Table A.3: Private Equity Benchmarks 2017

Plan (2017)	Private Equity Benchmarks 2017			
Arizona SRS	Russell 2000 Index			
Georgia Teachers	Not Applicable			
Illinois Teachers	Russell 3000 Index + 3%			
Iowa PERS	Custom Benchamark			
LA County ERS	Private Equity Return			
Oregon PERS	Russell 3000 Index + 300 bps			
PSERS Mix of Standard & Poor's MLP Index for MLP and Burgiss Med Year Weighted Index for Alternative Investments				
SERS	Russell 3000 Index + 3%			
South Dakota RS	Custom Benchamark			
Virgina RS	Custom Benchamark			
New Mexico Education	ona Cambridge Associates US All PE (1 Qtr Lag)			

Source: Individual Peer Fund 2017 Comprehensive Annual Financial Reports (CAFR)

Table A.4: Hedge Funds Benchmarks 2017

Plan (2017)	Hedge Funds Benchmarks 2017			
Arizona SRS	Custom Benchmark			
Georgia Teachers	Not Applicable			
Illinois Teachers	BoA Merrill Lynch 91 Day Treausry Bill Index + 4.0%			
Iowa PERS	Custom Benchmark			
LA County ERS	Custom Benchmark			
Oregon PERS	Russell 3000			
PSERS	Three month LIBOR +3.50%			
SERS	Hedge Fund Custom Benchmark			
South Dakota RS	Not Applicable			
Virgina RS	Custom Benchmark			
New Mexico Educatio	ona GAA/Risk Parity Custom Index			

Source: Individual Peer Fund 2017 Comprehensive Annual Financial Reports (CAFR)

Table A.5: Commodities Benchmarks 2017

Plan (2017)	Commodities Benchmarks 2017			
Arizona SRS	Bloomberg Commodity Index			
Georgia Teachers	Not Applicable			
Illinois Teachers	CPI + 5%			
Iowa PERS	Not Applicable			
LA County ERS	Bloomberg Commodity Index			
Oregon PERS	CPI + 400bps			
PSERS	Bloomberg Commodity Gold Index (37.5%) and the Bloomberg Commodity Index (62.5%).			
SERS	Not Applicable			
South Dakota RS	Not Applicable			
Virgina RS	Not Applicable			
New Mexico Education	na CPI +4%			

Source: Individual Peer Fund 2017 Comprehensive Annual Financial Reports (CAFR)

Table A.6: Real Estate Benchmarks

Plan (2017)	Real Estate Benchmarks 2017			
Arizona SRS	NFI ODCE Index			
Georgia Teachers	Not Applicable			
Illinois Teachers	NCREIF Property Index			
Iowa PERS	Not Applicable			
LA County ERS	ODCE + 40 bps			
Oregon PERS	Custom Benchmark			
PSERS	Custom Benchmark			
SERS	Custom Benchmark			
South Dakota RS	MSCI US REIT Index multiplied by 120% less 20% of the Citi US Three-Month Treasury-Bill Index (2017)			
Virgina RS	Custom Benchmark			
New Mexico Education	ona NCREIF Property Index			

Source: Individual Peer Fund 2017 Comprehensive Annual Financial Reports (CAFR)

Table A.7: Cash Benchmarks 2017

Plan (2017)	Cash Benchmarks 2017				
Arizona SRS	Not Applicable				
Georgia Teachers	Not Applicable				
Illinois Teachers	Not Applicable				
Iowa PERS	US Treasury Bills				
LA County ERS	Citigroup 6-Month T-Bill Index				
Oregon PERS	Not Applicable				
PSERS	Not Applicable				
SERS	BofA ML 3 Month US TBill Index				
South Dakota RS	Not Applicable				
Virgina RS	Not Applicable				
New Mexico Education	ona 91 Day T Bills				

Source: Individual Peer Fund 2017 Comprehensive Annual Financial Reports (CAFR)

APPENDIX 2: Section 3 United States Security and Exchange Commission (SEC) Fines for Private Investment Firms

The SEC has fined private equity firms for inappropriate fee charges and manipulating charges.

- (1) Oppenheimer & Co. November 2012 \$2,800,000
 - (a) Oppenheimer misled investors by manipulating the valuation of a fund by enhancing performance measurements.²
- (2) Kohlberg Kravis & Roberts (KKR) August 2013 \$30,000,000
 - (a) KKR was charged for disclosure violations, misallocating fees, and failing to implement a compliance program.³
- (3) Blackstone Group January 2014 \$39,000,000
 - (a) Three private equity fund advisors accelerated monitoring fees for personal benefit without informing investors.⁴
- (4) Fenway Partners LLC February 2014 \$10,000,000
 - (a) Fenway partners failed to disclose that portfolio company assets were used to pay former employees and an affiliate and failed to provide management fee offsets.⁵
- (5) WL Ross & Co. September 2014 \$2,300,000
 - (a) WL Ross failed to disclose how they calculated fees, leading to some investors paying up to \$10 million in unnecessary management fees.⁶
- (6) Apollo Global Management LLC April 2015 \$52,700,000

² "SEC Charges Former Oppenheimer Private Equity Fund Manager with Misleading Investors about Valuation and Performance." SEC Emblem. August 20, 2013. Accessed March 24, 2018. https://www.sec.gov/news/press-release/2013-160-sec-charges-former-oppenheimer-private-equity-fund-mana.

³ https://www.sec.gov/news/pressrelease/2015-131.html

⁴ "Blackstone Charged With Disclosure Failures." SEC Emblem. October 07, 2015. Accessed March 24, 2018. https://www.sec.gov/news/pressrelease/2015-235.html.

^{5 &}quot;SEC Charges Private Equity Firm and Four Executives With Failing to Disclose Conflicts of Interest." SEC Emblem. November 03, 2015. Accessed March 24, 2018. https://www.sec.gov/news/pressrelease/2015-250.html.

^{6 &}quot;SEC Fines Wilbur Ross Firm \$2.3 Million over Fees." Reuters. August 24, 2016. Accessed March 24, 2018. https://www.reuters.com/article/us-wlross-sec/sec-fines-wilbur-ross-firm-2-3-million-over-fees-idUSKCN10Z2YJ.

- (a) Apollo was fined for misleading clients about fee disclosures and failed to prevent a senior partner from charging personal expenses to clients.⁷
- (7) TPG Capital June 2015 \$13,000,000
 - (a) TPG was to pay a \$3 million fine and \$9.8 million disgorgement for misleading disclosures about fees to investors and accelerating fees.⁸
- (8) Resources Planning Group Inc. October 2015
 - (a) RPG was charged for raising more than \$1.3 million by misrepresenting the Midwest Opportunity Fund as a viable private equity fund that could offer high returns and failed to tell investors about the fund's poor financial condition or that their money was being used to repay personal MOF promissory notes.⁹
- (9) Blackstreet Capital Management November 2015 \$3,100,000
 - (a) Blackstreet Capital Management and Murr N. Gunty (owner) performed inhouse brokerage services and charged fees without registering and committed other securities law violations.¹⁰
- (10) Clean Energy Capital LLC November 2015
 - (a) Clean Energy Capital LLC was charged for improperly paying more than \$3 million of the firm's expenses by using assets from 19 private equity funds that invest in private ethanol production plants.¹¹
- (11) Alpha Titans LLC November 2015 \$700,000

⁷ "SEC Fines Private-equity Firm Where Bayh Works Record \$53M," Indianapolis Business Journal | IBJ.com. Accessed March 24, 2018. https://www.ibj.com/articles/60085-sec-fines-private-equity-firm-where-bayh-works-record-53m.

⁸ Robinson, Matt. "TPG to Pay \$13 Million Over SEC Allegations It Misled Investors." Bloomberg.com. December 21, 2017. Accessed March 24, 2018. https://www.bloomberg.com/news/articles/2017-12-21/tpg-to-pay-13-million-over-sec-allegations-it-misled-investors.

⁹ "Resources Planning Group, Inc., Et Al.: Release. No. LR-22548 / November 29, 2012." SEC.gov. November 29, 2012. Accessed March 24, 2018. https://www.sec.gov/litigation/litreleases/2012/lr22548.htm.

^{10 &}quot;SEC: Private Equity Fund Adviser Acted As Unregistered Broker." SEC Emblem. June 01, 2016.
Accessed March 24, 2018. https://www.sec.gov/news/pressrelease/2016-100.html.

¹¹ "SEC Announces Charges Against Arizona-Based Private Equity Fund Manager in Expense Misallocation Scheme." SEC Emblem. February 25, 2014. Accessed March 24, 2018. https://www.sec.gov/news/press-release/2014-41.

- (a) Alpha Titans LLC and two executives were charged for improper allocations of fund assets to pay undisclosed operating expenses around \$450,000 in expenses.¹²
- (12) Lincolnshire Management November 2015 \$2,300,000
 - (a) Lincolnshire Management was charged with breaching its fiduciary duty to a pair of private equity funds by sharing expenses between a company in one's portfolio and a company in the other's portfolio in a manner that improperly benefited one fund over the other.¹³
- (13) Camelot Acquisitions Secondary Opportunities Management, LLC June 2016
 - (a) CASO Management was charged for engaging in a fraudulent scheme of misappropriating \$9.3 million in fund assets, disadvantaging investors, and elevating its own interests above those of the fund they advised.¹⁴
- (14) Cherokee Investment Partners, LLC August 2016
 - (a) Cherokee Investment Partners is a private equity fund advisor that manages two private equity real estate funds; they were charged for the improper allocation by these two fund advisers to client funds of certain consulting, legal, and compliance-related expenses incurred based on their standing as registered investment advisers.¹⁵
- (15) Potomac Asset Management Company August 2016 \$300,000
 - (a) PAMCO was charged for improperly charging \$2.2 million in fees and expenses to two private equity fund clients.¹⁶
- (16) Capital Dynamics, Inc. September 2016 \$275,000

¹² "SEC Charges Santa Barbara-Based Hedge Fund Firm, Executives, and Auditor for Improper Expense Allocations." SEC Emblem. April 29, 2015. Accessed March 24, 2018. https://www.sec.gov/news/pressrelease/2015-76.html.

¹³ "SEC Charges New York-Based Private Equity Fund Adviser With Misallocation Of Portfolio Company Expenses." SEC Emblem. September 22, 2014. Accessed March 24, 2018. https://www.sec.gov/news/press-release/2014-205.

¹⁴ https://www.sec.gov/litigation/complaints/2014/comp-pr2014-19.pdf

¹⁵ https://www.sec.gov/litigation/admin/2015/ia-4258.pdf

¹⁶ https://www.sec.gov/litigation/admin/2017/ia-4766.pdf

- (a) Capital Dynamics was charged for the improper allocation of certain expenses to private equity fund client; CDI caused the Solar Fund to pay for over \$1 million in legal, hiring, and consulting expenses.¹⁷
- (17) Cranshire Capital Advisors, LLC December 2016 \$250,000
 - (a) Cranshire was charged for inappropriately charging expenses to its fund clients and failing to adopt and implement certain compliance policies and procedures.¹⁸
- (18) First Reserve Management, LP July 2017 \$3,500,000
 - (a) First Reserve was charged for failing to disclose certain fees and expenses of two entities and charging certain premiums for a liability insurance policy.¹⁹
- (19) Paramount Group Real Estate Advisor LLC August 2017 \$250,000
 - (a) Paramount was charged for failing to cause Paramount Residential Development Fund to reimburse Fund III for development expenses. Paramount failed to seek approval from Fund II.²⁰
- (20) Platinum Equity Capital Partners, LP September 2017 \$2,000,000
 - (a) Platinum was charged for incurring out-of-pocket fees, costs, and expenses from investing \$5.3 billion in 85 companies.²¹
- (21) Platinum Partners NYC September 2017
 - (a) Platinum Partners was charged with conducting a fraudulent scheme to inflate asset values and illicitly move investor money to cover losses and liquidity problems.²²
- (22) JH Partners, LLC December 2017 \$225,000
 - (a) JHP was charged for failing to disclose potential conflicts of interests when loaning approximately \$62 million to portfolio companies to provide interim financing for working capital or other urgent cash needs.²³

¹⁷ https://www.sec.gov/litigation/admin/2017/ia-4746.pdf

¹⁸ https://www.sec.gov/litigation/admin/2015/ia-4277.pdf

¹⁹ https://www.sec.gov/litigation/admin/2016/ia-4529.pdf

²⁰ https://www.sec.gov/litigation/admin/2017/ia-4726.pdf

²¹ https://www.sec.gov/litigation/admin/2017/ia-4772.pdf

²² "SEC Charges Platinum Funds and Founder With Defrauding Investors." SEC Emblem. December 19, 2016. Accessed March 24, 2018. https://www.sec.gov/news/pressrelease/2016-267.html.

²³ https://www.sec.gov/litigation/admin/2015/ia-4276.pdf

Recommendations

Upon review of the work of the Consultant, as represented in these chapters, the Commission makes the following recommendations.

Performance and Asset Allocation

- We recommend that each fund revisit and reconsider its asset allocation in light of the findings in the consultant report as to past risk-adjusted and relative performance of the current models.
- At SERS, we recommend that such a reconsideration focus on the role of illiquid investments in the portfolio, particularly private equity. We note the finding that through the 2008 financial crisis, SERS allocation, heavy in illiquid investments, performed worse than a balanced public market index. We do not recommend that SERS exit private equity as an asset class, and note that SERS performance in this asset category has been stronger than PSERS. However, we recommend that SERS carefully reconsider the risks of its current allocation targets to illiquid private investments, particularly private equity, and reduce them to more appropriate levels, noting that the 2017 allocation was found to be "in line" with peers.
- At PSERS, where one measure of total fund risk was found to have "nearly doubled" in recent years and unusual levels of portfolio complexity noted, we find greater cause for concern, and we recommend that such a reconsideration focus on the role of illiquid investments more broadly, particularly private equity, hedge funds, and commodities. We note the troubling finding that PSERS level of illiquid investments overall at 43% (not including unfunded commitments to these investments) is a "significant outlier" and far more than either SERS or peer funds. We therefore urge that PSERS carefully reconsider the risks of its current allocation targets for illiquid private investments, and reduce them to more appropriate levels.
- We also recommend that PSERS, as a matter of priority, revisit and reexamine its use of leverage. The use of leverage borrowing by U.S. pension funds is extremely rare, and the extent to which PSERS uses leverage (effectively borrowing against over 17% its portfolio) is an anomaly, the potential risks of which are not widely understood by stakeholders. As the report notes, leverage can be "treacherous" and has sometimes led to catastrophic outcomes. We recommend that a PSERS review of leverage clearly examine and communicate risks, and ensure that robust board-level guidelines are in place and understood by all stakeholders.
- We commend SERS for maintaining a more rigorous fund-level benchmark, and note the finding that SERS performance weakness appears to have been more of "execution" rather than "strategy." We recommend SERS continue to use such a rigorous benchmark, and focus its efforts on continuing to improve execution.
- We recommend that PSERS reconsider and revise its fund-level benchmark, found to be the lowest among
 a peer group over every period. We note the finding that PSERS performance weakness appears to have
 been both of "strategy" and "execution," and recommend PSERS comprehensively reexamine both.
- We recommend that the investment management of the systems be redirected towards simplicity.
 Because complexity increases costs and risks without any assurance of higher returns, because the Consultant report shows that lower-cost simpler portfolios in fact would have performed "significantly better on a risk-adjusted basis than the current complex strategies," and because findings in the Consultant report suggest the funds do not currently have the expertise and oversight in place to properly oversee their current complex (particularly in the case of PSERS) portfolios, we recommend the funds take a new and simpler approach.

Cost-savings Options

- We note the findings that there is a fundamental "mismatch" between oversight capacities for such
 complex portfolios as PSERS has adopted, particularly internal management, derivatives, and illiquid
 investments, and that such capacities appear "stretched" at SERS, particularly in the large number
 of allocations to private equity and real estate. We therefore recommend that new commitments of
 capital to these strategies, at either fund, are limited until these issues are addressed.
- We note the findings that sufficient accountability, risk monitoring, and management structures
 are not currently in place, and we recommend that certain "innovation" cost-savings options, such
 as further internal management, co-investments, seeding new managers and/or forming exclusive
 relationships with new firms, should NOT be pursued at this time.
- We note that the cost-savings recommendations in the Consultant report below are limited in that
 they were only able to analyze public mandates, and the recommendations are made in the context of
 presuming no change to current allocations or strategies. Thus, the following recommendations should
 be understood as options that may be superseded by recommendations found elsewhere in this report.

Cost-savings Analysis

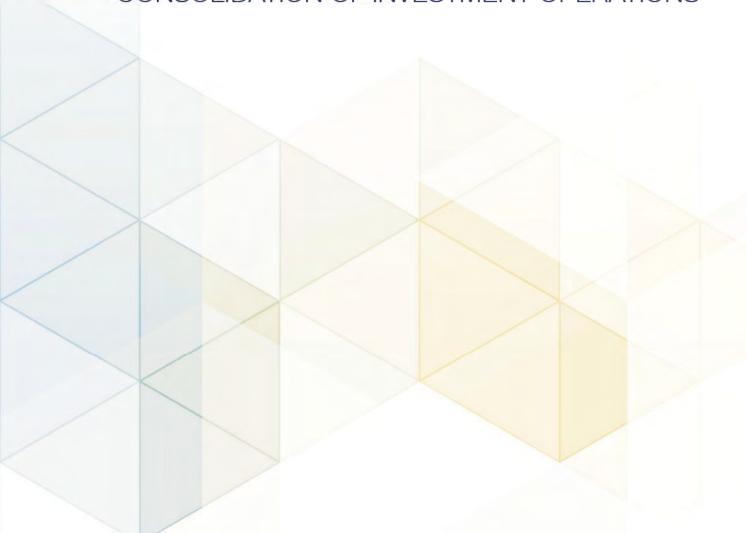
- We note the Consultant report's finding that in practice at both SERS and PSERS, "active mandates
 that cost more do not necessarily represent better value for money" and indeed, at one asset class at
 PSERS, the cheapest mandates were the best performing.
- We recommend that PSERS comprehensively review and revise its benchmarks for asset classes, subasset classes and managers, particularly all benchmarks used for performance-based compensation, noting the report's finding that PSERS benchmarks across the board are not "sufficiently granular."
- We note the report's finding that in the PSERS high yield allocation, managers have been paid 93% of the "alpha over the 10-year period ending June 30, 2018 (100% in the 10-year period ending June 30, 2017)", and we recommend that performance pay arrangements at both funds be rigorously reviewed, appropriately benchmarked, and entered into only after modeling total costs to the fund of different options. We recommend that all fees, whether base or performance, be considered and tracked, and do not recommend pursuing fee "savings" that are simply shifting costs from base fees to performance fees.
- · We recommend that both funds adopt the following best practices to minimize fees:
 - o track the age of all fee schedules, and reviewing at least every two years
 - track the age of all manager relationships, and considering longevity of relationship in recurring fee
 reviews and negotiations
 - o require all asset managers to confirm in writing that they do not receive commissions, rebates and the like in connection with fund investments
 - o require all asset managers to confirm in writing that they have not paid fees, commissions and the like in connection with obtaining investments into their funds
 - o establish a fee budget, at the fund level, for all investment managers, subject to waiver by the board
 - o prohibit the use of bundled brokerage by brokers and managers.
- · We commend SERS for conducting regular transaction cost analysis, and recommend that PSERS do

the same.

- We recommend that both funds establish a better process for considering specific alternatives to
 each proposed investment under consideration, which the Consultant report findings suggest need
 improvement. Any proposed investment should be evaluated not in a vacuum, but against a specific
 low-fee equivalent-risk alternative, as a way of strengthening a commitment to cost discipline and
 better evaluation of expected and realized performance.
- · We recommend that both funds evaluate procurement guidelines for asset management services.
- We recommend that both funds adopt the practices detailed in the Consultant report to negotiate harder on private markets investments, particularly when the Systems together would constitute one of the top investors in terms of asset size, including but not limited to: seeking to pay fees based only on invested rather than committed capital; seeking fee reductions during the investment phase; capping monitoring, oversight, and legal fees; negotiating carry terms more carefully and modeling different scenarios; seeking full transparency on waterfall terms, and whether other waterfall terms have been offered to other investors; recalculating GP-determined carry payments; having a process to ensure that all terms contained in marketing materials or arrived at in negotiations are legally documented and monitored; and monitoring and auditing all fees and costs charged by general partners in limited partnership structures.
- We recommend that both funds retain the services of an outside expert who, with proper access to full
 information, could assist them in developing and implementing further cost-savings.
 - o We recommend that SERS, with the assistance of an outside expert, immediately renegotiate public security mandates identified in the Consultant report that are mispriced to achieve at least \$4.87 million in savings on an annual basis, or \$584 million compounded over 30 years, while noting that this recommendation is not meant to preclude action on other savings recommendations elsewhere in this report that may supersede it.
 - o We recommend that deploying these and other approaches, SERS, with the assistance of an outside expert, renegotiate all new (or renewed) private equity investment agreements to achieve at least \$12.18 million in savings on an annual basis, or \$926 million compounded over 30 years.
 - o We recommend that PSERS, with the assistance of an outside expert, immediately renegotiate the public security mandates identified in the Consultant report that are mispriced to achieve at least \$4.91 million in savings on an annual basis, or \$560 million compounded over 30 years, while noting that this recommendation is not meant to preclude action on other savings recommendations elsewhere in this report that may supersede it.
 - o We recommend that deploying these and other approaches, PSERS, with the assistance of an outside expert, renegotiate all new (or renewed) private equity investment agreements to achieve at least \$15.48 million in savings on annual basis, or \$1.17 billion compounded over 30 years.
 - o We recommend that PSERS, with the assistance of an outside expert, immediately restructure its high yield allocation as suggested in the Consultant report, to achieve savings of at least \$42.5 million on an annual basis, or \$3.23 billion compounded over 30 years, while noting that this recommendation is not meant to preclude action on other savings recommendations elsewhere in this report that may supersede it.
- We recommend that, in the absence of the legislatively-created Central Pension Investment Office, the systems establish structures to share manager selection, monitoring, and risk control work between the two Systems.

Final Report and Recommendations: PUBLIC PENSION MANAGEMENT AND ASSET INVESTMENT REVIEW COMMISSION

CONSOLIDATION OF INVESTMENT OPERATIONS



IX. Consolidation of Investment Operations

I have difficulty understanding why you have two different plans from the point of view of investing and what I would call the back office operations. I can understand why you would have two different plans in terms of representation of the teachers and representation of all other employees, but why they ought to be operationally separated doesn't sound like anything that would be chosen by a rational observer. - Dr. Charley Ellis, Testimony to the Commission on October 25, 2018

Now, I have no idea ... whether that's even feasible in Pennsylvania or the like. I know it was hard in the U.K. But in general, I would have -- if you were designing the scheme afresh, right, you probably only have one public pension scheme in Pennsylvania. - Dr. Tim Jenkinson, Testimony to the Commission on September 20, 2018

Consolidation: A Commonsense Approach

For over 100 years, the Commonwealth of Pennsylvania has recognized the importance of providing, to those whose careers have been dedicated to public service, a fair and secure retirement. The Commonwealth has prioritized cost-savings in doing so by creating and managing multi-employer retirement systems: PSERS serves 750+ education employers, SERS serves 100+ state public employers, and PMRS serves 900+ municipal plans. While there are current and historical reasons why these are and should be different systems, there are many commonalities that make them ripe with opportunity for greater efficiency, better management, and lower costs through pooling resources. Both SERS and PSERS are mature plans (though PSERS has a slightly lower percentage of beneficiaries in retirement). The systems each use identical discount rates of 7.25%. In their quest to achieve the returns to meet this discount rate, the systems overlap considerably in the assets in which they invest. The efforts of best practice sourcing, evaluating, selecting, monitoring, and managing specific investments is not unique to either system. These similarities present opportunities for the principle of cost-sharing to extend to the two systems' investment implementation, without jeopardizing each system's unique service mandate, and to the benefit of each system's beneficiaries.

Experts throughout Commission hearings testified to the commonsense intuition that a consolidated pension investment office would cost less and be more operationally efficient than running two operationally duplicative offices. A consolidated pension investment office would provide the following benefits to Pennsylvania: (1) reducing operational and administrative costs through the elimination of duplication; (2) driving better deal terms with asset managers by leveraging scale of investments; (3) and improving performance by using market power to access, partner with, and concentrate relationships with select managers, enhancing focus on operations and risk management, and building internal capabilities to directly manage index equity and fixed income strategies.

What is a Consolidated Investment Office?

A consolidated pension investment office is a shared professional investment service for public employee retirement systems which, by pooling assets, can capitalize on economies of scale to achieve cost-effective operations and improve access to high quality investment management firms. Generally, in instances where shared pension investment services are utilized, they have not resulted from the merging of assets, plans, or entire organizations. Instead, they are formed as new, independent pension investment management services, created as a utility for client pension systems. While exact composition of oversight boards vary,

these organizations are typically overseen by boards with professional financial expertise, and are entrusted with the duty to act in the best interests of client pension systems by ensuring that investment decisions are based solely on seeking the best returns without other influences. Ideally, consolidated pension investment offices deploy professional investment and risk management practices with assets under management sufficient to support investing in a broad range of asset classes at the most competitive costs. **Oxexit** While investments may be pooled at an asset class or portfolio level, participating client pension systems may still participate in broad asset allocation decisions. One fifth of the largest U.S. pension funds trust a separate investment management organization with its own board to invest. **Oxexit**

The Commission heard testimony from and analyzed some of these organizations regarding their common characteristics and the benefits they provide to client pension systems. A shared pension investment management office reduces duplicative staffing and investment provider costs, leverages scale including the ability to attract and retain the talent necessary to manage assets internally, and improves risk management to the benefit of the plan beneficiaries, employers, and taxpayers.

The Province of Ontario created the Ontario Investment Management Company (IMCO) in 2016, to invest the assets of more than 100 pension and other investment funds within the Canadian province. Coexciti In the Ontario model, the pension investment management office is tasked with operations, not policy. The scope of work for the shared pension investment office conducted on behalf of client pension funds may include: the selection and monitoring of managers, the negotiation and drafting of contracts, the oversight of performance, investment accounting, and compliance. The client pension systems, in contrast, set broad policy, including identifying the asset classes in which they invest. In practice, an investment office may create "a family of unitized pooled funds, similar to mutual funds" in which client assets would be invested.

COMMONWEALTH OF MASSACHUSETTS PENSION RESERVE INVESTMENT MANAGEMENT BOARD

Massachusetts, the second state to create a defined benefit pension system in 1911, also provides an early model of a shared pension investment operation.

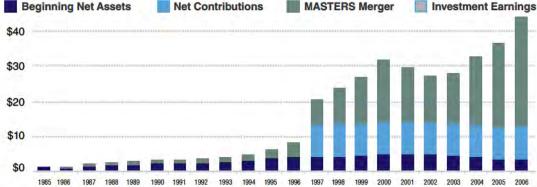
Following years of study of how its pay-as-you-go pension system would financially burden the state, in 1983 the Massachusetts General Assembly established the Pension Reserve Investment Trust Fund (PRIT) and its overseer, the Pension Reserve Investment Management Board (PRIM), in order to invest and grow the assets of the pension fund.

The second se the impact of the pension investment management organization through the consolidation of the PRIT with the Massachusetts State Teachers and Employees Retirement System (MASTERS). The same legislation also opened PRIT up to local pensions, by allowing them to invest Trust or retain control of their asset allocation and invest in asset classes (called "segments") of their choosing, with PRIM managing part or just some of their assets. An analysis from 2005, almost a decade after the MASTERS joined PRIT, found that 81% of income to the PRIT fund came from investment earnings.

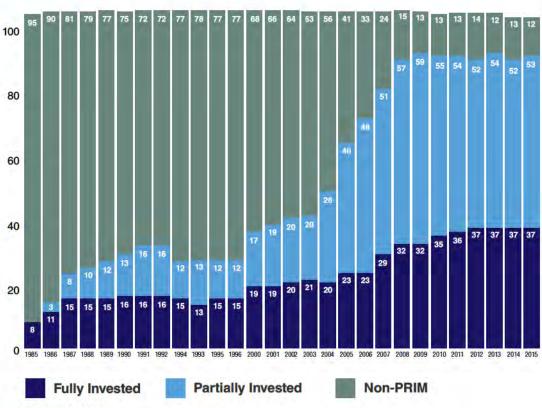
Today, just nine of the state's 104 local pension systems do not invest with PRIM, and both the State-Boston/Teachers Retirement System and State Retiree Benefit Trust Fund (SRBTF) are required by legislation to invest their assets with PRIT.

Figure 76: PRIT's Growth in Net Assets





Source: The Commonwealth's Pension System: A Good Investment For Massachusetts prepared on behalf of MA Public Pension Forum by Lussier, Gregor, Vienna Associates.



LOCAL PENSION SYSTEMS' INVESTMENT IN PRIM 1985-1996, 2000-2015

Figure 77: Local Pension Systems' investment in PRIM

Source: Pioneer Institute.

Benefits of Consolidation

There are three main benefits to be gained from a consolidated pension investment office: (1) eliminating duplication to reduce costs; (2) leveraging scale to drive better deals; and (3) improving performance.

1. Eliminate Duplication

Consolidated pension investment offices can lead to reduced operational and administrative costs through the elimination of duplication. Pension systems retain staff to select investment strategies reflective of the asset allocation determined by the board. For pension systems managing their assets independently, the size of internal investment staffs may vary by the size of assets and complexity of construction, but the function of staffs across two systems with investments in the same asset classes is duplicative. In parallel, pension systems hire numerous professional services to support the evaluation, selection, and monitoring of investments, including general investment consultants, alternative investment specialist consultants (e.g. hedge fund, real estate, private equity), risk systems (e.g. Bloomberg, FactSet), and investment-related service providers such as lawyers, accountants, or compliance staff and services. General consultants provide expert outside counsel to staff and boards. Examples of their work include asset liability studies and portfolio analysis. Systems retain specialist consultants to help assess the opportunity set across and quality of managers in complex alternative asset classes, like private equity, real estate, and hedge funds. Consulting firms commercialize their expertise by selling this core knowledge to and replicating work for many pension systems. These investment service providers have high fixed costs, and Pennsylvania's two largest state-run

systems would benefit by paying for this expertise once rather than twice. Of additional benefit would be the consultant's enhanced ability to leverage the scale of a large, collective asset pool in any support given to sourcing and negotiating with managers.

Bloomberg, BlackRock Solutions, and FactSet are examples of portfolio management tools that provide important portfolio and risk management insight to institutional investors who can afford them. These analytic and risk systems can and should be used across a portfolio, with functionality that scales with portfolio size. These technologies are priced at a relatively fixed cost, meaning they do not cost more for increased assets under management, and their high cost means some systems are too small individually to afford access. A shared pension investment management service would have the asset size to afford an expert staff capable of using such data and analysis systems for the benefit of client pension systems.

Support services to investment management are required by each pool of assets, and also offer an opportunity for duplicative cost reduction through a consolidated pension investment manager. Core staff and retained firms include accountants, lawyers, compliance officers/managers, and actuaries. Non-investment support services and overhead are also duplicated when pension assets are managed in isolation, including office space and administration.

2. Leverage Scale

A consolidated pension investment office can drive better deal terms with asset managers by leveraging scale. Asset management expenses are the most significant cost in investing pension capital and, as such, provide an opportunity for cost-savings through consolidation. Asset management fees have historically been charged to pension investors by basis points for assets under management. Management fees often feature a sliding scale with "break points" where, after certain asset levels, the percentage rate per dollar is reduced. This reduction acknowledges the operating leverage inherent in the asset management model: asset managers can implement an investment strategy without adding headcount or systems in line with the increase in the assets managed. Break points are features of both traditional public market strategies and alternative strategies. A recent private equity fund evaluated by the Systems featured a flat management fee of 1.5% per year, which reduced to 1.4% with a \$250 million dollar investment, 1.3% with a \$500 million dollar investment, and 1.15% with a \$750 million dollar commitment. As Systems' staff have been able to demonstrate, even a "sticker price" for funds with break points can be further negotiated.

Particularly in alternative investments, large investors may have access to preferential fee terms through coinvestment opportunities. Co-investment is the additional direct investment in a single investment alongside
one of the pension fund's external managers. As a direct investment in a single company, co-investment
requires that investment staff have financial modeling and transaction experience that differs from those
skills typically used to underwrite managers. Managers recognize the benefit they gain from this additional
commitment by the pensions that already invest with them, as it allows them to invest in deals that do not
otherwise fit with their investment fund (perhaps because of size or other terms) and in more recent years it
has been seen as a method for reducing costs for their largest investors, without explicitly lowering their stated
fee structure. A consolidated investment office offers the opportunity to attract staff skilled at analyzing and
managing individual direct investments, including co-investments, which when paired with the proper risk
controls may result in lower investment costs for the pension fund.

Large, consolidated offices actively engage their market power in negotiating relationships with managers, often going far beyond the benefit of break points offered by managers (which may eventually plateau). Combined assets change the dynamic of how terms are set between managers and plans. As Dr. Ashby Monk testified before the Commission: "Now, I admit that consolidation could be seen as innovation, it could be seen as cost arbitrage. But ultimately, what you're doing by consolidating plans is giving yourself a stronger negotiating position." Grounding this theory in a recent real-world example, Dr. Jenkinson testified, "And if you look at what happened in the U.K. with the local authority pension schemes, they've had a big program

of consolidation. And for basically the reasons you say, that, [...] each one of them was much smaller, [...] the odd couple of billion didn't have much bargaining power.... So I think there is a general tendency towards consolidation, which I think is a good thing." CONSOLIDATION OF THE PROPERTY OF T

3. Improve Performance

Consolidation of investment operations can improve performance by using market power to access, partner with, and concentrate relationships with select managers, enhancing focus on operations and risk management, and building internal capabilities to directly manage index equity and fixed income strategies. In addition to eliminating costly redundancies, consolidation can create further value by giving the single investment organization access to high quality investment staff able to level the partnership with external investment managers. Potentially performance-enhancing investments -- beyond index managed stocks and bonds -- should only be contemplated by the few well-staffed professional management organizations capable of understanding the risks and underwriting the highest quality investment partners.

CONTENT Without qualifying which investors can prudently invest outside of traditional asset classes, Dr. Jenkinson testified, "I think also, as you go into private markets, [...] you need more specialist staff and expertise, and you might need some more manpower, as well. And [...] there can be economies of scale in putting these schemes together." CONTENT OF THE PROPERTY OF

While pension funds traditionally partner with third-party investment managers, for certain asset classes, some organizations can credibly retain qualified staff within the organization to invest directly in the capital markets, thereby eliminating the cost of a third party asset manager. Direct investing by staff may be called internal asset management or "in-sourcing." As an ancillary benefit, the threat of being deemed unnecessary by investment staff endows pension investment staff a stronger negotiation position with managers. Such savings have attracted the attention of many pensions globally, which is why Dr. Monk called "insourcing" ... probably the biggest buzz word of the last decade."cexxxii Ash Williams, the Chief Investment Officer of the State Board of Administration (SBA), Florida's \$150 billion dollar consolidated investment organization, testified to the Commission, "I think the key thing is, number one, yes, you can effectively centralize investment operations. Number two, you can and should manage money internally. It will save you a lot of money doing so. Number three, for the most part, passive investment is a good thing... by doing this [investing] ourselves, we avoid an awful lot of costs in fees that would otherwise be paid in management fees and carried interest." examile Testimony from senior officials of other consolidated investment offices and independent consultant reports quantify the cost benefits that Mr. Williams discussed. The Chief Investment Officer of the State of Wisconsin Investment Board (SWIB), David Villa, quantified the benefit: "economies of scale and investing in professional staff can save about 20 basis points. So in the context of a \$100 billion plan, that's about \$200 million a year in savings." Constitution Dollars that would otherwise leave the pension trusts of the system effectively stay within the pension trust, continuing to compound and enhance performance.

The South Dakota Investment Council (SDIC), State of Wisconsin Investment Board (SWIB) and Florida State Board of Administration (SBA) demonstrate that it is possible to attract and retain world-class investment talent capable of both tough, knowledgeable negotiations with Wall Street and cost-saving, skilled internal management of index and fixed income mandates. With oversight by expert investment committees, the Chief Investment Officers of each organization, located away from typical global financial centers, differ in their exact approaches to recruiting and retaining capable team members. Mr. Williams described the transparent process, metrics, and communication to help attract and retain world-class investors to serve the State of Florida and its pensions:

I'm very, very sensitive to how difficult it is to provide even remotely competitive compensation in a traditionally, highly compensated field like investment management for public sector employees, particularly when the vast majority of public sector employees have rather modest compensation, and taxpayers, generally, if you look at average family or individual incomes in most states compared to average incomes in the invested management industry, the contrast tends to be rather steep, or rather severe. So in Florida, the way we approached that to gain understanding [and] buyin and to share the value proposition with all of the constituencies and shareholders of the Florida Retirement Systems, was we held a series of public meetings -- and you'll think I'm exaggerating, I'm actually not -- over a period of six years developing our compensation scheme that we have now had truly operational for three years. And what we did was take great pains to ensure that everybody understood exactly what was going on. Very high degree of transparency, very high degree of structural alignment in the interest of the taxpayer, the beneficiary, the senior part of the governance structure, and the investment professionals working at the State Board. And we were able to establish very clear documentation using a third-party fiduciary external compensation consulting firm, Mercer, to advise us on that, get us comparable data, et cetera. And the other thing we did that I think was smart in retrospect was we never said, "Let's make our objectives to pay the same as Wall Street." That obviously would be a foolish and unfulfillable goal. And so we said, "Why don't we compare ourselves to our brethren in public pension land," other very large public pension funds," and compare our compensation to theirs and see where we stack up. coxxxv

Analysis of PSERS and SERS

The Commission considered the various opportunities for PSERS and SERS to benefit from consolidated investment opportunities. A discussion of the areas under consideration follows in this section.

1. PSERS and SERS duplicate many operational and administrative costs.

Together, PSERS and SERS spend more than \$23 million dollars per year on investment office costs, allocated across similar line items including staff, operating expense, consultants and legal, as summarized in the figure below. Some fixed costs may be duplicative, and thus a shared investment office for the two funds may only require some portion of the current total costs. Consultants offer a good example: SERS, whose assets are slightly more than half the size of PSERS, pays nearly same cost for these services. Other costs, such as staffing and operating expenses, vary with headcount and systems support. McKinsey, a management and strategy consulting firm, and their strategic partner CEM Benchmarking, a firm which gathers data from pensions and other institutional investors, studied the benefits of pension investment office consolidation. The investment costs per dollar of assets under management for a \$100 billion pension fund was 18% lower than a \$50 billion pension, and 22% lower than a \$25 billion pension plan. A closer inspection of the redundant costs to the system may yield an estimated \$9 million in potential annual savings (See the second table below).

Figure 78: Cost Areas of SERS and PSERS, 2017

ANNUAL COSTS - CURRENT IN THOUSANDS OF DOLLARS

SERS		PSERS	
Personnel	2,864	Personnel	10,422
Consultants	3,183	Consultants	3,098
RVK	707	AonHewitt	700
StepStone, GCM	2,185	Hamilton Lane	1,400
NEPC	291	Courtland	298
		Aksia	70
ISS	93	Glass Lewis	17
Korn Ferry Hay Group	443	Conduent HR Services	63
Subscriptions	296	Subscriptions	1,87
	6,878		16,20
COST TO MANAGE EXISTING INDEX INVESTM	ENTS, EXTER	RNAL AND INTERNAL	
Equities	1,562	Equities	2,04
Fixed Income	308	Fixed Income	1,07
	1,870		3,12
BASE MANAGEMENT COST FOR PRIVATE EQU	YTIL		
Private Equity Allocation		Private Equity Allocation	
\$4,077,500		\$5,950,167	
1.63%	66,463	1.38%	82,11

Please note that the plans indicate base management fees of 163 (SERS) and 138 (PSERS) bps in their annual and consultant reports.

Source: Estimates based on data in Systems' Budget Books, CAFRs, and Monk et al. chapters of this report.

The separate pension investment operations of SERS and PSERS may lead to burdensome costs and to the misallocation of scarce resources that could otherwise be used to benefit returns. Separate investment implementation could mean duplicative investment staff, who evaluate opportunities in the same asset classes and who use the same, duplicative support services. (See figure below for areas of overlap.) This overlap spends money that could either be reinvested in the pension trusts or used to expand expertise in portfolio and risk oversight.

Outside service providers whose services may be duplicated include general and alternative investment specialists, accountants, and actuaries. Each board and staff retains a different general consultant to assist in asset allocation and asset liability study. In addition to dedicated portfolio teams to look after each asset class, each system also has specialty consultants to evaluate the quality of external asset managers within asset classes including real estate, private equity, and hedge funds. These firms commercialize their expertise by selling this core knowledge to and replicating work for many pension systems. Our Systems would benefit by paying for this expertise once.

Figure 79: Estimated Potential Cost Savings for Centralized Investment Office

CONSOLIDATION

IN THOUSANDS OF DOLLARS

SAVINGS	% REDUCTION IN SUM COSTS	1 YEAR	30 YEARS			
1) ELIMINATION OF REDUNDANCIES						
Personnel	-33%	4,384				
Consultants	-44%	3,490				
General	-50%	703				
Private Equity	-50%	1,793				
Real Estate	-50%	295				
Hedge Fund	0%	700				
Proxy Voting Advisor	-50%	136				
Actuary	-33%	354				
Subscriptions	-33%	716				
Total		9,080	897,170			
2) IN-HOUSE MANAGEMENT OF EXISTING EQUITY A	ND FIXED INCOME IND	EX INVESTMENTS				
Equities	-43%	1,562				
Fixed Income	-22%	308				
Total		1,870	185,790			
3) LEVERAGE SIZE TO REDUCE EXTERNAL MANAGEMENT FEES						
Private Equity	-7%	10,194	1,007,350			
Total		21,144	2,090,310			
Source: Systems Budget Books, CAFR, RCI Report						

Source: Estimates based on data in Systems' Budget Books, CAFRs, and Monk et al. chapters of this report.

2. Diluted scale results in competing and inferior terms with asset managers.

PSERS and SERS retain separate, yet duplicative investment staff to implement asset allocation, meaning to execute the activities of investment management relating to the selection, management and monitoring of managers who provide access to the capital markets and strategies identified in the asset allocation. The two systems' experience in US Equities, a familiar asset class, shows that despite shared beliefs about the asset class, the two systems do not use their scale to reduce operational cost. Both systems have chosen to index a significant portion of their US public equity allocations. Yet SERS engages external, third party asset managers to invest assets in index-based strategies to whom the System pays \$1.8 million annually while PSERS endeavors to manage internally an index strategy. To reduce costs, a shared investment office could use its scale to negotiate the smallest cost with one external asset manager or develop internal capabilities for index equity investments.

Worse than missing out on an opportunity to take advantage of scale, PSERS and SERS may compete against each other for partnership with the best external asset managers. For example, throughout 2017, a year of active fund raising by managers, both systems were in the process of building up high cost private equity

portfolios. Services such as Bloomberg provide a list of which managers are "in market" with funds, and include details of fund size and close dates. A well-known manager marketed their next in a series of large buy-out private equity fund. Both SERS and PSERS invested in the fund, one paying a 1.5% management fee and 20% performance fee subject to an 8% hurdle, while the other has a management fee of 1.4% which stepped down every 2 years to 0.75% after year 6. While both systems independently made use of staff, lawyers, and consultants to evaluate this private equity opportunity, the only risk free way to increase the return of this particular investment was overlooked – they did not use their combined purchasing power to reduce the direct costs of this investment even to the extent that it was offered to one of the two systems. The Systems' consultants report that PSERS pays 138bps in base management fees to its private equity program, while SERS pays 163bps (Chapter VIII: Cost-Saving Analysis). SERS individual fund commitments also tend to be smaller than those of the larger fund, PSERS. Applying the lower base management fees to the entire allocation, collective bargaining power might save \$10 million in fees in private equity alone. A consolidated investment service would use its market power to negotiate the best terms with the managers identified.

Subsequently, PSERS and SERS have recently found opportunities to work together, as Executive Director Glen Grell testified, "We've had a couple of instances where PSERS and SERS were both looking at the same deal, so we collaborated. In one case, we were able to use our maybe bigger buying power to negotiate a lower fee, not for us, but for SERS, but we're all in the same family, so that was a good outcome. We'd like to do more of that. But there really are limits to what can be done without statutory change." In its fee analysis of the systems, consultant Novarca identified a public securities manager used by both SERS and PSERS for an identical strategy, but paid different rates irrespective of the scale of the mandate. While informal collaboration appears to have increased in private equity following the 2017 example above, collaboration does not appear to be systematic or to occur across other asset classes, and would be institutionalized through the creation of a new, shared investment office for the two systems.

3. Duplicative costs misallocate resources that could be used to improve performance.

Duplication of costs across the two pension systems misallocates resources away from the internal investment infrastructure that is critical to improving performance, namely, (1) enhanced understanding and managing risks in portfolios and (2) the developing of internal investing capabilities in order to reduce investment fees paid to external managers. A large reliance by both Systems' current staff on external consultants suggests a lack of prioritization on the tools to manage risk including: front office systems to analyze risk, asset allocation, attribution, and trading; middle and back office, including an investment book of record (IBOR) operations; and finance and administration. Front office risk systems such as Bloomberg, BlackRock Solutions, and FactSet have high but fixed costs. As previously mentioned, they do not cost more for increased assets under management, as would be expected through investment office consolidation. Moreover, these systems are also high value, and may provide important portfolio and risk management insight to those systems unable individually to afford access. A better resourced organization with a greater ability to attract world-class staff would be better equipped to pay for and utilize these systems. These skilled individuals seek to understand and manage risks when portfolios have complexity, and know such systems are essential to properly risk controlled internal investing.

A new consolidated pension investment operation with appropriate and expert oversight could also improve performance through bringing additional capabilities and talent to oversight. Given the complexity of investment strategies available to investors, Dr. Monk counseled, "Sponsors have a legitimate desire and right to oversee their plans. But that representative instinct has to be balanced with the expertise needed to oversee increasing complexity." Table 3 below summarizes Dr. Monk's observations on how consolidated investment boards are staffed, their qualifications, and his view on their improved abilities to oversee the implementation of the complex investment strategies available to large institutional investors.

Table 3: Overisght of Selected Consolidated Investment Offices

TABLE 3: OVERISGHT OF SELECTED CONSOLIDATED INVESTMENT OFFICES

System	Number Board Members	Туре	Function	Investment Expertise	Reliance on Consultants	Board fits Complexity of Portfolio
SDIC	5 expert appointees, plus 3 ex-officio	Expert	Investment	"members of the State Investment Council shall be qualified by training and expertise in the field of finance"	Low	Yes
SWIB	5 experts, 1 local government finance professional, 2 retirement board reps, 1 secretary of administration	Expert	Investment	minimum 10 years experience making investments	Low	Yes
SBA	9 on Investment Advisory Council (3	Expert	Investment	Knowledgeable about financial markets	Low	Yes

Source: Dr. Ashby Monk, 2018.

Elements of a consolidated central pension investment office ("Office")

A properly established Office would avoid duplication of investment operations, enhance internal execution capacities, leverage combined fund size and bring additional investing governance capacity, while maintaining the existing governance structure for both retirement systems. In order to maximize the potential benefits associated with a consolidated central pension investment office and applying the best practices of examples in other jurisdictions, a properly established Office should include the following elements:

- a) Be responsible for the management, implementation and execution of all investment mandates on behalf of each client pension system, SERS and PSERS, pursuant to each retirement board's adoption of asset allocation plans recommended by the Office;
- Be exclusively composed of high-caliber investment professionals recruited and retained by the Office's oversight committee;
- c) Be overseen by an Investment Oversight Committee of small number (e.g., 5) of well-established, senior investment professionals selected and nominated by an appropriate process, such as nomination by the Governor and confirmation by the Senate. Each member should have at least ten years relevant investing or financial experience. The Investment Oversight Committee should have exclusive authority to select and hire all Office investment professionals;
- d) The Office and its Investment Oversight Committee should be subject to a fiduciary standard, requiring it to act in the sole and best interest of each client retirement fund and maintain vigorous reporting and disclosure standards consistent with those recommended in this Commission's Report;
- e) The Office should develop necessary competencies and capacity for the prudent management of all equity, fixed income, real estate, or other strategies as may be required for the benefit of the client funds:
- f) The Office should be the sole contracting authority to retain external investment management and consulting services on behalf of the retirement funds when there are insufficient internal capacities;
- g) The Office should also be responsible for providing all necessary back-office support associated

- with prudent investment management, including by way of example, accounting, legal, compliance, auditing, risk monitoring, and reporting services;
- h) The Office should be subject to an annual review by each retirement system. Investment staff salaries and promotions would take into account the results of each annual review.

Eliminating investment operation redundancies between the two pension systems will not "fix" Pennsylvania's unfunded pensions, but – in concert with consistent funding – consolidated pension investment organizations with expert oversight and highly professional staff have been shown to reduce costs and improve investment outcomes as a shared steward of pension trust assets.

RECOMMENDATIONS:

It is recommended that the General Assembly enact legislation to establish a consolidated central pension investment office ("Office") to manage and execute all investment mandates on behalf of and as directed by each of the Commonwealth's retirement systems. While maintaining the existing governance structure for both retirement systems, the Office would avoid duplication of investment operations, enhance internal execution capacities, and leverage their combined fund size. The Office would have the following responsibilities:

- The Office would be responsible for the management, implementation, and execution of all investment
 mandates on behalf of both Systems pursuant to each retirement board's adoption of asset allocation
 plans;
- · The Office should be composed of high caliber investment professionals;
- The Office would be subject to a fiduciary standard requiring it to act in the sole and best interest of
 each client System and shall maintain vigorous reporting and disclosure standards consistent with
 those recommended in the Commission's report; and
- The Office, in consultation with the respective System, should be the sole contracting authority to retain external investment management and consulting services on behalf of the Systems.

Final Report and Recommendations: PUBLIC PENSION MANAGEMENT AND ASSET INVESTMENT REVIEW COMMISSION



X. Procurement

Procurement of Investment Services

In the context of this chapter, "procurement" refers to the process by which public pension systems identify, evaluate, and select external investment managers and consultants.

- Investment managers (also referred to as asset managers or portfolio managers) invest system assets
 according to agreed-upon objectives and parameters; some classes of investment managers offer
 commingled investment funds to which the system subscribes.
- Investment consultants are retained by the system to provide advice on various investment issues, including asset allocation; asset/liability studies; investment in specialty asset classes; and the selection, monitoring, and termination of investment managers. PSERS retains a consultant in each of the following areas: Absolute Return, Commission Recapture, Custodian Bank, Securities Lending, General Investment Consultant, Private Markets Investment, Proxy Voting Agent, Real Estate Investment, IAASP (Investment Accounting Application Service Provider).

This chapter focuses on the activities that culminate in signing a contract with an investment manager or consultant. In particular, it looks at identification and sourcing of managers and consultants. This chapter does not cover post-retention policies and practices, such as routine and on-demand reporting; monitoring and audit, performance evaluation, and contract review; or conditions and procedures for manager/consultant termination. For details on these topics, please see:

- PSERS: "Investment Policy Statement," ecxl "Draft External Portfolio Manager Fee Policy," ecxli "Investment Consultant Performance Reporting Policy," ecxlii and "Draft External Manager Monitoring Policy: Traditional Asset Classes." ecxliii
- · SERS: "Investment Manager Monitoring Policy." cexliv

Pennsylvania Statute Governing Procurement of Investment Services

For both PSERS and SERS, procurement of investment services is governed by Pennsylvania's Commonwealth Procurement Code. **Commonwealth* Section 511 **Commonwealth* agency contracts shall be awarded by competitive sealed bidding (see sidebar). This includes public notice of the invitation for bids and public bid opening.

However, Section 513 coxivit allows for competitive sealed proposals when the contracting officer determines in writing that the use of competitive sealed bidding is either not practicable or advantageous to the Commonwealth. In this situation, a request for proposal (RFP) must be created and made public, but the contents of the proposals may be withheld.

Furthermore, Section 515 cextviii permits sole source procurement in a variety of situations, including, as stated in §515(a)(8), when "The contract is for investment advisors or managers selected by the Public School Employees' Retirement System, the State Employees' Retirement System, or a State-affiliated entity."

Practices: PSERS & SERS

What follows is a discussion of the current practices of PSERS and SERS in the following areas: investment manager selection; investment consultant selection; and (for PSERS) approval of other financial professionals. It includes quotations from the relevant system policy manuals along with commentary from the reports of the audits conducted by the Auditor General's office in 2017.

A. PSERS: Current Investment Service Procurement Practices

Investment Manager Selection Process. In its response to a PPMAIRC data request, explication of PSERS stated that it does not have procurement guidelines for asset management services. As of this writing, it is unclear how PSERS interpreted "procurement" and in what ways it might differ from manager selection as defined in their Investment Policy Statement and the due diligence process for evaluating prospective managers, as explained in their Draft External Investment Manager Underwriting Policy. ed

The PSERS Investment Policy Statement contains detailed information on the manager selection process. ^{coll} To summarize: PSERS does not perform a competitive bidding process to select investment managers. Instead, staff work with the relevant investment consultant(s) to identify, evaluate, and recommend managers for intermediate and final Board approval.

For public markets managers (including public equity, fixed income, and commodities), a search process results in a short list of candidates. The investment consultant prepares for each candidate a profile including historical performance, ranking/score, analysis of assets under management of the manager and the product; and a style/size comparison (if applicable). For private markets managers (including private debt, private equity, and venture capital), staff routinely monitors new private markets funds coming to the market.

Candidates meeting the initial criteria are screened and interviewed, and further in-depth due diligence is performed. When a candidate is selected, staff negotiates the fees and contract terms. Only then is the candidate brought to the Board for final approval. Before the final contract is executed, the manager selection will have been approved by several levels of the investment office staff, the investment consultant, the Finance Committee, and the full Board.

Investment Consultant Selection Process. PSERS issues public RFPs for investment consultants through the PA e-Marketplace portal. See, for example, the RFP of May 4, 2018. ccxlii

PROCUREMENT TERMINOLOGY

Competitive procurement involves soliciting and evaluating bids from multiple providers.

Competitive sealed bidding typically is used when price is the most important consideration. An invitation for bid (IFB) is publicly issued; it includes specifications for the goods or services; administrative requirements; and bid submittal date. The bids are opened in a public forum and the contract is awarded to the lowest responsive, responsible

Competitive sealed proposals typically are used when price is not the only important factor. A Request for Proposals (RFP) is the solicitation document for this method of procurement. The RFP includes the scope of work and evaluation criteria. It may ask the bidder to propose ways to meet a stated objective, and in that way is more conceptual than an IFB. In some cases, an RFP is preceded by a Request for Information (RFI), which is used to gather information about possible approaches and how to formulate the RFP.

Non-competitive procurement process, the buyer (here, a state agency such as a pension system) either selects the service provider without going through a bidding or RFP process, or they restrict the set of providers who may bid.

Sole source procurement occurs when there is only one supplier who offers the desired product—for example, a particular investment fund offered by a particular private equity firm. In some cases, the buyer is required to issue public notice of their intent to do sole source procurement. Often, the buyer must submit a sole source justification to a review proces (Sole source procurement should not be confused with single source procurement, in which there is a decision to purchase only from one selected supplier, although there are other suppliers of similar products.)

Approval of Other Financial Professionals. The PSERS Investment Policy Statement also specifies selection procedures for two additional categories of external professionals:

- Securities lending agents facilitate securities transactions by identifying a borrower and negotiating the loan terms on behalf of the fund sponsor (here, the pension system). PSERS lending agents must be approved by the Board of Trustees and the Finance Committee, and the Investment Office Staff is authorized to negotiate and execute appropriate agreements.
- QIRs (Qualified Independent Representatives)
 facilitate swaps—exchanges of future cash flows. The
 PSERS policy sets forth criteria for the QIRs to be
 used by prospective Swap Dealers and Major Swap
 Participants.

The Pennsylvania Auditor General conducted an audit of PSERS in 2017. The audit report^{ecliv} states, "During our audit period, PSERS and the Board appear to have properly procured investment consultants and external investment managers in accordance with its written procedures."⁸⁷

A CLOSER LOOK AT THE DUE DILIGENCE PROCESS FOR INVESTMENT MANAGERS

The PSERS "Draft External Manager Underwriting Policy" cetting sets forth the steps to be followed by its in-house investment professionals in evaluating prospective external managers once they are identified. The steps are: sourcing and identification; manager interviews; performance analysis; document review; public information review; reference calls; review of the manager's operations; establishment of investment guidelines; preparing a memo of recommendation; Allocation Implementation Committee approval; operational preparation; Board approval; and contracting/legal negotiations.

B. SERS: Current Investment Services Procurement Practices

Investment Manager Selection. SERS does not issue RFPs for investment managers. The SERS process is described in their Statement of Investment Policy:

[Members of the Board of Trustees are responsible for] approving the engagement and termination of investment managers. Staff and consultants will identify potential candidates. Potential managers will be evaluated based on their ability to achieve the objectives outlined in the Investment Plan and their demonstrated experience and expertise for the specific mandate. Board suggestions for potential managers who meet these criteria will be evaluated by staff and consultants. While individual Board Members may meet with prospective managers, all group meetings involving a quorum of Board Members for a presentation by prospective managers shall be through formal Board meetings or Board Committee meetings. Staff and consultants are jointly responsible for carrying out the research and initial due diligence to identify qualified candidates. Staff and consultants are also jointly responsible for performing the on-going monitoring of investment managers and funds. Lastly, all prospective investment opportunities and/or investment manager terminations which are recommended to the Board must be supported by a memo from Staff and a memo from the relevant investment consultant. celv

The Pennsylvania Auditor General conducted an audit of SERS in 2017. The audit report states, "We found that SERS' procedures to sufficiently research and hire investment managers and investment consultants appear to be adequate and were performed in accordance with their written procedures." ⁵⁸

⁽⁶⁷⁾ The report also states that PSERS failed to document its investor fee negotiations. The topic of investment manager and consultant fees is covered extensively elsewhere in the PPMAIRC report.

 $^{^{(58)}}$ The audit report also notes that, as with PSERS, SERS failed to document its fee negotiations.

Investment Consultant Selection. The audit report outlines the process followed by SERS for hiring investment consultants. Prospective consultants respond to a Request for Information (RFI) and due-diligence questionnaire and then submit technical proposals:

Approximately one year before a current investment consultant's contract is up for renewal, or when the Investment Office and the Board deem it necessary to hire a new investment consultant, a selection committee develops a Request for Invitation (RFI). The RFI and a due diligence questionnaire are provided to potential investment consultants. Candidates then submit technical proposals to SERS' Investment Office and Legal Office, which jointly recommends three to four semi-finalists to the Board's consultant selection committee. The selection committee interviews the semi-finalists and selects two to three finalist consultants for the full Board to interview. SERS investment staff provides a memo to the full Board, describing the finalists' profiles and fee structures and the selection committee's recommendation. The full Board interviews the finalists during a regular Board meeting and then decides through a vote which consultant is to be awarded the contract. Celvii

The audit concludes that "The Investment Office follows SERS' documented procedures for the hiring and managing of investment consultants." However, the audit then describes the extension of a contract for the real estate sector consultant due to unusual circumstances and comments on sole-source procurement:

SERS management stated that because the procurement of investment consultants is exempt under the sole source requirements within the Commonwealth Procurement Code there are no mandated requirements that other consultants needed to be considered. However, just because competitive bids are not required by law, that does not mean that SERS should not make it a point to offer all RFIs to multiple firms or to publicly advertise RFIs to ensure its hiring practices are the most prudent and cost-effective.

We acknowledge that awarding a contract to investment consultants without competition does not violate the Commonwealth Procurement Code nor SERS' internal written policy/procedures. However, if SERS fails to pursue a competitive advantage by considering other consultants, it loses the opportunity to negotiate the best contract terms and threatens its compliance with the prudent investor rules. SERS illustrated this point when it ultimately conducted the RFI process for its real estate consultant and found a more suitable and less costly consultant than this firm it had been contracting with for the past two decades. celix

Procurement Sourcing Best Practices for Public Pension Systems

Many states exempt the selection of investment managers and consultants from their general procurement requirements. In 2015, as part of its research for a proposed bill, CalSTRS (California State Teachers' Retirement System, the second-largest U.S. pension system) stated that:

All 11 state pension funds contacted by CalSTRS are not required to abide by the same statemandated procurement processes required for the procurement of other types of goods and services by other state agencies. For example, the board of the Ohio Public Employees Retirement System has the full power to invest the funds solely in the interest of participants and beneficiaries, including the power to adopt policies and criteria for selecting investment manager firms. *cclx**

However, pressure has been mounting on public pension systems to conduct open, competitive processes for the selection of external investment professionals. The following arguments are typically advanced in favor of such processes:

- They enable the investor to obtain the most-qualified service providers, by widening the pool of prospects.
- They enable the investor to obtain the most-favorable fee structures and terms, by fostering competition.
- · They ensure all minimum requirements are met.
- They prevent questionable selection practices, or the appearance thereof.
- They facilitate monitoring the selections for diversity and other desired criteria.

Arguments that are typically advanced against open processes include:

- They handicap the investor in obtaining the most-qualified service providers, because some may be reluctant to undergo an open process, particularly if not just the fact of their participation but also the content of their response is made public.
- They generate a surfeit of responses/bids, particularly from unqualified respondents, thus burdening the investor's staff.

However, it is not always clear what constitutes an "open and competitive" process.

A best-practices document from the Government Finance Officers Association (GFOA) on selecting investment professionals for pension funds^{colxi} states that "a competitive, merit-based procurement process should be employed." But it does not elaborate on what a "competitive" process entails and whether that implies the use of publicly-released RFPs.

In 2011, Massachusetts enacted legislation colxili requiring an "explicit open and competitive procurement process to be followed by retirement boards when soliciting investment, actuarial, legal or accounting services." Their intended meaning for the phrase "open and competitive" is illuminated in a best-practices investment manual issued by the state's retirement administration (PERAC) in 2007. COLXIV

SELECTING INVESTMENT PROFESSIONALS FOR PENSION FUNDS

- 1.Selection Method. The responsible public official or the governing board should appoint a pension investment committee to conduct the search process. Training should be provided to the governing board so that they may determine appropriate qualifications for consultant or committee the review committee and/or pension investment consultant should be stated as should be the method of selection. A competitive, merit-based procurement process should be employed. Responsibilities of the investment professional(s) should be clearly defined in
- 2.Sourcing Investment Professionals. The consultant and/or review committee should determine the sources for candidates to be considered based on procurement rules, including, but not limited to:
 - a.consultants' database on investment management firms,
 - b.industry reports and articles,
 - c.marketing materials,
 - d.references from other pension plans or jurisdictions,
 - e.existing vendor database or registry, and
 - f.other governmental entity resources and information. cobii

The PERAC report states, "The main purpose of a competitive process is to assure that the retirement board has a sufficient number of highly qualified respondents from which to choose and that the ultimate selection is based on an informed and fair analysis of objective criteria." It goes on to advocate a number of basic principles, including:

- · Well-defined roles for all parties in the selection process.
- Openness: The use of publicly-issued RFPs. To address a common objection on the part of investors,
 the report states that "While it is possible that an RFP notice might attract so many responses as to
 make the job of the board and its consultant extremely time consuming and difficult, the greater risk is
 advertising in an outlet that attracts too few qualified responses."

- Fairness: Having not only a well-documented and disciplined RFP process and deadlines, but also an informative RFP that contains detail on the scope of the proposed mandate, minimum requirements and standards, specific and objective evaluation criteria and weighting.
- Objectivity: Having clear pre-established criteria of minimum standards. For investment managers, such standards might include assets under management (firm-wide and in the specific asset class mandate); length of track record; and preferences relative to style (e.g., concentrated or diversified, aggressive or riskconstrained).

In 2017, the state of Kentucky adopted legislation requiring open, competitive bidding procedures when hiring investment managers for their retirement systems. Essentially, Kentucky removed the former exemption for investment managers, placing them under the standard procurement procedures.

However, other states maintain exemptions for investment manager procurement. For example, similarly to Pennsylvania, the Rhode Island General Treasurer's Office exempts the procurement of investment managers from an open-bidding requirement of investment managers and consultants to conduct procurement of investment managers and consultants using a competitive RFP process, but they can invoke a solesource exemption. Colavii Note also that some systems, such as CalPERS and CalSTRS, exempt selection of emerging investment managers Geoclaviii from competitive procurement procedures.

Recommendations

- We recommend that both PSERS and SERS consider the benefits and limitations of adopting open competitivebidding processes for investment managers.
- We recommend that SERS adopt an open competitivebidding process for all investment consultants. (PSERS already has this in place.)
- We recommend that both PSERS and SERS publish policy documents that address the following:
 - o Circumstances (if any), for which asset classes, and for which categories of investment professionals are RFIs and RFPs issued?
 - Publish all RFIs and RFPs. Publish the names of all respondents.
 - o Publish the contents of the responses.

CFA ASSET MANAGER CODE

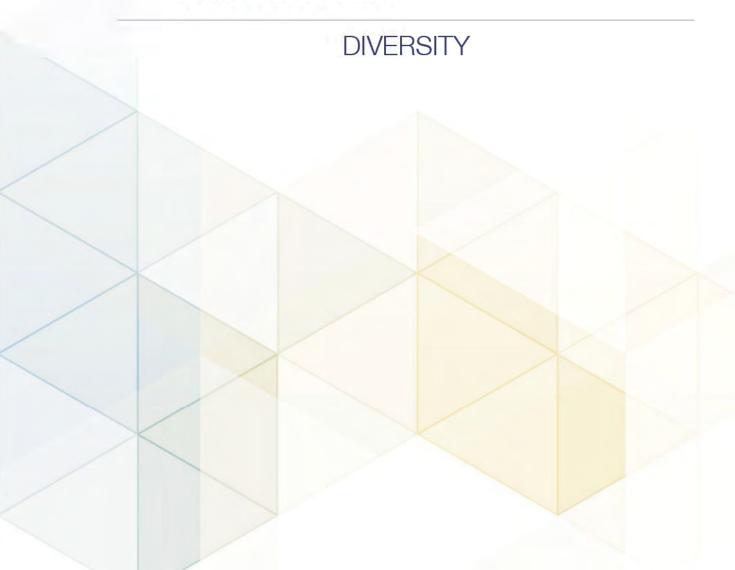
The CFA Institute is a leading investment management organization whose stated mission is to promote "the highest standards of ethics, education, and professional excellence for the ultimate benefit of society." Policies In 2017, a number of pension funds including PSERS wrote an open letter urging investment management firms to embrace the standards of the CFA Asset Manager Code. Policies The Code establishes minimum ethical standards for asset management services, including adherence to the following general principles of conduct:

- 1. Act in a professional and ethical manner at all times.
- 2. Act for the benefit of clients.
- 3. Act with independence and objectivity.
- 4. Act with skill, competence, and diligence.
- 5. Communicate with clients in a timely and accurate manner.
- 6. Uphold the applicable rules governing capital markets.

The open letter notes that more than 1,300 firms in more than 50 countries claim compliance with the code. Former Kentucky Retirement System board member Chris Tobe noted in his book *Public Pensions, Secret Investments* that SB2 (the procurement and transparency legislation mentioned previously) additionally requires individuals and firms managing money for the system to adhere to the CFA manager code. Colonii He finds, however, that few alternative investment managers of the Kentucky Retirement System have endorsed the code. See Appendix for a summary of the Asset Manager Code.

- o Identify the criteria and justification for exercising the single source / sole source exemption.
- We commend PSERS for urging investment management firms to comply with the CFA Manager Code and recommend that SERS do the same. We recommend SERS and PSERS include a firm's compliance with the CFA Manager Code as part of the evaluation and due diligence process.

Final Report and Recommendations: PUBLIC PENSION MANAGEMENT AND ASSET INVESTMENT REVIEW COMMISSION



XI. Diversity⁶⁰

Research across a multitude of fields and industries has identified the potential economic and social benefits of diversity. There is ample research confirming that diverse asset managers are competitive across industries and asset classes. Yet, the asset management industry continues to face challenges with a lack of diversity. Research studies and articles have consistently documented the low level of representation by women and racial/ethnic minorities among asset managers.

Through intentional, structural adjustments to be more inclusive in the manager selection process, organizations can do a better job of identifying top-performing diverse managers across all asset classes and address the structural inequality that exists for women and minorities across the asset management industry.

Representation of diverse-owned firms has increased modestly in recent years among hedge funds, private equity and real estate. However, assets under management (AUM) with diverse-owned firms has fluctuated significantly year-to-year.

The universe of asset managers is predominantly white and male. One of the biggest practical barriers to utilizing diverse asset managers is, quite simply, lack of awareness. When we talk about being more inclusive, it means making sure those managers who may not be naturally networked are not unintentionally excluded from managing assets. Unconscious bias affects inclusion.

"Diversifying Investments – A study of ownership diversity in the asset management industry" was commissioned by the John S. and James L. Knight Foundation in May 2017 and led by Josh Lerner, chair of the Entrepreneurial Management Unit and the Jacob H. Schiff Professor of Investment Banking at Harvard Business School, and the Bella Research Group. **clostiff* The study examined four segments of the industry – mutual funds, hedge funds, private equity funds and real estate funds – finding that the number of women- and minority-owned firms ranged from 3 to 9 percent, and AUM ranged from below 1 percent to 5 percent. The study grew out of Knight's efforts to diversify its own endowment investments. Knight has moved \$472 million of its endowment – or 22 percent – to management by women- and minority-owned firms in the past decade, with no compromise on performance. Below is the data collected across asset classes.

Mutual Funds

The research identified 127 women-owned and 107 minority-owned firms as of Q2 2016, managing 572 and 416 mutual funds, respectively. Women- and minority-owned mutual funds represent just 5.2 percent and 3.8 percent of all mutual funds, respectively.

The women-owned mutual funds comprise 288 funds with substantial female ownership (25 to 49 percent) and 284 funds with majority female ownership (50 percent and higher). Together, these women-owned funds manage \$405.9 billion in AUM, accounting for less than 1 percent of the total industry AUM. Similarly, minority mutual funds comprise 51 funds with substantial minority ownership and 365 funds with majority-minority ownership (that is, 50-plus percent minority ownership); all together, minority-owned mutual funds manage less than 0.5 percent of the industry AUM.

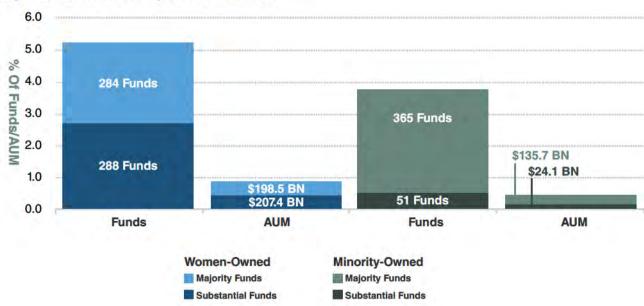


Figure 80: Women and Minority-Owned Mutual Funds

Source: Bella Research Group

Hedge Funds

As of mid-2016, hedge funds managed by women- and minority-owned firmsrepresent about 3.3 percent and 5.5 percent of all hedge funds, respectively. Most of the identified diverse hedge funds are managed by firms with 51 percentor more female or minority ownership. Together, women- and minority-ownedhedge funds control less than 1 percent of the total industry AUM.

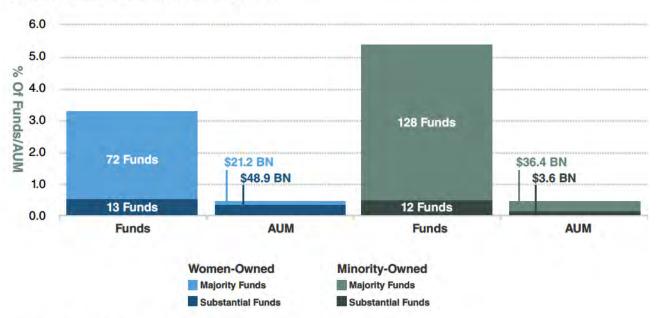


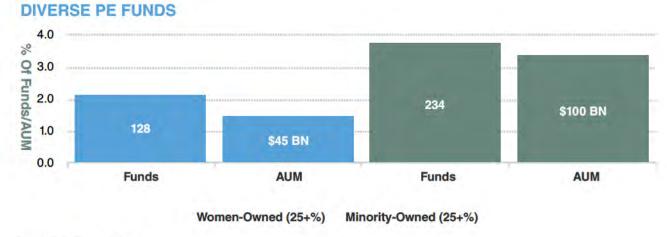
Figure 81: Women and Minority-Owned Hedge Funds

Source: Bella Research Group

Private Equity

Among active private equity funds (established since the beginning of 2004), the research identified 128 funds managed by women-owned firms and 234 funds managed by minority-owned firms, making no distinction between substantial ownership (25 to 49 percent) and majority ownership (50-plus percent) because of data constraints. These firms represent less than 6 percent of the total fund count and control less than 5 percent of AUM in the private equity industry.

Figure 82: Women and Minority-Owned Private Equity Funds

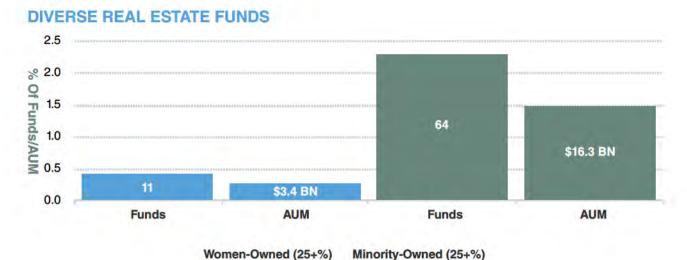


Source: Bella Research Group

Real Estate

The research identified 11 women-owned funds and 64 minority-owned funds among the universe of real estate funds in Preqin (established since the beginning of 2004). Together, this represents less than 3 percent of all real estate funds. Representation by AUM is even lower, with women and minorities representing about 0.3 percent and 1.5 percent of the industry totals, respectively.

Figure 83: Women and Minority-Owned Real Estate Funds



Source: Bella Research Group

The study confirmed there is no legitimate reason not to invest with diverse asset managers in the 21st century. While diverse-owned firms have grown in representation in recent years, the growth has been moderate and has not uniformly occurred across all asset classes. Diverse firms still represent a small fraction of the total asset management industry. The study sheds light into just how little diversity there is in ownership of asset management firms. Aggregating across all four asset classes examined in the report, diverse-owned firms represent just 1.1 percent of industry AUM.

An important finding of the research is that there is no statistical difference in performance between diverseowned firms and their peers. Diverse-owned funds perform at a level comparable to that of their non-diverse peers. Within conventional statistical confidence levels, funds managed by diverse-owned firms typically perform as well as non-diverse funds after controlling for relevant characteristics (such as firm size, fund size, geography and investment focus). A common refrain has stated that poor performance among diverse-owned firms has precluded their receipt of greater investment; the findings of this study cast doubt on this assertion.

Recommendations

Pennsylvania can adopt practices other states have utilized to encourage and increase diversity and inclusion in public assets under management.

Consultants in the industry point to Illinois as one of the leaders among public pension funds promoting diversity and inclusion in the management of public assets. Illinois pensions have boosted investments with women- and minority-owned money managers in the 15 years since the General Assembly began tracking allocations.

In October of 2018, the Chicago Teachers' Pension Fund (CTPF) announced that it invested \$4.5 billion, more than 41.9 percent of total fund assets, with Minority, Women and Disabled-Owned Business Enterprise (MWDBE) firms in fiscal year 2018. This represents a 9.11% increase over 2017 investments.

Public pension plans in Illinois by far have done the largest hiring relative to total assets of minority- and women-owned firms and have set the highest future targets for such hirings, according to reports to the governor and Legislature. Not only does Illinois state law set a strict definition of "emerging," but also the state's pension plans must set targets to increase the hiring of managers, consultants and senior staff, among others, who meet that definition.

CTPF invests in emerging managers through direct mandates and Manager-of-Managers programs (MoMs). Currently, the Fund has direct relationships with 29 MWDBE firms who manage 54 portfolios. The Fund has MoMs relationships with an additional 17 MWDBE firms who manage 21 investment portfolios. Managers who perform well under the MoMs program may graduate to direct mandates with the Fund. Since the program's inception, eight firms have graduated to direct mandates.

The Illinois Pension Codeincludes the following language:

to encourage the trustees of public employee retirement systems, pension funds, and investment boards to use minority investment managers in managing their systems' assets, encompassing all asset classes, and to increase the racial, ethnic, and gender diversity of their fiduciaries, to the greatest extent feasible within the bounds of financial and fiduciary prudence, and to take affirmative steps to remove any barriers to the full participation in investment opportunities afforded by those retirement systems, pension funds, and investment boards. colaxiv

As a point of reference, the Illinois Municipal Retirement Fund Board of Trustees has adopted the following minimum goals for the utilization of Minority Investment Management firms.

Figure 84: Example Utilization Goals for Minority Investment Managers

UTILIZATION GOAL FOR MINORITY INVESTMENT MANAGERS BY CLASSIFICARTION

CLASSIFICATION	MINIMUM GOAL AS % OF TOTAL FUND MARKET VALUE
Minority Owned Businesses	13%
Women Owned Busincesses	6%
Businesses Owned by a Person with a Disability	1%
TOTAL MINORITY INVESTMENT MANAGERS	20%

UTILIZATION GOAL FOR MINORITY INVESTMENT MANAGERS BY ASSET CLASS

PORTFOLIO ASSET CLASS	MINIMUM GOAL AS % OF ASSET CLASS	
Domestic Equity	8%	
International Equity	15%	
Fixed Income	25%	
Real Estate	8%	
Private Equity	15%	
Timberland	Best Efforts	
Agriculture	Best Efforts	

Source: Illinois Municipal Retirement Fund. Timberland and Agriculture percentages are calculated using NAVs. Private Equity and Real Estate percentages are calculated using committed amounts.

The Public School Teachers' Pension and Retirement Fund of Chicago (CTPF) Board of Trustees adopted a Investment Manager Diversity Policy to set goals for increasing the Fund's utilization of MWDBE Investment Management firms. CELEXCH OF THE STATE OF T

The State of New York's efforts were spurred by a law signed in November 2010. *Charvi** The legislation, while not requiring set-asides or quotas for minority- or woman-owned asset management firms, attempted to increase opportunities for those groups. The law required New York state to create a database of minority- and woman-owned asset managers and requires the state to hold an annual conference to make diverse groups aware of asset management opportunities.

Organizations that are successful in allocating to diverse asset managers have boards and investment teams that prioritize diversity and inclusion. Organizations that have been prudent and successful in allocating capital to diverse asset managers are those that have strong support from the boards of their organizations. By intentionally collaborating with others in the field and educating themselves about diverse managers, support and enthusiasm at the top level grows. By collaborating with other industry experts, board members and investment staff can be made aware of the rich pool of talent among diverse asset managers. Diversity starts at the top. Our state boards and staff must have a focus on diversifying our assets under management by minority-and woman-owned firms.

One way to ensure this prioritization is requiring that the composition of Pennsylvania's public pension boards reflect the diversity of the state with its membership. Furthermore, the pension systems should also be required to consider women and minorities in their hiring practices for staff. Organizations such as the National Association of Securities Professionals (NASP), the National Association of Investment Companies (NAIC), and the Asian American Association of Investment Managers (AAAIM) focus on minority investment professionals and could be a source for recruiting more diverse talent.

A 2014 study commissioned by the Teacher Retirement System of Texas indicated that strong leadership from boards and staff is a critical building block for creating a high functioning emerging manager program (EMP). CLARCH All of the well-established EMPs examined easily identified at least one champion of the program on the Board or among the staff. When selecting board and staff leadership, candidates should be sought out that will be strong advocates for a successful EMP. The study found a strong correlation between boards and investment staff that were demographically diverse and the organizational commitment to EMPs. Organizations that value inclusiveness and a wide range of backgrounds naturally see value in EMPs as part of the asset allocation.

SERS and PSERS rely on external consultants for sourcing and vetting asset managers. The importance of these relationships cannot be ignored. The Boards and staff of the pensions systems must communicate to their consultants the priorities of diversity and inclusion when presenting managers for consideration. Without strong and specific encouragement, most consultants have not recommended diverse asset managers. It is imperative that consultants understand they are expected to be inclusive in their search. To that end, the staff and boards Pennsylvania's public pension funds need to hold the consultants accountable in meeting this goal.

Public reporting seems to be one means of holding Illinois and City of Chicago pension funds report annually on a long list of questions regarding the ethnicity and gender of the members of their own staffs and boards as well as money managers they hire to invest pension dollars.

The thrust is that holding boards and staff accountable for their hiring and selection practices and airing their performance publicly will advance more diverse choices. It is important to note, that increasing diversity among asset managers is not in conflict with the stated goals and recommendations of this Commission – in particular, recommendations involving investment asset management.

We recommend that the Pennsylvania General Assembly follow the lead of other states by enacting legislation to encourage diversity and inclusion efforts to increase the use of minority- and woman-owned asset management managers and firms. These initiatives include but are not limited to:

- Encouraging the Commonwealth's public pension systems and other investment boards to use
 minority investment managers in managing their assets, encompassing all asset classes, and to
 increase the racial, ethnic, and gender diversity of their fiduciaries, to the greatest extent feasible
 within the bounds of financial and fiduciary prudence, and to take affirmative steps to remove any
 barriers to the full participation in investment opportunities.
- Requiring the public pension systems and other investment boards to report annually on the ethnicity
 and gender of the members of their own staffs and boards as well as money managers they hire. (For
 reference, the Chicago Teachers' Pension Fund Response to the 2017 Senate Committee on Public
 Pensions and State Investments Minority and Female Investment Hearing Questionnaire can be found
 at https://www.ctpf.org/sites/main/files/file-attachments/2017_senate_questionnaire_report_final_vk3_0.pdf.)
- Requiring the public pension systems and other investment boards to obtain diversity information on
 each current and prospective manager and produce a minority inclusion report annually.

- The report should include information from investment advisors, consultants, or private market funds:
 - 1. the number of its investment and senior staff and the percentage of its investment and senior staff who are (i) a minority person, (ii) a woman, and (iii) a person with a disability; and
 - 2. the number of contracts, oral or written, for investment services, consulting services, and professional and artistic services that the investment advisor, consultant, or private market fund has with (i) a minority-owned business, (ii) a women-owned business, or (iii) a business owned by a person with a disability;
 - 3. the total number of searches for investment services made by the consultant in the prior calendar year that included (i) a minority-owned business, (ii) a women-owned business, or (iii) a business owned by a person with a disability;
 - 4. the total number of searches for investment services made by the consultant in the prior calendar year in which the consultant recommended for selection (i) a minority-owned business, (ii) a women-owned business, or (iii) a business owned by a person with a disability;
 - 5. the total number of searches for investment services made by the consultant in the prior calendar year that resulted in the selection of (i) a minority-owned business, (ii) a women-owned business, or (iii) a business owned by a person with a disability; and
 - 6. the total dollar amount of investment made in the previous calendar year with (i) a minority-owned business, (ii) a women-owned business, or (iii) a business owned by a person with a disability that was selected after a search for investment services performed by the consultant.
- · Creating a Commonwealth online database of minority- and woman-owned asset managers.
- Adopting minimum goals for the utilization of minority- and woman-owned asset management firms.

Final Report and Recommendations: PUBLIC PENSION MANAGEMENT AND ASSET INVESTMENT REVIEW COMMISSION

GLOSSARY

Glossary

Glossary entries are tailored to the context of public pension investment and specifically to the work of the Commission.

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Glossary Terms

2 and 20. A typical structure of payments owed to external *alternative investment* managers. For example, the *management fee*, intended to cover fund administration costs, is often set at 2% of total *committed* asset value. In addition, the manager might earn a *performance fee* of 20% of the *carry* (net profits that exceed the agreed-upon *benchmark*, also known as the "preferred return" or the *hurdle rate*).

Active management. Active funds management (also called active investing) refers to a portfolio management strategy where the manager makes specific investments with the goal of outperforming an investment benchmark index or target return. [Wikipedia]

Actuarial savings. Projected savings based on actuarial projections of plan assets and liabilities.

Actuarial Standards Board (ASB). The nine-member Actuarial Standards Board (ASB) establishes and improves standards of actuarial practice for the United States. These Actuarial Standards of Practice (ASOPs) identify what the actuary should consider, document, and disclose when performing an actuarial assignment. [ASB]

Actuarial Standards of Practice (ASOP) (see Actuarial Standards Board).

Actuarially Determined Contribution (ADC). A target or recommended contribution to a defined benefit pension plan for a given reporting period, determined in conformity with *Actuarial Standards of Practice* based on the most recent measurement available when the contribution for the reporting period was adopted. The ARC may or may not be the amount actually paid by the plan employers (sponsors). [GASB 67/68]

Alignment. In this context, alignment of interests/incentives between stakeholders. For example, it is desirable for the financial incentives of an external investment manager to be closely aligned with those of the pension fund participants.

Alpha. The returns for an investment that exceed the benchmark set for it. [Investopedia]

Alternative investments. An umbrella term for certain types of investments. The unifying theme of alternative investments is the legal structure, in which there is a *general partner* that manages an investment fund on behalf of itself and a set of *limited partners*. Alternative investments include private equity, hedge funds, distressed debt, real estate, and commodities—basically anything other than publicly-traded fixed-income, cash, and public equities. Typically, alternative investments lack an established public exchange; have low liquidity; and can be more difficult to value than stocks or bonds. [Pew]

Annually Required Contribution (ARC). The amount the pension plan's employers (sponsors) must contribute for a given year in order to cover the pension's annual normal cost and amortize the unfunded accrued liability. [Public]

Asset allocation. Investment choices made among broad asset classes such as equities, fixed income, securities, real estate, etc. Also referred to as "asset mix." [SERS Investment Policy]

Asset class. A group of assets that exhibits similar characteristics, behaves similarly in the marketplace and is subject to the same regulations. There are multiple, sometimes overlapping, categorization schemes for assets, and there is no single authoritative classification. The following primary classes are generally recognized: (1) Cash equivalents with a holding period of less than one year; this includes bank deposits, short-term Treasury bills and bonds, mortgage-backed securities, and money market accounts; (2) Commodities; (3) Bonds—principally, domestic and foreign government and corporate bonds; (4) Equities which are ownership shares in a private or publicly-exchanged company; (5) Real estate. Investments in alternatives are sometimes classified within the above categories or on their own, including labels such as hedge funds, private equity, private debt, multi-strategy and venture capital.

Assets Under Management (AuM). The AUM measures the total market value of all the financial assets that a financial institution manages on behalf of its clients and themselves. [Wikipedia] Note that investment fees may be assessed as a percentage of AUM for a particular investment fund.

Base fee. The fee (also known as a *management fee*) that is charged by an *external manager*. It is typically calculated as a percentage of assets under management for traditional investments and as a percentage of either invested capital or committed capital for limited partnership structures. The base fee is often tiered, where incremental additional investments are charged a progressively lower amount. [PSERS]

Basis points (bps). A common unit of measure for interest rates and other percentages in finance. One basis point is equal to 1/100th of 1%, or 0.01%, or 0.0001. For example, an investment fee of "200 basis points" is equivalent to 2%. Similarly, a reduction in the target rate of return from 7.5% to 7.25% represents a reduction by 25 basis points.

Benchmark. A benchmark is a standard against which the performance of a security, mutual fund or investment manager can be measured. [Investopedia]

Beta. In finance, the beta (β or beta coefficient) of an investment or of a portfolio is a measure of sensitivity to an index. It is the estimated or forecasted regression coefficient when regressing the excess returns (over a risk-free rate) of the investment with the excess returns of the index. Beta measures the *systematic* risk arising from exposure to general market movements as opposed to *idiosyncratic* factors.

Blue Ribbon Panel (BRP). The Blue Ribbon Panel on Public Pension Plan Funding (2013-14) was convened by the Society of Actuaries. The report recommended actions to strengthen financial and risk management practices by providing new information to trustees, funding entities and their elected officials, employees and their unions, taxpayers and other stakeholders. [SOA]

Broker-dealer. In the U.S., a registered entity that engages in the business of trading securities on behalf of its customers (in which case it is acting as a broker) or for its own account (in which case it is acting as a dealer). [Wikipedia] A *placement agent* is a broker-dealer that connects a company offering securities with potential qualified investors such as pension systems.

Buckets. The strategy of apportioning assets into several portfolios ("buckets"), each with a range of investments meeting specific needs over a particular time frame.

Bundled brokerage. The situation in which an investor pays one rate of commission to its broker and receives the broker's research as part of the "bundle." Unbundling is the process of separating the execution commissions paid by an investor from its research spending.

Burgiss data. Data provided by the Burgiss company (provider of investment decision support tools) to investors on the *transparency* of their private capital portfolio holdings; this data helps them measure risk, portfolio composition, and manager performance.

Call ("capital call"). A general partner may, at any time during the investment period, "call" a portion of the capital that a *limited partner* has committed to the investment fund. The amount and timing of when the limited partner must provide the funds define the terms of the capital call. See also *committed capital*.

Calpers. The California Public Employees' Retirement System, the largest U.S. public pension fund.

Carried interest ("carry"). Compensation earned by the investment manager that is calculated as a percentage of the returns in excess of a *preferred return* or *hurdle rate*. Also known as a "profit share," "performance fee," or "incentive fee."

Catchup. One aspect of the distribution of an investment's returns to the general partner and the limited partner (the investor). The rationale of a catchup is to give to the GP all or a majority of the gain, until the share of the profit received by the GP equals the carried interest. [Wikipedia: Distribution Waterfall]

Co-investment. An ownership investment made directly into an operating company, alongside a financial sponsor or other private market investor. Co-investments exist in any type of private markets transaction, including leveraged buyout, recapitalization or growth capital transaction, real estate, and private debt.

COLA. Cost of living adjustment; pension benefits may be adjusted periodically to reflect a COLA.

Committed capital. The amount of capital that a limited partner agrees to invest in a limited partnership structure, e.g., a private equity fund. Typically, the general partner draws down (*calls*) the capital over time, typically 3-5 years.

Commodities. A type of asset that has been standardized such that each unit is indistinguishable from another. Examples include oil, beef, grain, precious metals, electricity, foreign currencies and emissions credits. Commodities are consiered one of the *asset classes*.

Comprehensive Annual Financial Report (CAFR). A set of financial statements comprising the financial report of a state, municipal or other government entity that complies with the accounting requirements outlined by the Governmental Accounting Standards Board. [SERS]

Covariance. The degree to which the value of the assets in a portfolio move in tandem, thus corresponding to the investment risk. The higher the covariance, the larger the risk.

Cost arbitrage. The act of investing in opportunities with similar risk and return characteristics to those already held, but at a lower cost.

CWI (All Country World Index). The MSCI ACWI, maintained by Morgan Stanley Capital International (MSCI), is a market capitalization weighted index designed to provide a broad measure of equity-market performance throughout the world in both developed and emerging markets. [Investopedia]

Defined Benefit (DB) plan. A retirement program under which the employer guarantees a level of retirement benefits, as determined by formula, to employees who meet certain eligibility requirements. [JSGC]

Defined Contribution (DC) plan. A retirement program under which the amount of the retirement benefit depends on the amount contributed to the plan by the employer, the employee, or both, and the investment return on those contributions. A DC plan gives participants a way to save for retirement in a tax-deferred environment. [JSGC]

Deterministic analysis. In *deterministic* financial models used for *stress testing*, the scenario considered in the model is fully determined by the parameter values and the initial conditions, and randomness is not considered. (Contrast with *stochastic analysis*.)

Direct fees. In private equity/markets, direct fees (or "direct investment expenses") are deducted from a limited partner's account balance or paid from other assets of the limited partners (i.e., paid through the accounts payable process). By contrast, *indirect* fees are deducted from fund returns and thus are not invoiced directly to the limited partner. *Management fees* often are direct, while *performance fees* often are indirect. Pension systems report direct fees, but current practices for reporting indirect fees vary.

Direct investment. An approach to investing in private equity in which the investor (here, the pension system) directly purchases ownership shares in the securities of a private company instead of purchasing through an intermediary, e.g., an investment manager's fund.

Discount rate. For defined benefit pension plans, the rate used to value the current cost of future pension obligations. It reduces (discounts) the plan's liabilities based on its long-term assumed rate of investment return (*target rate*).

The discount rate is a critical factor for determining how much gets saved today to pay pensions in the future. The higher the discount rate employed, the lower will be the net present value of anticipated pension benefits, which are also known as accrued pension liabilities. The lower the present value of the accrued pension liabilities (i.e. the value of all future pension benefits measured in today's dollars), the less the government and employees will need to pay into pension coffers today to cover those promised benefits when they come due. Thus, the higher the discount rate, the lower the rate of contributions flowing into a pension fund (all else equal). Conversely, the lower the discount rate, the higher annual contributions will need to be to ensure a fully funded system. [Reason]

Dodd-Frank. Following the global financial crisis of 2008, the Dodd-Frank Wall Street Reforms and Consumer Protection Act of 2010 required banks to be subjected to stress tests in order to gauge their ability to withstand crises such as stock market drops, housing market crashes, and high unemployment.

Employee contribution. The percentage of salary deducted from the employees' paychecks and allocated to the retirement funds.

Employer. In this context, the Pennsylvania public school district or public agency (commonwealth agency, judicial and legislative system, community college, port authority, Turnpike system, etc.) that employs the individuals participating in the pension plan.

Employer contribution. The percentage of payroll the *employer* ("sponsor") contributes to the retirement fund.

Environmental, social and governance (ESG). The three central factors in measuring the sustainability and ethical impact of an investment in a company or business. These criteria help to better determine the future financial performance of companies. [Wikipedia]

Equities. Stocks, held by investors, that represent ownership shares of a company (domestic or international). Equities do not guarantee a return, but they are a claim on the future value of the company.

External investment manager. Third-party investment manager, as opposed to an investment manager who is on the staff of the pension system.

Ex-officio member. A member of a body (e.g., a board or committee) who is part of it by virtue of holding another office or position. [Wikipedia]

Fiduciary. A legal or ethical relationship of trust between two or more parties where one party has undertaken to act for and on behalf of another party. A pension fund's board is a fiduciary for the pension plan members.

Fixed-income. A type of investment whose return is usually fixed or predictable and is paid at a regular frequency. The class is composed principally of bonds (including U.S. Treasuries, municipal and corporate bonds), bond mutual funds, certificates of deposit, and money market funds.

Forward rate. An interest rate applicable to a financial transaction that will take place in the future. It may also refer to the rate fixed for a future financial obligation, such as the interest rate on a loan payment. [Investopedia]

Fully funded. The situation wherein a pension fund has sufficient assets to support its net liabilities for the benefits of all active and retired members at a given time. [JSGC]

Fund. A company (or a fund, in the case of a *fund-of-funds*) that gathers capital from a number of investors to create a pool of money that is then reinvested into stocks, bonds and other assets.

Fund gross exposure. The absolute level of a fund's investments, including the value of a fund's long positions plus the absolute value of the short positions.

Fund-of-funds. An investment fund that itself invests in other externally-managed funds. Unlike investment managers of typical funds, the fund-of-funds investment manager does not select securities of companies but instead selects other funds in which to invest. This strategy is also referred to as a "multi-manager investment." Contrast with *direct investment*.

Funded ratio ("funding ratio"). The ratio of a pension system's assets to the present value of its liabilities. It is one measure of the system's health. A funded ratio less than 100% indicates the pension does not have enough assets to cover its liabilities under the current actuarial assumptions; the gap is referred to as the unfunded liability.

Governance budget. Allocation of an organization's governance activities based on assessment of its governance responsibilities and its human-resources capacity—in this context, a pension system's board of trustees and investment committee.

Governmental Accounting Standards Board (GASB). The independent, private-sector organization that establishes accounting and financial reporting standards for U.S. state and local governments that follow Generally Accepted Accounting Principles (GAAP). [GASB]

General partner. In *private equity*/market investing, the entity that raises capital from investors (in this context, the pension system) and invests and manages the funds. The investors from whom capital is raised are the *limited partners*.

Gross of fees/gross fees. The return to the investor on an asset or portfolio, before fees, costs, taxes and expenses are subtracted. (See *net of fees.*) Gross fees, as typically used by private equity investment professionals, includes all investment-related expenses, including but not limited to: administrative costs, compliance costs, travel, and oversight expenses, in addition to management fees and performance payments.

Hedge fund. An investment fund that pools capital from accredited individuals or institutional investors and invests in a variety of assets, often with complex portfolio-construction and risk-management techniques. [Wikipedia] In contrast to a private markets investment, typically a hedge fund invests in securities that are publicly traded. Hedge fund strategies often involve leverage, derivatives, and both long and short positions. (See asset classes and alternative investments.)

Hurdle / hurdle rate. In hedge funds, private equity or other private markets investing, a hurdle rate is the threshold return that must be earned before a general partner earns *carried interest* (profit-sharing) on an investment. If the hurdle rate is not achieved, the general partner does not receive the carried interest.

IBOR (Investment Book of Record(s)). A centralized data repository that gives an investor real-time information on the value of their assets.

Idiosyncratic risk. The risk from adverse events associated with a particular asset or investment manager that impact the value of the investment. It is the opposite of *systematic risk*, which is the overall risk that affects all the portfolio assets, such as fluctuations in the stock market or interest rates. Idiosyncratic risk can be mitigated by diversification in the portfolio, ensuring that each idiosyncratic risk exposure is small. (See *beta*.)

Index fund ("indexing"). An index fund is a type of mutual fund with a portfolio constructed to match or track the components of a market index, such as the Standard & Poor's 500 Index (S&P 500). Indexing is the act of investing in portfolios designed to replicate an index. (See *passive management*.)

Indirect fees. See direct fees.

Information ratio. A measure of portfolio returns above the returns of a *benchmark*, usually an index, relative to the volatility of those returns. [Investopedia]

Investment consultant. A consultant retained by an investor (here, the pension system) to provide advice on various investment issues, including asset allocation; asset/liability studies; investment in specialty asset classes; and the selection, monitoring, and termination of external investment managers. Sometimes referred to as an "investment advisor," although occasionally that term is also used to refer to investment managers.

Internal investment manager (internal or external). An investment manager who is part of the investment staff of the investing entity—in this context, the pension system. (Contrast with *external manager*.)

Institutional investor. An organization that invests on behalf of its members. Institutional investors face fewer protective regulations than individual investors because it is assumed they are more knowledgeable and better able to protect themselves. There are generally six types of institutional investors: endowment funds, commercial banks, mutual funds, hedge funds, pension funds, and insurance companies.

Institutional Limited Partners Association (ILPA). With approximately 450 member institutions across 50+ countries, representing more than \$2 trillion USD in assets under management, the ILPA supports limited partners through education, research, advocacy and events. [ILPA]

Internal Rate of Return (IRR). A metric used to measure an investment's return. Technically speaking, the IRR is the interest rate (also known as the *discount rate*) that will bring a series of positive and negative cash flows to a *net present value* (NPV) of zero (or to the current value of cash invested). [Investopedia] (Contrast with rate of return.)

Leverage. Leverage investing is a technique that seeks higher investment profits by using borrowed money. These profits come from the difference between the investment returns on the borrowed capital and the cost of the associated interest. Leveraged investing exposes an investor to higher risk. [Investopedia]

Liability-driven investment (LDI). A strategy based on the cash flows needed to fund future liabilities. It is sometimes referred to as a "dedicated portfolio" strategy. Hedging is often involved, either in part or in whole, to block or limit the fund's exposure to inflation and interest rates. The LDI strategy tends to focus on using swaps and various other derivatives. [Wikipedia] LDI hedges unrewarded risks and provides a framework for taking rewarded risks, targeting the volatility of surplus instead of asset-only.

Limited partner (LP). An investor—in this context, a pension system—in a private markets fund. Most private markets funds are structured as limited partnerships and are governed by the terms set forth in the *limited* partnership agreement. Such funds have a general partner (GP), which raises capital from institutional investors such as pension plans, universities, insurance companies, foundations, endowments, and high-networth individuals, which invest as limited partners (LPs) in the fund. [Wikipedia]

Limited Partner Agreement (LPA). The legal document governing the relationship between a private equity general partner and a limited partner.

Liquid market. A market with many bids and offers, low spreads, and low volatility. In a liquid market, it is easy to execute a trade quickly and at a desirable price because there are numerous buyers and sellers. [Investopedia]

Liquidity/illiquidity. The degree to which an asset or security can be quickly bought or sold in the market without affecting the asset's price. [Investopedia]

Management fee. The fee charged by an investment manager (in private equity, the *general partner*). Also known as the *base fee*.

Mandate ("investment mandate"). An instruction to manage a pool of capital, or a set of funds, using a specific strategy and within certain risk parameters. Some managers are given multiple mandates, each with a specific strategy.

Maturity. The most common measure of a pension fund's maturity is the ratio of retirees who are drawing benefits to active members who are making contributions.

Mean variance optimization (MVO) models. Modern portfolio theory, or mean-variance analysis, is a mathematical framework for assembling a portfolio of assets such that the expected return is maximized for a given level of risk. It is a formalization and extension of diversification in investing, the idea that owning different kinds of financial assets is less risky than owning only one type. Its key insight is that an asset's risk and return should not be assessed by itself, but by how it contributes to a portfolio's overall risk and return. It uses the variance of asset prices as a proxy for risk. [Wikipedia]

MFN ("most-favored nation") provision. In this context, a contract provision in which a general partner agrees to give a limited partner the best terms that it makes available to any other limited partner of comparable or lesser commitment amount. A MFN clause is typically contained in a "side letter" that sets out terms that supplement or, in some cases, modify the terms of the governing partnership agreement.

Monte Carlo analysis. A *stochastic* method of *stress testing* used to model the probability of different outcomes in a process that cannot easily be predicted due to the intervention of random variables. It is a technique used to understand the impact of risk and uncertainty in prediction and forecasting models. [Investopedia]

Net asset value (NAV). The net value of an entity calculated as the total value of the entity's assets minus the total value of its liabilities. [Investopedia]

Net excess return. The return after deducting all fees and costs of an investment over that of a defined alternative investment. (See *risk-free rate*.)

Net of fees. The return to the investor on an asset or portfolio, after all fees, taxes and expenses (e.g., legal, accounting, reporting) are subtracted. Compare to *gross of fees*, which is the return before subtraction of fees, taxes, and expenses.

Net present value (NPV). Net present value (NPV) is the difference between the present value of cash inflows and the present value of cash outflows over a period of time. NPV is used in investment planning to analyze the profitability of a projected investment or project. [Investopedia]

Net value added. In this context, the additional net value provided by *active* (*investment*) *management* as compared to *indexing*.

Non-disclosure agreement (NDA). A legal agreement between parties to maintain specified information in confidence between the parties, except as explicitly provided by the agreement.

Normal cost. The present value of projected lifetime benefits to be paid to active workers that is allocated to the current year by the actuarial cost method. [Public]

Outsourced CIO. A company that is hired by an *institutional investor* to manage some portion of its investments, ranging from an individual asset class to the entire portfolio. In this sense, the institutional investor is outsourcing some of the functions that a Chief Investment Officer would normally perform.

Pareto efficiency ("pareto optimality"). A state of allocation of resources from which it is impossible to reallocate so as to make any one individual or preference criterion better off without making at least one individual or preference criterion worse off. The Pareto frontier (or "efficiency frontier") is the set of all Pareto efficient allocations, conventionally shown graphically. [Wikipedia]

Passive management. Passive funds management (also called passive investing or *indexing*) refers to a portfolio management strategy that tracks a market-weighted index or portfolio. Often, this involves mimicking the performance of an externally specified index by buying an index fund. [Wikipedia]

Pension plan. A retirement plan that requires an employer ("sponsor") to make contributions into a pool of funds set aside for a worker's future benefit. The pool of funds is invested on the employee's behalf, and the earnings on the investments generate income to the worker upon retirement. In addition to an employer's required contributions, some pension plans have a voluntary investment component. A pension plan may allow a worker to contribute part of their current income from wages into an investment plan to help fund retirement. The employer may also match a portion of the worker's annual contributions, up to a specific percentage or dollar amount. [Investopedia]

Performance fee. See carried interest.

Performance persistence. The extent to which an investment manager consistently obtains favorable results over time.

Placement agent. A registered *broker-dealer* retained by an external investment manager to connect it with qualified investors such as pension systems.

Platform company. Typically, a financial management firm that an asset owner (a pension, sovereign wealth fund, or large family office) owns--usually in perpetuity--in order to access a particular asset class.

Portfolio. A collection of assets owned by an institution (here, a pension system), typically containing assets from many asset classes.

Preferred return. See hurdle rate.

Private equity ("PE"). Equity capital that is not quoted on a public exchange and consists of investors and funds that make investments directly into private companies or conduct buyouts of public companies that result in a delisting of *public equity*. Private equity investments often demand long holding periods to allow for turnaround of a distressed company or a liquidity event such as an initial public offering (IPO) or sale to a public company. Often, pension funds invest in private equity funds that hold ownership in multiple assets. [World Bank]

Private markets investments. There are non-listed securities in all types of markets, not just equity. For example, there are private debt securities as well as private securities for the financing of real estate investments. Private markets investing encompasses investment in any publicly-traded securities. Since *private equity* is the largest segment of this market, the term private equity is often used to refer to private markets.

Procurement. Here, the process of identifying, evaluating, and engaging external investment managers and consultants.

Proprietary information. Information concerning an organization's operations, assets, partnerships, etc. that is not public knowledge and that is viewed as the property of that organization. For example, *investment managers* may view information about their fee structures and other key contract terms as proprietary.

Public equity. Equity (ownership shares) of capital that is listed on a public exchange.

Public market equivalent (PME). A set of analyses used to evaluate the performance of a private market investment against a public-markets benchmark or index. The analysis is also known as ICM (index comparison method). A "PME return" on a private market investment is one that is equal to the return earned by the benchmark or index.

Rate of return (ROR). The percentage increase or decrease of an investment over a given period of time. ROR tells an investor about the total growth, from the starting point to the current date, of the investment. By contrast, the *internal rate of return* (IRR) tells the investor what the annual growth is. [Investopedia]

Rebalancing. Realigning the weightings of a portfolio of assets across asset classes. Rebalancing involves periodically buying or selling assets in a portfolio to maintain a target level of asset allocation in each class. [Investopedia]

REIT (Real Estate Investment Trust). A company that owns, operates or finances income-producing real estate, including office and apartment buildings, hotels, infrastructure and timberland. Investors purchase shares of the trust.

Return distribution. The probability distribution of the possible values of the returns from an asset or portfolio.

Risk. The uncertainty of outcome or the likelihood of not meeting an objective. In the context of public pensions, risk may be measured along several dimensions. *Volatility* (often measured as standard deviation) indicates how much the current return is deviating from its expected historical normal returns. *Beta* measures the amount of systematic risk an individual security or an industrial sector has relative to the whole stock market. "Downside risk" estimates how much can be lost on the investment. [Investopedia]

Risk appetite. The level of risk (for individual investments or across an entire portfolio) an institution is prepared to accept/tolerate.

Risk-adjusted return. A refined measure of an investment's return that reflects how much risk is involved in producing that return. Risk-adjusted returns are applied to individual securities, investment funds, and portfolios. [Investopedia]

Risk-free rate. The risk-free rate of return is the theoretical rate of return of an investment with zero risk. The risk-free rate represents the interest an investor would expect from an absolutely risk-free investment over a specified period of time. [Investopedia] The return on domestically held short-dated government bonds is normally perceived as a good proxy for the risk-free rate. [Wikipedia]

Risk parity. A portfolio allocation strategy that uses risk to determine allocations across various components of an investment portfolio. [Investopedia]

Risk premium. The return in excess of the *risk-free rate of return* an investment is expected to yield; an asset's risk premium is a form of compensation for investors who tolerate the extra risk, compared to that of a risk-free asset, in a given investment. [Investopedia]

Scenario testing ("scenario analysis"). The process of estimating the expected value of a portfolio after a given period of time, assuming specific changes in the values of the portfolio's securities or key factors take place, such as a change in the interest rate. Scenario analysis is commonly used to estimate changes to a portfolio's value in response to an unfavorable event and may be used to examine a theoretical worst-case scenario. [Investopedia]

Sensitivity analysis. A method for determining how different values of an independent variable affect a particular dependent variable under a given set of assumptions. This technique is used within specific boundaries that depend on one or more input variables, such as the effect that changes in interest rates (independent variable) has on bond prices (dependent variable). Sensitivity analysis is also referred to as "what-if" or simulation analysis and is a way to predict the outcome of a decision given a certain range of variables. By creating a given set of variables, an analyst can determine how changes in one variable affect the outcome. [Investopedia]

Sharpe ratio. Measures the *risk-adjusted return* of an investment asset, portfolio, or strategy. The ratio is the average return earned in excess of the *risk-free rate* per unit of volatility or total risk. A higher number is favorable, indicating that the investment is earning more return per unit of risk. [Investopedia]

Side letter. An agreement between a private equity fund and one particular investor to vary the terms of the *limited partner agreement* with respect to that particular investor (typically, in favor of the investor).

Skewness. A measure of the degree of asymmetry of a distribution around its mean; a normal distribution has a skewness of zero. Here, we are referring to the distribution of the possible returns of an investment. Positive skewness means that the investors have a greater chance of extremely positive outcomes.

Sortino ratio. A modification of the *Sharpe ratio* that penalizes only those returns falling below a user-specified target or required rate of return, while the Sharpe ratio penalizes both upside and downside volatility equally. [Wikipedia]

SPIVA® scorecard. S&P Indices Versus Active (SPIVA®) measures the performance of actively managed funds against their relevant S&P index benchmarks. SPIVA® scorecard reports for various fund markets are issued semi-annually.

Stochastic analysis. Stochastic financial-simulation models address the inherent randomness of the future; the same set of parameter values and initial conditions will lead to an ensemble of different outputs. *Monte Carlo* analyses are one type of stochastic analysis used for *stress testing*. Compare to *deterministic analysis*.

Stress testing. Assessment of the impact of extreme scenarios on an investment portfolio and/or an institution's financial health. Stress tests usually take the form of computer-generated simulation models that test hypothetical scenarios. (See *scenario analysis*.) Broadly speaking, stress tests can be classified as *deterministic* or *stochastic*.

Subscription line of credit. A private equity firm may use the commitments of capital by its investors to its funds as collateral to secure a line of credit.

Swensen J curve. In private equity, the characteristics of an investment's return and cash flow profile. The J curve illustrates the tendency of private equity funds to deliver negative returns and cash flows in the early years and investment gains and positive cash flows later in the investment fund's life as the portfolio companies mature and are gradually exited. [Capital Dynamics]

Systematic risk. The risk to the value of an investment or portfolio from aggregate economic events and general market movements, such as a decline in a broad index of equities. In contrast, *idiosyncratic risk* is due to factors particular to an asset. Systematic risk cannot be diversified in a portfolio that holds only long positions in securities. (See also *beta*.)

Target rate. The annual percentage return on investments that a pension system is seeking.

Transparency. Generally, transparency refers to the degree of disclosure about an entity's operations. In this context, it may refer to a limited partner's access to financial information (including fees, valuation, and performance results) concerning a particular private equity asset. It may also refer to the information shared by a pension system with its stakeholders.

Undrawn. Funds committed by a *limited partner* that have not yet been called by the general partner but are still a legal obligation of the limited partner to the fund. Also known as "unfunded capital commitments." (See *committed capital.*)

Value add ("value added"). A moderate to high risk investment strategy. In real estate, value add properties often have little to no cash flow at the time of acquisition but have the potential to produce a tremendous amount of cash flow once the value has been added. These buildings typically have some combination of occupancy issues, management problems, and deferred maintenance. [Origin]

Venture capital. Financing that investors provide to startup companies and small businesses that are believed to have long-term growth potential. [Investopedia] (See asset class and alternative investments.)

Volatility. One type of risk, volatility measures how much the price of a security, derivative, or index fluctuates.

Zombie fund. Also referred to as a "closed fund," a with-profits fund that is closed to additional investment. Typically, a with-profits fund provides annual bonuses and a terminal bonus. A zombie fund holds some or all of its assets beyond its initially-intended holding period, awaiting a time when it can sell the asset for a profit.

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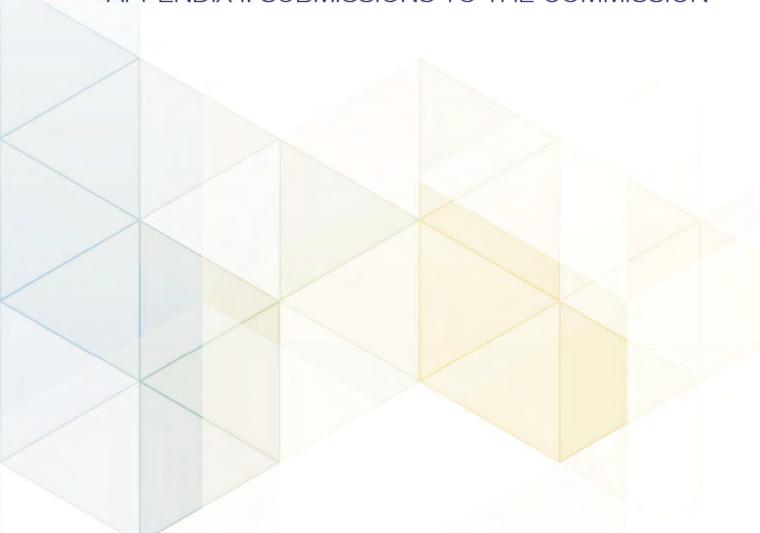
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Final Report and Recommendations: PUBLIC PENSION MANAGEMENT AND ASSET INVESTMENT REVIEW COMMISSION

APPENDIX I: SUBMISSIONS TO THE COMMISSION



Appendix I: Submissions and Exhibits

Separately printed document.

Final Report and Recommendations: PUBLIC PENSION MANAGEMENT AND ASSET INVESTMENT REVIEW COMMISSION

APPENDIX II: ADDITIONAL RESEARCH MATERIALS



Appendix II: Additional Research Materials

Separately printed document.

Final Report and Recommendations: PUBLIC PENSION MANAGEMENT AND ASSET INVESTMENT REVIEW COMMISSION

APPENDIX III: "INDEPENDENT REVIEW OF THE PPMAIRC REPORT" SUBMITTED BY COMMISSIONER GALLAGHER

Appendix III: "Independent Review of the PPMAIRC Report" submitted by Commissioner Gallagher

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Final Report and Recommendations: Public Pension Management and Asset Investment Review Commission

Errata Sheet

The Final Report and Recommendations of the Public Pension Management and Asset Investment Review Commission as first printed, December 2018, is amended to reflect the following correction(s):

Page 25

To replace the background description of Bernard Gallagher with the following:

Bernard F. Gallagher is a Senior Budget Analyst for the Appropriations Committee in the state House of Representatives, and has been an appointed designee since 2010 for PSERS and since 2014 for the state employees' system board. In his previous public sector experience, Gallagher served as a nonpartisan principal budget analyst for the Colorado General Assembly. In the private sector, Gallagher modeled business and revenue strategies for the corporate travel industry and analyzed price volatility in the energy industry at the U.S. Energy Information Administration. Gallagher has received trustee-specific institutional investing and governance training at the Kennedy School of Government at Harvard University, Haas School of Business at UC-Berkeley, the International Centre for Pension Management at the University of Toronto, Rotman School of Business, and is a certified Pennsylvania Public Retirement Plan Professional through the Pennsylvania Association of Public Employees' Retirement Systems (PA-PERS).