 11, 2003.
[137] The premium for the last private fiduciary liability insurance policy PSERS had was $510,000 and it was subject to a deductible of $200,000.

The terms of Article VII of the Bylaws and the Coverage Memorandum provide a level of coverage for Covered Parties that compares favorably with the terms generally available from private insurance carriers, and which appears to be broader than the coverage previously provided by the Commonwealth. Because the Board has elected to provide the coverage by self-insurance, however, the Board has effectively decided not to seek an institutional source of recovery for losses caused by breaches of fiduciary duty.[138] It appears that the Board made this decision based on an informed evaluation of the relevant facts. However as developments in the law continue, and changes in the insurance market manifest themselves in either new products for public funds or better pricing, it would be wise for the Board to revisit the issue periodically to determine whether new circumstances suggest a different approach. In this regard, we note that the Coverage Memorandum, establishing the self-insurance program, provides that it may be terminated (prospectively only, of course) by the Board at any time.

Recommendation IIJ-1	PSERS Response
The Board should periodically (i.e., at least every two years) review its policy of self-insuring its indemnification obligation under Article VII of the Bylaws.	The Board agrees and will endeavor to implement this recommendation.

[138] SERS could conceivably assert a claim directly against a breaching Board member, but its right to recovery would be limited to the personal assets of a Board member available to satisfy a court judgment and any personal insurance the Board member carried that might cover such claims.

II-K. Innovative Practices

1. Background – Innovative Practices in General

Innovative practices are typically investment approaches that are sufficiently new or different as to not be widely accepted as mainstream strategies. The fundamental objectives of investing are to achieve an attractive return within the limits of acceptable risk over appropriate measurement periods. For an innovative practice to be a desirable one, it should bear a reasonable probability of increasing return relative to its own specific risk and/or to the whole portfolio risk.

A century ago pension funds were invested almost entirely in bonds; stock investments were considered innovative. Later, stocks became commonplace, but often only pre-approved stocks meeting particular criteria, such as paying a dividend. Yesterday's innovative investment practices are today's list of generally accepted practices. Using the whole portfolio theory approach to risk and return, as well as following the prudent investor standard, has led to investing in publicly traded stocks and bonds (both domestic and international), investing in certain types of equity real estate and mortgages, securities lending, and other activities becoming common and best practices.

For purposes of this review, and as outlined in the scope of work, we will consider innovative practices to include investments of all types in illiquid securities, i.e., assets not traded on an exchange that provides objective, readily ascertainable prices (often known as "appraised assets"), investments in properties and strategies using derivatives.

2. Reasons to Pursue Innovative Practices

Each additional investment in a portfolio adds an incremental degree of return and risk to the total portfolio, which can be positive or negative. Return is additive; the return of the portfolio is the weighted average of the returns of its components. Risk, defined as variability of returns or the degree to which long term average returns fluctuate over short periods (e.g., standard deviation), is a complex concept because variability of two instruments can moderate one another or can amplify one another. The degree to which two instruments move similarly to one another is measured by their correlation. When two instruments tend to move in the same direction in response to particular economic events, they tend to change value in the same direction at the same time, and so the combination of the two movements is additive (i.e., positive correlation). When they react differently to particular events, they tend to change value in opposite directions, so they tend to offset one another (i.e., negative correlation). Correlation is statistically measured between pairs of investments and can be used to calculate the variability of portfolios holding different mixes of investments. Correlations range from positive 1.0 to negative 1.0, with 1.0 signifying perfect correlation.

Innovative investment strategies exhibit two characteristics that are generally favorable to the total fund's investment characteristics: higher expected performance than traditional classes of investments and a correlation that generally reduces total portfolio variability. Innovative investment strategies may, however, have higher individual variability, liquidity, and investment risks. In constructing a portfolio, including innovative investment strategies along with traditional publicly traded stocks and bonds generally results in a total portfolio with a higher expected rate of return and a lower overall expected standard deviation or variability.

3. PSERS' Use of Innovative Practices Investments

PSERS Uses a Significant Amount of Innovative Investment Practices

PSERS' investment program has a long history of significant allocation to both real estate and private equity markets. Both asset classes are managed in one department within the investment office under a single Alternative Investment Managing Director. They retain different specialty consultants for each asset class.

Over the past dozen years the allocation target to real estate has increased from five percent to seven percent. This is consistent with the investment exposure reported by the eight funds responding to our custom peer group survey in this area, which averaged 5.0 for equity real estate plus 1.5% for REITS, with the highest total real estate exposure reported at 9.4%.

PSERS' target allocation to private equity has increased from 2% to 11%. The significant growth in private equity can be partly attributed to the significant increase in use of that asset class by pension funds generally and by public pension funds in particular in recent years. Seven of the eight custom peer group public funds reported investing in private equity, averaging 6.7% and 7.1% for all alternatives, excluding real estate.

An additional factor affecting PSERS' significant use of real estate and private equity is the total Fund return hurdle they to strive to meet – 8.50%. Given current generally accepted return and risk expectations for publicly traded stocks and bonds, it is necessary to include additional innovative asset classes in an attempt to meet or exceed the 8.50% at a reasonable risk level. Including higher than typical allocations to real estate and private equity allows the fund to construct a portfolio with a higher target return and a reasonable level of variability or risk.

PSERS also uses portable alpha strategies in two ways. In short, the way that PSERS uses portable alpha is to gain market (or "beta") exposure through a passive instrument, such as

S&P 500 Index futures and invest the cash collateral in an "alpha" (or excess return) generating strategy. The alpha is "ported" onto the beta exposure. One strategy used by PSERS is for enhanced S&P 500 Index exposure through a short-term fixed income portfolio. The alpha is the returns generated over the costs necessary to manage the S&P 500 futures overlay account. PSERS uses two external managers with similar strategies and also manages a portfolio in-house. We discuss PSERS' second use of portable alpha through global macro managers below.

A very detailed and extensive investment policy statement sets forth the guidelines, objectives and restrictions on the portfolio as a whole and on its various asset classes and special types on investments.

Recommendation
No recommendation necessary.

a. PSERS' Real Estate Program

PSERS has a Broadly Diversified Real Estate Program

PSERS' real estate program is fairly typical for a large public fund. It is broadly diversified and uses a combination of strategies and investment vehicles. Prior to 1997 the real estate portfolio was focused primarily on return or yield. This more conservative strategy is sometimes referred to as "core," and its investments are in fully developed, fully leased properties that provide a bond-like return and a degree of inflation protection. The typical mechanism to invest in such strategies is large, open end real estate funds, many of which are managed by insurance companies. Another approach to core, income-focused real estate investments are REITS, or Real Estate Investment Trusts, which invest in portfolios of income producing real estate and are publicly traded similar to common equity instruments.

The PSERS real estate strategic plan today is balanced between return focused and opportunistic strategies. Opportunistic strategies are more diverse than conservative, return focused core strategies and include value-add strategies and opportunity investments. Value-add strategies are properties that can significantly benefit from upgrading: combinations of physical renovation and improvement as well as aggressive leasing activities. Increased value is generated through capitalization of the higher rent rolls. Opportunity investments tend to be more developmentally oriented than value-add, such as land development or redevelopment, conversion to different use, major rebuilding and similar investments that add value to a property prior to achieving a capitalized rent roll.

PSERS' allocation is currently 30 percent core, 30 percent value, and 40 percent opportunity. The core investment portfolio includes three REIT managers (as of June 30, 2005 REITS made up approximately 26% of the allocation to real estate). We understand that PSERS has used the large allocation in part as a temporary measure until it can invest in additional open-end funds – it allows them a liquid vehicle when it is difficult to find partnerships.

Equity real estate investments by institutional funds are effected in three fundamental ways: direct ownership and management of individual properties, open end commingled funds, and closed end limited partnerships or similar structures.

- **Direct Investments**

PSERS is in the process of liquidating its direct property investments, e.g., where PSERS directly owns an office building or other real estate holding. We understand that PSERS had a direct investment program that was shut down in 1995. This strategy is very staff and labor intensive. While it is fairly common for very large pension funds such as PSERS to own real estate directly, either through a separate account or managed by staff, it should depend on the goals of the program and even large funds can have difficulty achieving reasonable diversification. Such investments can also bear risks of loss greater than the investment or even the market value of the property, and so should be carried within legal structures that can isolate the risk and protect other fund assets.

- **Open End Funds**

Open end commingled funds tend to be managed by large financial institutions and hold many properties and many investors. Investors buy into and out of these funds on a periodic basis, although there are typically limits on investor liquidity. They may have geographical, property type, or other focus, or may be broadly diversified across the entire market. Most core investments are available through these funds, because they essentially have an infinite life that is commensurate with the long holding periods for core investments. PSERS also has some of its value strategies invested through open end funds. Since these funds have an infinite life, PSERS can evaluate funds as its need arises and invest immediately or get in the "queue."

- **Closed End Funds**

Closed end funds are normally structured as limited partnerships. These investment vehicles are organized by real estate investors who, as an entity, are the general partner. They raise funds from institutional investors who become limited partners. Some of the limited partners function as an advisory board for the ongoing investment vehicle. The finite life of these partnerships makes them an appropriate means to invest in value-add and opportunistic strategies. The manager acquires properties for the purpose of making the value added changes and selling the property to a core investor. Since these funds are open for a limited time, PSERS must evaluate them as they come to the market place.

Overall, we find PSERS' real estate program to be well managed and constructed and appropriate for their overall investment program.

Recommendation
No recommendation necessary.

b. PSERS' Private Equity Program

PSERS has a Well Diversified Private Equity Program

PSERS' private equity allocation is aggressive on a total Fund basis at 11% of the total portfolio, but it is conservative in the funds and investments selected. The investments included in the portfolio tend toward the more straightforward, less risky approaches.

Private equity originally referred to stocks in companies not publicly traded or thinly traded in less liquid markets such as the old "pink sheets." PSERS uses private equity to refer to its program of alternate securities investing (non real estate.) The strategy is limited to true private equity – untraded or thinly traded stocks – in U.S. and non-U.S. companies, plus distressed debt and some mezzanine debt. A broader definition of private equity typically includes both venture capital – stock issued by a company very early in its development, often before initial product launch – and later stage equity issued as a company begins to grow. Distressed debt is bonds issued by a company that is in financial difficulty. The debt is typically bought at a deep discount in the hopes that on reorganization the bondholders will recover more in settlement than the market price anticipates. Mezzanine debt is loans to relatively new companies, generally to finance growth between the initial equity and the initial public offering. It frequently carries a high coupon and attached stock warrants that can acquire significant value if the company has a successful IPO and subsequent growth.

In these types of investments managers typically require a total commitment of funds, but draw down the funds over a period of months or years. PSERS measures its exposure by the value invested, not including committed but undrawn cash. This is a reasonable approach, as it measures the true economic exposure at any point in time.

The program also includes PSERS' investment in the Development Fund, which focuses on hiring new, emerging public equity managers located in Pennsylvania and minority and women owned businesses located in or outside Pennsylvania. Such firms that become successful may take a mainstream investment manager role in the portfolio. Two such managers, Emerald and Longwood, have done so. Managers' ability to move up to a mainstream role is based on need as well as performance. An asset class such as large cap actively managed domestic equity may be used in the Development Fund, but would not be able to graduate into the main fund because that asset class is not managed externally there.

The private equity program does not include a number of more aggressive, mathematically complex, and often derivatively based strategies that have also become known under the generic hedge fund heading. Thus the investments included in the private equity strategy are those that typically carry the probability of a somewhat higher return with a moderately higher risk, and not those that are esoteric and offer the possibility of a very high return with a very high risk.

i. Implementation of PSERS' Private Equity Program

PSERS' investments are through limited partnerships, as is nearly universal with these types of alternative investment programs. The identification and due diligence process required for a direct investment program is unwieldy for a pension fund. A limited partnership program requires an identification and due diligence process characterized by two constraints, in addition to the typical organizational and investment based decision factors.

The first constraint PSERS has established is a set of financial prerequisites that a general partner has to agree to before PSERS will consider making an investment. This requirement is enforceable, because the total size of PSERS' investment gives it the leverage to convince general partners that it is in their interest to so structure the partnership. Sometimes the requirements are effectuated through modifying the partnership structure; sometimes by creating a parallel partnership. The requirements are:

- Minimum general partner investment of 5% (10% of parallel fund).
- General partner takes first losses.
- Fund returns 100% before general partner shares in gains.
- General partner distributions except management fees and taxes are escrowed until limited partners recover their investment.

The other constraint is regulatory. A dilemma has developed between private equity limited partnerships whose investment activities may be impaired by premature disclosure of holdings and public funds that may be legally required to disclose investment details under Freedom of Information Act (FOIA) requirements. A number of managers with successful track records will not accept public fund investors where disclosure might jeopardize their programs. A number of public pension funds have been successful in obtaining changes to their sunshine laws to exempt this information from the disclosure requirements. We understand an act to provide a degree of confidentiality is under consideration in the Pennsylvania legislature.

PSERS' access is restricted to the largest, most successful, and most widely known funds due to the second constraint coupled with smaller less widely known funds absence of an investing history. As a result, PSERS' focus has been on identifying newer, smaller firms. As demand for private equity grows, finding quality opportunities with sufficient levels of expected return is an increasing challenge, particularly for venture capital strategies which institutional investors have aggressively sought.

The process of qualifying a general partner and a partnership follows a thorough investigation by staff and consultant including meetings with the fund management both at PSERS' and the general partner's offices. The consultant is required to disclose its history with the fund and any other potential conflicts. The Board makes final approval based on a personal presentation supported by a combination of publicly disclosed and proprietary documents. Each year PSERS invests in a small number of totally new relationships plus later generation funds by general partners with whom they have previously invested. The due diligence on the former is more extensive and in depth.

PSERS is highly fee sensitive in selecting private investments, and is often in a position to negotiate the fee structure as typically one of the largest investors. In the ideal structure the base management fee covers the partnership expenses and the general partners' profit comes solely from the incentive fees.

ii. PSERS' Private Equity Program Controls

PSERS' control over private equity partnerships is largely focused on maintaining membership and active participation in the partnership advisory boards, as discussed below. Portfolio Advisors, PSERS' alternatives consultant, maintains the primary performance recordkeeping data and generates quarterly IRR[139] based return reports. Wilshire includes performance on a time weighted basis in its more comprehensive performance reporting. In addition, PSERS subscribes to *private i®*[140]software to calculate IRR returns.

Capital calls are approved by compliance relative to the contractual commitment. Manager fees are recalculated before payment. Incentive fees are not specifically recalculated, except to the extent that partnership advisory boards typically review how they are done.

Although investment ideas may come from a variety of internal and external sources, the process through which a manager is evaluated provides a tight control over unqualified investments being funded. All of the staff, CIO and consultant have to agree before a

[139] Internal rate of return or dollar weighted rate of return.
[140] Private i® is a database application developed by The Burgiss Group that allows an investor to track, measure and report on complex private equity investments.

recommendation is made to the Board. In practice, unqualified investments do not get past staff review.

Recommendation
No recommendation necessary.

c. Private Equity and Real Estate Concerns

PSERS' Staff is Stretched Thin

Overall PSERS is managing its private equity and real estate programs in a well organized and disciplined manner, although additional staff resources may be necessary if it continues to sit on all advisory boards. PSERS participates in the advisory board of almost every limited partnership in which it invests. Although this provides an unparalleled opportunity to keep on top of the fund's and the general partner's activities it is extremely time consuming and requires extensive use of staff. Advisory board members receive more detailed information on valuation and valuation processes, fee calculations, and other activities that affect the value of the investment. The contact through an advisory board with other limited partners is helpful in maintaining awareness of market developments and opportunities. It is also an effective means of identifying which general partners are candidates for future investments and, more importantly, which are not.

In addition, we have a minor concern over the verification of performance based fees in both private equity and real estate limited partnerships, although in general this appears to be adequately controlled.

Recommendation IIK-1	PSERS Response
To the extent possible, negotiate advisory board rights to obtain independent verification of the performance based fee calculations in all future partnerships, and internally verify the calculation to partnership terms and published values.	PSERS agrees and will endeavor to implement this recommendation.

d. Global Macro Program

PSERS has Expanded its Use of Portable Alpha to Generate Additional Return

At the time of our interviews, PSERS was in the process of implementing a program to generate an excess return above stock index returns, called global macro. The concept is based on the belief that the domestic, large-cap equity market is too efficient to generate attractive net returns above the index and in order to achieve alpha one must look to more aggressive less correlated strategies. For this strategy, the global macro managers are expected to generate alpha over the S&P 500 Index exposure, which is derived through an S&P 500 futures overlay account managed internally by staff. Global macro managers can invest in any number of strategies; they aim to profit from changes in global economies, typically brought about by shifts in government policy which impact interest rates, in turn affecting currency, stock, and bond markets. They will participate in all major markets – equities, bonds, currencies and commodities – though not always at the same time and can use leverage and derivatives to accentuate the impact of market moves. They may also utilize hedging, but leveraged directional bets tend to make the largest impact on performance.

At the time of our interviews, PSERS had hired three global macro managers with different expected tracking error[141], ranging from 15 to 20%.[142] The more aggressive managers

[141] Tracking error is the standard deviation of a portfolio's return relative to a benchmark.
[142] As discussed earlier, we understand that a fourth manager has been hired.

will have a larger tracking error and the potential for earning a higher alpha. It is a measure of the amount of active risk in a portfolio. The tracking error is used to estimate the amount of excess return or alpha the manager will generate. PSERS calculated the managers' portfolio weightings so that they will be equally weighted on a risk-adjusted basis and achieve the same amount of alpha. In other words, the riskier managers received a smaller weighting. The total program is slated to total $2 billion and be a 10% allocation within the large cap equity portfolio. The allocation is expected to boost total fund performance by 40 basis points.

This type of strategy, although innovative, is quickly gaining significant popularity. According to a recent JPMorgan Asset Management survey of 118 pension funds, 24% have implemented at least one portable alpha portfolio and 31% are considering using the strategy. According to the 2005-2006 Russell Investment Group Survey on Alternative Investing by institutional investors, 23% currently use portable alpha and 44% are considering using it.[143]

In addition, the global macro strategy may introduce risks into the system that could include derivatives exposure as well as the open-ended "alpha" or excess return strategy investments.

Recommendation
No recommendation necessary.

[143] Pensions & Investments, "Slaking the thirst for portable alpha" Crain Communications: November 14, 2005.

II-L. Proxy Voting

1. Background – the Role of Proxy Voting

In the 1980's, corporate governance took on greater significance as control over some companies turned on shareholder responses to hostile takeover bids (in the form of director elections, resolutions to end "poison pills" and other anti-takeover defenses). It became increasingly common for shareholders to be asked to override decisions by corporate boards and to set a new course for companies, particularly those that had performed poorly or who possessed significant untapped assets. Previously, many shareholders had paid little attention to proxy issues and assumed that corporate boards could be counted on to make decisions in the best interests of both management and shareholders. That assumption began to change dramatically in the 1990's.

Institutional shareholders and pension fund trustees were put on notice of the importance of proxy voting in February 1988 when the U.S. Department of Labor published a letter to Helmuth Fandl, Chairman of the Retirement Board of Avon Products. Known subsequently as the "Avon Letter," the DOL stated that proxies were plan assets that should be managed with the same care and prudence as other plan assets. Proxies could not be ignored and how they were voted mattered. The Avon Letter was primarily concerned with process and fiduciary duty and it did not take a view on how proxy voting might itself enhance shareholder value. In July 1994, the DOL took the argument a step further in Interpretative Bulletin 94.2 when it stated that "plan fiduciaries should make proxy voting decisions with a view to enhancing the value of the shares of stock, taking into account the period over which the plan expects to hold such shares."[144] With this regulatory action, the debate shifted from *whether* proxy voting had any value to *how* shareholders could best manage that value.

In the 1990's, empirical evidence demonstrated a clear connection between shareholder rights and economic value. Writing in 2001, economists from Harvard, Wharton and the National Bureau of Economic Research found that "firms with weaker shareholder rights earned significantly lower returns, were valued lower, had poorer operating performance, and engaged in greater capital expenditure and takeover activity."[145] Other studies found "statistically significant improvement in operating profitability and share returns after [publicly traded companies] become the focus of shareholder activism."[146]

Today, most large public employee pension funds have written policies that state the fund's positions on a number of common corporate governance issues. Many have staff devoted to tracking the fund's holdings and coordinating the voting process, whether the voting decisions are made by investment managers, fund staff or third party specialist firms. The most active funds meet together regularly to discuss their responses to shareholder resolutions and to consider ways in which they can promote shareholder value through the corporate governance process. The most significant forum for these discussions is the Council of Institutional Investors (CII).

2. Elements of an Effective Proxy Voting Program

Institutional investors fulfill their proxy voting responsibilities in various ways. Most assign the responsibility to collect, evaluate, and vote proxies to their equity investment managers (with each manager responsible for the proxies associated with the holdings in the manager's portfolio). Other funds delegate proxy voting tasks to internal staff of the fund and provide their staff with sufficient resources to accomplish the job. An increasing number hire a "third party" specialist firm to collect, evaluate, and vote proxies, and they transfer that

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[144] U.S. Department of Labor, Pension and Welfare Benefits Administration, Interpretative Bulletin 94.2, 29 CFR Part 2509, July 21, 1994.
[145] Gompers, Ishii, and Metrick, "Corporate Governance and Equity Prices," National Bureau of Economic Research Working Paper 8449, published August 2001.
[146] International Foundation of Employee Benefit Plans, Investment Policy Guidebook for Trustees, Fifth Edition, 2005, page 133.

responsibility from the investment managers to the specialist firm. Regardless of how this responsibility is assigned, the Board of Directors or Trustees of the Fund must determine which party is responsible for setting the policies that will guide the Fund's proxy voting program.

Those institutional investors that adopt the first approach described above typically rely on the investment managers to provide a proxy voting policy (of the managers' own devising) and other times they direct the managers to follow the fund's specific proxy voting guidelines. Although virtually all registered investment advisors have established proxy voting policies to guide their firms' decisions, the details of those policies vary widely. Some have thorough policies that discuss in detail the types of proxy resolutions that are encountered in the corporate world and the general outlines of the managers' response. Others have policies that merely state that they will follow the recommendations of the management of the company owned in the portfolio. Some investment managers take proxy voting very seriously, devote appropriate staff and resources, take an independent perspective on the resolutions that are presented to shareholders, and provide their clients with detailed reports on the votes cast. Other managers are much less rigorous in their commitment to this responsibility, and the reports they provide can be lacking in the detail needed for the client to assess how the manager discharged its duty.

Relying on the investment managers is inexpensive and operationally easy for an institutional investor, but it carries governance risks. First, each manager may have different policies on a given issue (like executive compensation, classified boards, and anti-takeover provisions). These policies may be inconsistent with one another. Second, if two managers hold shares in the same company, the client's proxies may be voted differently on a resolution before that company's shareholders. Third, the managers are likely to report their proxy votes in different formats and time periods, making it difficult for the fund to consolidate, compare and review the totality of the fund's proxy votes. The evolution of institutional practices with respect to proxy voting has gone beyond reliance on investment managers, and this approach is not considered to be best practices in pension fund management.

Use of fund staff or a third party specialist both have the disadvantage of somewhat greater costs, but they also both have the virtue of consolidating the fund's proxy voting and creating greater consistency in the votes cast. While these approaches allow the directors of a fund greater control over the program, they also carry their own governance and operational risks. The work involved in tracking a fund's equity holdings and collecting the correct proxies is substantial. Specialized research is required to evaluate proxy resolutions and to reach an appropriate decision on how individual votes should be cast. Since corporate annual meetings tend to cluster in the second calendar quarter of each year, a huge volume of information floods through the system in a short amount of time and the decisions required are all time-sensitive. Organizing and supervising the work of internal staff has the usual management risks. Use of an external specialist creates the need for oversight and regular operational review. However these risks are manageable and well within the ability of most large funds. Best practices for large pension funds have developed in a direction that combines some participation by internal fund staff with outside sources of research, proxy tracking and the mechanics of voting.

No matter what approach is employed to undertake the mechanics of proxy voting, directors retain the responsibility to set a policy that:

- Is motivated by an informed perspective on how shareholders can contribute to the governance of corporations;

- Anticipates many of the complex issues that populate the proxies of major corporations today; and

- Recognizes the differences between the accounting and corporate governance regimes in the United States and other countries.

Specifically, a comprehensive proxy voting policy should articulate the fund's philosophy on issues including:

- Election of directors and the balance between insiders and independent directors;
- Methods of shareholder voting, such as cumulative voting, confidential voting, and super-majority requirements;
- Opportunities for shareholder initiatives;
- Composition of the board and compensation of directors;
- Anti-takeover provisions;
- The role of the CEO on a company's board;
- Executive compensation, use of stock options, and performance standards;
- Expensing of stock options;
- Increases in the amount of common stock issued; and
- Reincorporation.

Among public employee funds, it is not uncommon for a fund's proxy voting policy to include positions on issues such as:

- Corporate environmental practices, CERES Principles[147], and climate change;

[147] Created in 1989 by the Coalition for Environmentally Responsible Economies, the CERES Principles (formerly known as the Valdez Principles) are broad standards for evaluating corporate activity and useful for investors seeking to measure a corporation's commitment to sustainable environmental practices.

- Production of tobacco products;
- Affirmative action in the workplace;
- Investment and business operations in Northern Ireland; and
- International labor standards.

Best practices indicate that a fund's proxy voting policy should be in written form, specific with respect to the most frequent types of corporate governance resolutions, and regularly reviewed by the board or trustees. To the extent that the fund has equity holdings in companies located outside of the United States, the fund should have a proxy voting policy that is tailored to the different issues that are presented to shareholders who invest in foreign companies.

3. PSERS' Proxy Voting Program

PSERS' Proxy Voting Program is Comprehensive and Well Documented

PSERS' proxy voting program is comprehensive and well documented. It combines the use of internal staff and a nationally recognized third party proxy voting firm. Elements of PSERS' program include the following:

- At the time of our due diligence, PSERS employed a highly skilled specialist, Institutional Shareholder Services ("ISS"), to provide research, policy advice, proxy collection and tracking, and voting operations.[148]

- ISS is the largest provider of proxy research and advisory services in the U.S. It has a large research staff devoted to tracking proxy resolutions, company financial and operating data, and the corporate governance activities of other investors. Its research is widely used in the investment community by institutional investors and investment managers. ISS also provides software systems to enable investors to track the proxies associated with their holdings and to analyze the issues.

- The PSERS Board has adopted proxy voting policies, one for U.S. equities and one for international equities, that rely on the standard guidelines recommended and used by ISS. The Board has also adopted a shorter list of exceptions to the ISS policy, covering social and environmental resolutions, management proposals to reincorporate in another state, and business operations in Northern Ireland.

- PSERS has assigned responsibility for monitoring the proxy voting program to one of its senior managers. Because this manager has a number of other significant responsibilities related to risk measurement and compliance, he relies heavily on the work of ISS and the Fund delegates substantial responsibility to ISS.

- PSERS' staff reviews the analysis of ISS on domestic equities before any votes are cast (via use of ISS' Proxy Master system).

- ISS provides reports to PSERS that are detailed and that include commentary on every vote cast.

- PSERS' staff does not monitor proxies associated with non-U.S. holdings.

[148] PSERS hired Glass Lewis on January 1, 2006 to provide these services.

- The Board reorganized its Corporate Governance Committee in 2005. This Committee had not, at the time of our interviews, undertaken a formal review the proxy policies and program.

For the most part, PSERS' proxy voting program represents best practices, and in one respect, it goes beyond best practices. The PSERS website includes a section, accessible to the public that displays PSERS' proxy voting policies and the votes cast on the Fund's behalf in the previous year. This represents a remarkable and commendable degree of transparency by the Fund. PSERS relies on ISS to build and maintain this website and database, representing a higher level of service by ISS than we have seen elsewhere.

Recommendations IIL-1 and IIL-2	PSERS Response
The Board's Corporate Governance Committee should undertake a formal review of the proxy policies and program on a regular basis.	The Board agrees and will endeavor to implement this recommendation. Indeed, since being reconstituted, PSERS Corporate Governance Committee has annually approved the domestic and international proxy policies that are in place. PSERS plans on continuing the annual review of the proxy policies by the Corporate Governance Committee going forward.
The Board should consider enhancing its ability to monitor international proxies (to a level consistent with its domestic proxy program) by assigning additional internal staff time.	PSERS will consider this recommendation and weigh the cost/benefit of increased attention to international proxies.

II-M. Disaster Recovery Planning

1. Background

Disaster recovery planning is essential for the System because of its mission and purpose to provide benefits for members without interruption. A Disaster Recovery Plan (DRP) should consist of comprehensive written documentation that details practical steps employees must take in the event of a disaster and in order to bring operations back online.

The DRP should extend to the entire organization not only to the IT functions. While some components of the DRP may be the responsibility of the Commonwealth, other components are the responsibility of the System. The ultimate responsibility for creation, maintenance, coordination, and testing of a formal written DRP remains with the System. The DRP should be tested periodically.

PSERS has a Well Thought-Out Business Continuity Plan

PSERS has an overall written business continuity plan. The business continuity plan for PSERS' investments is more critical than the plan for SERS investments since PSERS has a significant amount of internally managed portfolios. We commend the System for the development of the plan and for its ongoing efforts to improve and test it.

PSERS has established a solid policy regarding business continuity that mandates that safeguards shall exist to minimize the risk, cost, and duration of disruption to its business functions in the event of damage to, failure of, loss of, corruption of, or discontinuation of any component of PSERS' information resources and/or business processes. The policy lays the foundation for development of the plan.

PSERS makes the important distinction between business processes and information technology, and includes both in its recovery policy and procedures. Organizations often think only of the restoration of information technology resources when it comes to planning for recovery. PSERS' policy statement and plans address the business processes as well. PSERS' policy also requires that contingency processes and procedures must be established to restore data and information, computer systems, software, applications, and business processes if a disruption of PSERS' business should occur.

PSERS has taken a team approach to the business continuity plan that incorporates virtually every aspect of its business and most every employee. The plan includes various disaster scenarios, with action plans, flow diagrams, call lists, vendor contact information, and step by step procedures that identify the person or alternate responsible for the step. PSERS has also identified a Regional Office as an alternate location if SERS becomes inaccessible.

SERS and PSERS have Reciprocal Agreements to Assist each Other in the Event of a Disaster

SERS and PSERS have agreed in writing to provide each other with limited computers and work space in the event of a disaster. While PSERS' plan is clear that the SERS building will be the command center during a disaster, the plan does not mention the reciprocal agreement or include it as an appendix to the plan. Additionally, the benefit of their mutual agreement would be lost if, because of their proximity to each other, both Systems are affected by the same disaster. In that case other steps would have to be implemented.

In the event of a disaster, the plan requires the investments team leader (the CIO) to report to the designated command center or alternate location to coordinate recovery. The primary methodology is for the Fixed Income, Trading, and Alternative Investments groups to work from home computers to perform required investment activities. However, earlier in the plan, other locations (ITG and Bear Stearns) are identified for Trading.

We understand that PSERS' IT staff work with their Office of Administration Office of Information Technology counterparts to establish required specifications, exchange/update contact information to facilitate communication during an emergency, and jointly plan and execute tests of IT disaster recovery. That said, we are unsure whether the investment areas have been tested and with what results.

PSERS has stated that it would be affected by a loss of the Commonwealth's Data PowerHouse site since critical applications would become unavailable until it was restored or reconstituted at an alternate site. Should such a loss occur, PSERS is prepared to restore backups and recover its applications at its N. 5th Street facility.

Recommendations IIM-1 and IIM-2	PSERS Response
The Investment portion of the business recovery plan should be tested.	PSERS agrees and will endeavor to implement this recommendation.
Different disaster scenarios, such as loss of Commonwealth's Data PowerHouse, etc., should be addressed in the detailed recovery steps.	PSERS agrees and will endeavor to implement this recommendation.

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