NOVARCA

PA Treasury

Investment Cost Transparency & Optimization for SERS and PSERS

Oct, 2018

Contents

Executive Summary

We were asked to find savings opportunities to achieve actuarial savings of $1.5 billion for each System compounded over 30 years under the assumption of a 7.25% annual return.

Our analysis is purely limited to best-practice procurement in order to achieve cost reductions while keeping the existing risk/return exposure. None of our recommendations should be interpreted as investment advice, as our analyses and recommendations are done under the assumption that asset allocation and manager selection remain unchanged.

We believe that both plans are able to meet the target, although due to the different size of the plans, achieving the target proves to be more difficult for the smaller of the two plans, SERS.

Over a 30-year time horizon, taking into account 7.25% interest for both SERS and PSERS; the plans' current investment strategy carries the potential to achieve the following actuarial savings:

Plan	Identified Savings Potential
SERS	$ 1.51 B
PSERS	$ 4.96 B

We have not been granted full access to the information needed in order to perform an in-depth analysis across the entire portfolios of SERS/PSERS. In order to produce a report in time for this hearing we have, thus, focused our analysis on Public Equity mandates, where we have been given more, albeit still not sufficient, information in the case of SERS.

Executive Summary

SERS Public Equity Mandates:

Many passive mandates, which seem generally to be priced fairly.

There are four primary candidates for in-depth review and potential renegotiation:

- SERS Active Mandate 1: Agreement almost 9 years old; returns (3y ending June 2017) are poor.
- SERS Active Mandate 3: Very expensive for Developed World Small Cap.
- SERS Active Mandate 4: Agreement 8 years old.
- SERS Active Mandate 6: Agreement 5 years old.

Most Favored Nation (MFN) clauses don't guarantee best terms! And in fact; over time, they tend to serve the asset manager more than the asset owner.

PSERS Public Equity Mandates

More expensive mandates don't guarantee better returns.

The cheapest out of five mandates in "International All Cap Equities," has enjoyed the best returns. This cheapest mandate is priced at 44 bps, the average of the other four is 81.75 bps.

There are several primary candidates for potential renegotiation:

- All of the five International Equities Small Cap mandates.
- PSERS Passive Mandate 1, as SERS pays lower fees for the same.
- PSERS Active Mandate 3: Absence of tiers above $200M is not in line with best practice.
- PSERS Active Mandate 4: Worst performer in its category, despite highest fixed fee.

Executive Summary

Lack of Transparency

Despite having asked for unredacted contracts and limiting our request to Public Equity, **to date, we have not received these contracts for SERS**. Our analysis, specifically on SERS, is thus based on assumptions and average rates that we found in consultant reports.

Due to **the lack of data provided by the plans, it is difficult to make a statement about the potential overcharges, which the SEC found in 2014 to be likely in more than 50% out of all Private Equity General Partners**. For most investors, Private Equity is the most expensive asset class; therefore, potential cost savings can be substantial. However, they need to be captured over a longer time horizon than with other asset classes, as fees can only be renegotiated upon new investments, after a typical holding period of 10 years.

Performance Data

The data on performance used at the time of producing this report is as per end of June 2018.

Self-Assessment of the Plans

As part of our review, we have asked the plans to participate in a self-assessment on their investment cost. Here is a shortened version and excerpt of the answers provided.

1. On a scale from 1-10, where do you think your management fees are placed in the market (1 being least competitive, 10 being most competitive)?	
PSERS	**SERS**
10	10
Both plans justify this (self-assessed) ranking, by the fact they have Most Favored Nation (MFN) clauses in place.	

Novarca Comment: **We do not believe the plans merit a 10. Although there are many things that the Plans are doing very well, there are gaps that can and should be closed.** Most Favored Nation (MFN) clauses are not a guarantee of best terms.

2. What is the average age of the fee schedules in your portfolio?	
PSERS	**SERS**
Not tracked.	Not tracked.

Novarca Comment: It is essential to review contractual terms on a regular basis; at the very least every 2-3 years. **We, therefore, believe the plans should actively track the age of the agreements.**

Self-Assessment of the Plans

4. What percentage of your asset managers have confirmed in writing that they don‘t receive commissions, rebates, retrocessions and the like; associated with your investment?	
PSERS	**SERS**
“PSERS does not maintain this information.”	SERS has not directly answered the question, however indicates that this is addressed as part of their Due Diligence.

Novarca Comment: **This is an area of potentially big conflicts of interest and should be monitored with great discipline**. Most pension funds we work with have all asset managers confirm in writing whether or not they have received such benefits.

5. What percentage of your asset managers have confirmed in writing that they don‘t pay and have not paid any commissions, introduction fees or the likes associated with your investments?	
PSERS	**SERS**
“PSERS does not maintain this information.”	SERS has not directly answered the question; however, SERS indicates that this is addressed as part of their Due Diligence process. SERS also mentions that they do not directly work with placement agents and requires the fund sponsors to attest that no placement agent fees have been paid to attract SERS’ investment.

Novarca Comment: **We believe it is crucial to have full transparency on where your fees are ending up**. There have been many situations in the past where parties were inappropriately compensated for capital introduction; not being fully made aware of such potential payments carries enormous reputational risk for the plan and the state.

Self-Assessment of the Plans

8. Do your brokers, or those of your managers, make use of bundled brokerage?	
PSERS	**SERS**
"Yes, in some cases."	*"Yes, several of them."*

Novarca Comment: Bundled brokerage incentivizes the managers to churn the portfolio more than necessary, in order to generate soft dollars, such as, with Research. It is never clear if such soft dollars are then used for the benefit of the client who created such budgets or not. For example, **in Europe**, with MiFID II regulation coming into force, **bundled brokerage has been banned and has been considered illegal since the beginning of 2018.**

9. Are you conducting regular transaction cost analyses on equities, fixed income and FX?	
PSERS	**SERS**
No	*"Yes, on a quarterly basis."*

Novarca Comment: **It is important to regularly perform transaction cost analysis**, as it would highlight potential **shortcomings** in the implementation of a mandate, **such as closet indexing**, churning, market impact, etc.

Self-Assessment of the Plans

10. What do you think is the single biggest hurdle (per asset class, if different) as to why asset management terms cannot be further improved?	
PSERS	**SERS**
Overhead; Capacity.	Capacity.
PSERS partial Quote: "TRADITIONAL ASSET CLASSES: THE TWO GREATEST IMPEDIMENTS ARE THE NEED FOR THE ACTIVE ASSET MANAGER TO HAVE A MINIMUM AMOUNT OF FEES TO COVER OVERHEAD OF THE BUSINESS, ESPECIALLY DURING YEARS WHERE PERFORMANCE MAY BE MORE CHALLENGED."	

Novarca Comment: Although we respect both arguments, we believe that the **mentioned overhead is not applicable in the case of PSERS since all mandates are significant by size and create meaningful management fees for the managers.** And even if it were not the case, it is not a pension plan's duty to provide support for inefficiencies at their service providers.

We understand that **some strategies/managers indeed have capacity constraints.** We would, **however,** also like to warn that **this is the single most-used negotiating tactic by asset managers to avoid fee conversations,** whether it was applicable or not.

12. Do you have procurement guidelines for asset management services in place?	
PSERS	**SERS**
"No."	Yes, to some degree

Novarca Comment (excerpt): We believe it is **important to have procurement guidelines** in place, **as they ensure a structured and replicable process** whenever investment management agreements are signed.

SERS Mandates – Findings

US Equity Mandate, AuM, Benchmark	Findings
SERS Active Mandate 1 **$476M** Russell Mid Cap Index	• 0.49% (terms unclear) • **Active Mandate** • No visibility on contract details. • This is a candidate for review, **contract 9 years old**, recent returns (3Y ending June '17) are poor. • This is expensive! SERS has a Small Cap mandate that is cheaper than this Mid-Cap mandate. **We think that this nearly-$500M mandate should be about 25-30 bps.**
SERS Passive Mandate 1 **$5,570M** Russell 1000 Index	• <1bp (terms unclear) • **Passive Mandate** • No visibility on contract details. • **This mandate appears to be priced fairly.**
SERS Active Mandate 2 **$680M** Russell 2000 Growth Index	• 0.46% (terms unclear) • **Active Mandate** • No visibility on contract details. • This mandate has return 1.01% above benchmark over previous 3 years. This implies that **almost half of the gross alpha is being paid to the manager**. • PSERS has a contract for similar mandate with this manager at a base fee of only 0.05% with 20% Perf Fee above hurdle of MSCI US Small Cap Growth Index. This is an attractive fee structure to compare to. • Although this mandate is priced better than the Mid Cap Value portfolio above (SERS Active Mandate 1), we think an active US Small Cap mandate of $600-750M **should be priced at about 25-30 bps.**
SERS Passive Mandate 2 **$336M** Russell 2000 Core Index	• 0.02% (terms unclear) • **Passive Mandate** • No visibility on contract details. • **This mandate appears to be priced fairly.**
SERS Passive Mandate 3 **$615M** Russell 2000 Value Index	• 0.02% (terms unclear) • **Passive Mandate** • No visibility on contract details. • **This mandate appears to be priced fairly.**

SERS Mandates – Findings

International Equity – Developed World Mandate, AuM, Benchmark	Findings
SERS Passive Mandate 4 **$4,926M** MSCI World ex-US Index	• <1bp fee (terms unclear) • **Passive Mandate** • No visibility on contract details. • **This mandate appears to be priced fairly.**
SERS Active Mandate 3 **$604M** MSCI World ex-US (Small Cap) Index	• 0.68% (terms unclear) • **Active Mandate** • No visibility on contract details. • This mandate is very expensive for Developed World Small Cap. We think the fee **should be 40-45 bps for AuM between $300M-$600M.**
SERS Active Mandate 4 **$913M** MSCI World Index	• 0.39% fee (terms unclear) • **Active Mandate** • No visibility on contract details. • **We think 25-30 bps tiered fee rate** is the fair price for Developed World mandates for $1B.

SERS Mandates – Findings

International Equity – Emerging Markets Mandate, AuM, Benchmark	Findings
SERS Passive Mandate 5 **$681M** MSCI Emerging Markets (All Cap) Index	• 0.09% (terms unclear) • **Passive Mandate** • No visibility on contract details. • Additional allocation appears to have been made to this mandate as the AuM was $331M at the end of Dec '17. • Similar products from competing managers are priced equivalently for allocations >$100M. In light of recent additional allocation, we believe SERS has **room to negotiate** an improvement and will particularly benefit from switching to a tiered fee structure if and when they allocate more.
SERS Active Mandate 5 **$320M** MSCI Emerging Markets (All Cap) Index	• 0.40% fee (terms unclear) • **Active Mandate** • No visibility on contract details. • **This appears to be priced fairly.**
SERS Active Mandate 6 **$99M** MSCI Emerging Markets (Small Cap) Index	• 0.65% fee (terms unclear) • **Active Mandate** • **No visibility on contract details.**
SERS Active Mandate 7 **$326M** MSCI Emerging Markets (All Cap) Index	• 0.40% fee (terms unclear) • **Active Mandate** • No visibility on contract details. • **This appears to be priced fairly.**

SERS Mandates – Comments

Public Equity

Novarca has not been given unredacted contracts. Only one party's interests are served by not being transparent on asset managers' contractual details: that of the asset managers.

From our experience, whenever clients are told that contractual terms are a trade secret of the manager, it's an indication that these should be reviewed.

Due to the lack of transparency on contractual language, we will not be able to make meaningful statements on optimization potential (e.g., economies of scale, best practice language, etc.).

From an RVK report we have taken the average fees paid on Public Equity and have used them for our analysis:

Passive mandates seem generally fairly priced.

One of the two active mandates in International Developed Equity, SERS active mandate 3, seems very expensive. We strongly advise the contractual language be reviewed in greater detail.

Private Equity

This report is not focused on Private Equity, but we have learned that there are a large number of individual Private Equity investments in SERS' portfolio. Such a large volume of small Private Equity investments is rather unusual from our experience and, by definition, difficult to manage / monitor.

Although Private Equity allocation may be smaller than public market allocation, because the fees are higher on average, the smaller allocation to Private Equity may in fact cost more in total than the larger allocation to Public Equity.

Also, we have learned that there are thoughts of selling some of these through the secondary market. That, from experience, is a very (!!) expensive exercise due to lower secondary market value and we strongly advise such a decision be carefully reviewed before implementing.

PSERS Mandates – Findings

International Equity – Emerging Markets Mandate, AuM, Benchmark	Findings
PSERS Active Mandate 1 **$323M** MSCI EM (Small Cap) Index 70%, MSCI EM (All Cap) Index 15%, MSCI Frontier EM Index 15%	• 0.55% running costs (fee: 0.45% fixed + 25% Perf Fee above composite hurdle; projection 3y ending June 18) • **Active Mandate** • Recently switched from 0.90% flat fee to this performance fee schedule. As shown below, the new fee schedule would be expensive by a large margin in 5 out of the previous 9 years. Of particular interest would be 2011, where a -12.98% return under the old schedule would become -16.14% return under the new schedule. Please use “Reference Table” below*.
PSERS Passive Mandate 1 **$467M** MSCI Emerging Markets (All Cap) Index	• 0.124% tiered-rate • **Passive Mandate** • Small part of the internally managed $3.2B ACWI ex-US portfolio that has been allocated to an external manager. • SERS are paying BlackRock 9bps for the same product, which until Dec ’17, had a smaller allocation than PSERS. • As an example, Vanguard (VEMIX) Institutional Plus share class is available for 9bps for investments > $100M. Consequently, we think PSERS will benefit from using an improved tiered fee structure to benefit from scale for any allocation above $100M.

* Reference Table

			Old Fee Schedule		New Fee Schedule					
	PSERS Active Mandate 1		Flat fee @		Fixed Fee @	Perf Fee @				
			0.90%		0.45%	25%				
Calandar Year	Net Ret (NR)	Bnchmrk Ret (BR)	Net Value Added (NR - BR)	Gross Return (GR)	Fixed Fee (FF)	Perf Fee (PF)	Total fee Payable TF = FF + PF	Net Ret w/ Perf Fee NNR = (GR - TF)	Net Value Added (NNR - BR)	Diff in Value Add
2017	35.73%	33.33%	**2.40%**	36.63%	0.45%	0.71%	1.16%	35.47%	**2.14%**	**-0.26%**
2016	-3.95%	4.03%	**-7.98%**	-3.05%	0.45%	0.00%	0.45%	-3.50%	**-7.53%**	**0.45%**
2015	-10.36%	-9.81%	**-0.55%**	-9.46%	0.45%	0.00%	0.45%	-9.91%	**-0.10%**	**0.45%**
2014	2.13%	1.49%	**0.64%**	3.03%	0.45%	0.27%	0.72%	2.31%	**0.82%**	**0.18%**
2013	1.87%	1.01%	**0.86%**	2.77%	0.45%	0.33%	0.78%	1.99%	**0.98%**	**0.12%**
2012	28.06%	22.60%	**5.46%**	28.96%	0.45%	1.48%	1.93%	27.03%	**4.43%**	**-1.03%**
2011	-12.98%	-26.96%	**13.98%**	-12.08%	0.45%	3.61%	4.06%	-16.14%	**10.82%**	**-3.16%**
2010	42.87%	27.47%	**15.40%**	43.77%	0.45%	3.96%	4.41%	39.36%	**11.89%**	**-3.51%**
2009	119.09%	114.32%	**4.77%**	119.99%	0.45%	1.31%	1.76%	118.24%	**3.92%**	**-0.86%**

PSERS Mandates – Findings

International Equity – All-Country World (All Cap) Mandate, AuM, Benchmark	Findings
PSERS Active Mandate 2 **$1,167M** MSCI ACWI ex-US (All Cap) Index	• 0.51% running costs (fee: 23.4bps fixed + 8% Perf Fee over hurdle of MSCI ACWI ex-US +0.42%; projection 3y ending June '18) • **Active Mandate** • Although we think that Base Fee alone is a fair price to pay for this mandate, it has performed well over last few years, especially as compared to PSERS Active Mandate 3 and it is fine to reward the manager for such out-performance. But we think that to discourage excessive risk-taking, the **Performance Fee component should be capped.**
PSERS Active Mandate 3 **$1,117M** MSCI ACWI ex-US (All Cap) Index	• 0.327% tiered-rate • **Active Mandate** • Top tier ends at $200M at 30bps. We think **additional tiers should be added at $500M (~25bps), $750M (~20bps) and $1B (~15bps).**
PSERS Active Mandate New **$107M** MSCI ACWI ex-US (All Cap) Index	• New allocation of $400mln at unknown fees, as only redacted contract is available. • **Active Mandate** • We have reviewed the investment recommendation by PSERS and Aksia, and noticed that the recommendation does not show any evidence of alternatives being considered as part of the process while negotiating fees with this manager. As noted separately in this report, this is despite PSERS answering "Yes" to our self-assessment question whether this sort of comparison was an intrinsic part of their investment process.
PSERS Active Mandate 4 **$231M** MSCI ACWI ex-US (All Cap) Index	• 0.85% running costs (fee: 0.67% fixed + 20% Perf Fee over Hurdle; projection 3y ending June '18) • **Active Mandate** • **Worst performing in the last 3 years and most expensive** out of the 3 MSCI ACWI (ex-US) All-Cap mandates by PSERS. High Performance fee despite having highest fixed fee out of the 3. We think this mandate **should be negotiated to the fee level of PSERS Active Mandate 3.**

PSERS Mandates – Findings

International Equity – All-Country World (Small Cap) Mandate, AuM, Benchmark	Findings
PSERS Active Mandate 5 **$270M** MSCI ACWI ex-US (Small Cap) Index	• 0.42% tiered-rate • **Active Mandate** • **Cheapest and best performing mandate out of the 5 in this asset-class.**
PSERS Active Mandate 6 **$306M** MSCI ACWI ex-US (Small Cap) Index	• 0.85% tiered-rate • **Active Mandate** • This manager's MSCI All Country mandate is more expensive than its MSCI Emerging Markets mandate, which is hard to explain. • There is no reason this mandate should be paid twice that of PSERS Active Mandate 5, especially with lower returns. We think that a **tiered fee structure with an aggregate of 0.40% will be fair.**
PSERS Active Mandate 7 **$219M** MSCI ACWI ex-US (Small Cap) Index	• 0.87% tiered-rate • **Active Mandate** • There is no reason this mandate should be paid twice that of PSERS Active Mandate 5, especially with lower returns. We think that a **tiered fee structure with an aggregate of 0.40% will be fair.**
PSERS Active Mandate 8 **$98M** MSCI ACWI ex-US (Small Cap) Index	• 0.74% tiered-rate • **Active Mandate** • Smallest of the mandates, which explains the higher price on tiered schedule. We think that a mandate of this size **should be priced at 0.50%-0.60%.**
PSERS Active Mandate 9 **$159K** MSCI ACWI ex-US (Small Cap) Index	• 0.80% fixed fee • **Active Mandate** • Absence of tiered structure means that any economies of scale are to the full benefit of the manager. But since this mandate appears to have been cut (AuM has dropped from $156M in June '17), we will not make a recommendation.

PSERS Mandates – Comments

Public Equity

Two managers capture a (too) large portion of the alpha generated.

- PSERS Active Mandate 4 (38% in 2017, 3y rolling), and
- PSERS Active Mandate 1 (45% in 2017, 3y rolling).

International Small Cap mandates show large price differences, ranging from 44bps to 88bps (on similar sizes). Interesting side note: the cheapest is the best performer in recent years.

30% of mandates' fee schedules have not been revised in 5 years or longer.

SERS is paying lower fees on the same PSERS Passive Mandate 1 product, despite SERS allocating smaller amount until recently.

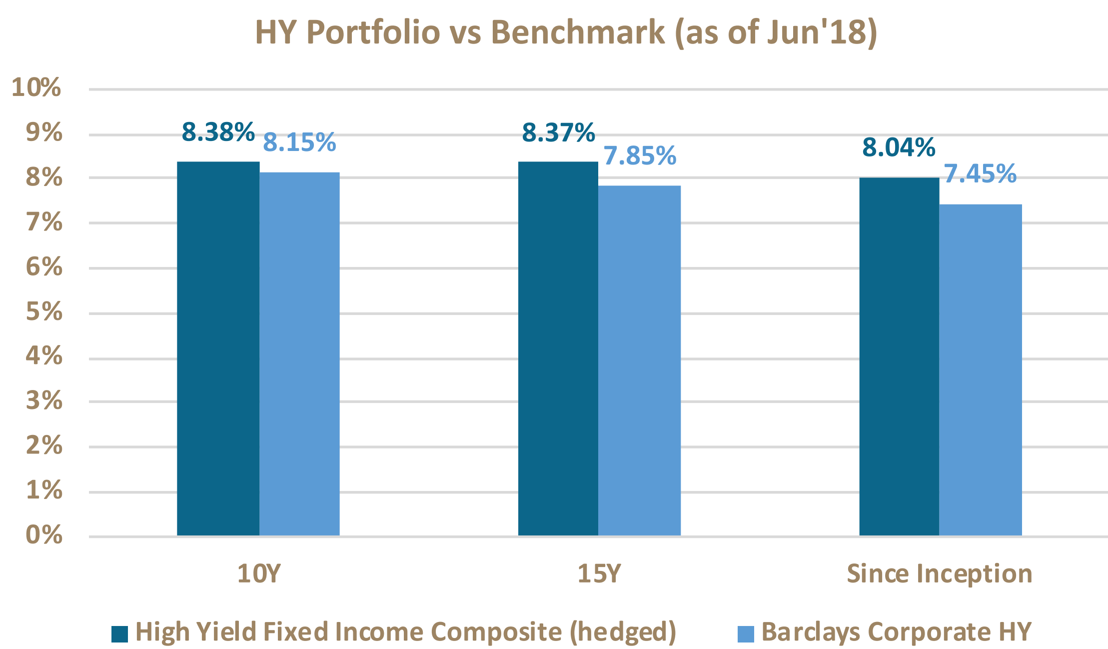
PSERS does not seem to have a sufficiently granular choice of benchmarks for their active managers. Although this helps in overall comparison, it could be problematic where performance fees are or have been introduced as one needs to make sure the benchmark properly reflects the risk of the investment.

PSERS Mandates – High Yield / Opportunistic

PSERS' investments of $5.02B (as of Jun '18) in this asset class are in, essentially, Private Debt Limited Partnerships. There are 41 external mandates classified under four subclasses of Mezzanine HY, Opportunistic HY, Real Asset HY and Senior Loans HY. All these investments are benchmarked against Barclays US Corp High Yield Index. The performance of each allocation within are wildly different, though. Over the previous 3 years, **the performance of various LPs have ranged from -25.57%p.a. to +22.13%p.a. compared to benchmark performance of +5.53%p.a.**

Long term performance has been similar to the benchmark. **The 10 year net value add was +0.23% p.a. (= Portfolio net return of 8.38%p.a. - Benchmark return of 8.15%p.a.).**

- Please note that in the **previous reporting period, ending June 2017, over 10 years this number was actually negative -0.22% p.a. (!!)**



PSERS Mandates – High Yield / Opportunistic (cont'd)

Base Management Fee:

- As per the report "Response to PSERB Resolution 2017-41 Re: Management Fees – July 2018," the aggregate fees paid by PSERS is 1.14%.
- As per the presentation "General Partner Ownership Interest (a.k.a. Carried Interest)," dated Oct 12, 2018; Net Management Fee for Private Credit in CY 2016 (AuM $4.16B) and CY 2017 (AuM $4.82B) were both 1.20% based on end-of-year AuM.

Assuming only Base Management Fee was paid, and it was a stable 1.14% historically, following table shows that 83% of the entire alpha is being paid as Base Management Fee to the asset managers.

10Y		
High Yield Composite Net Return (NR)		8.38%
Benchmark Return (BR)	(-)	8.15%
Net Alpha (NA)=NR+BR		0.23%
Base Management Fee (BF)	(+)	1.14%
Gross Alpha (GA)=NA+BF		1.37%
Share of Gross Alpha retained by Manager BF/GA		83%

Carried Interest:

- As per the presentation "General Partner Ownership Interest (a.k.a. Carried Interest)," dated Oct 12, 2018; Carried Interest for Private Credit in CY 2016 (AuM $4.16B) was 1.76% and in CY 2017 (AuM $4.82B) was 1.85% based of end-of-year AuM.

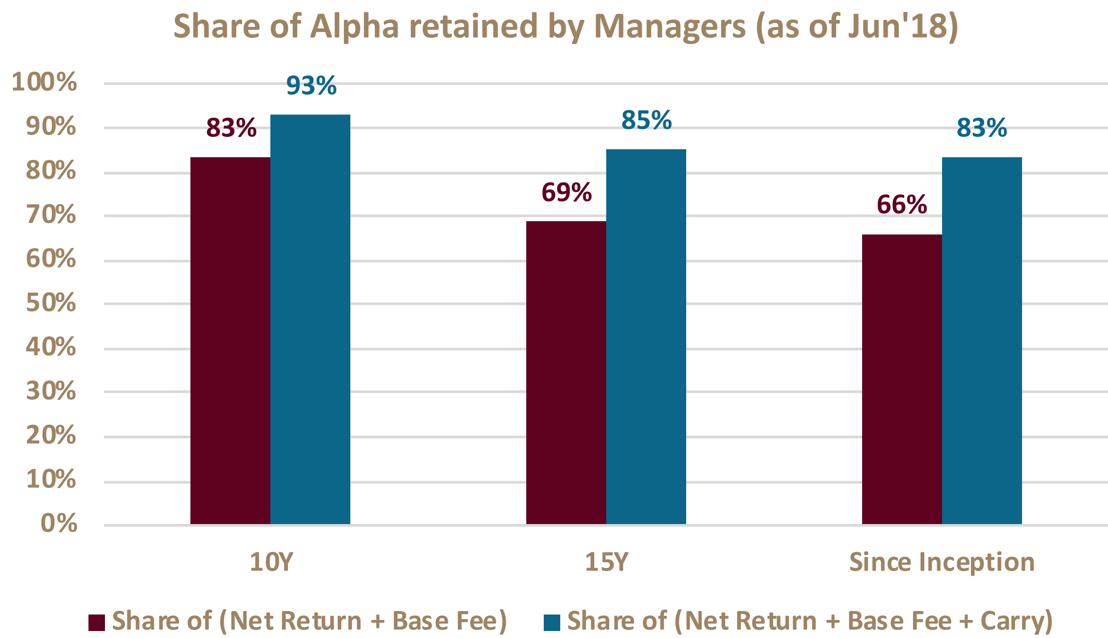
Now, if we assume an additional Carried Interest of 1.20% (average of 2016 and 2017) was paid historically, then the following table shows that **93% of gross alpha was paid as fee (Base Management Fee + Carried Interest) to the asset managers** (100% in previous 10year period).

10Y		
High Yield Composite Net Return (NR)		8.38%
Benchmark Return (BR)	(-)	8.15%
Net Alpha (NA)=NR+BR		0.23%
Base Management Fee (BF)	(+)	1.14%
Carried Interest (CI)	(+)	1.80%
Gross Alpha (GA)=NA+BF+CI		3.17%
Share of Gross Alpha retained by Manager (BF+CI)/GA		93%

Both above estimates do not include the cost of an internal team that selects and manages these (currently, 41) allocations, and fund level operating expenses.

PSERS Mandates – High Yield / Opportunistic (cont'd)

The following graph shows this share of alpha that is paid out to the manager for various periods.



Novarca has successfully renegotiated multiple **HY active mandates with fees of 25-30 bps** (compared to the 114bps paid here), **contracted without any carried interest**, for total assets that were less than a fifth of what PSERS has in it its portfolio in this asset class. That represents savings of >84bps (or $42M) annually on base fees alone, or >264bps (or $132M) annually on total fees including carried interest.

While the performance record of PSERS' investments in this asset class over >15 years was similar to long-term returns of the asset-class benchmark, it **generated a significant multiple of the costs of a passive replication of** such benchmark would have cost. **These passive mandates would be more liquid, more transparent, have smaller Operating Expenses, and incur negligible Internal costs compared to Private Debt LPs.**

Private Equity Savings – SERS and PSERS

Reducing Private Equity Fees (identical for both SERS and PSERS)

Without having been given full access to the Private Equity investment details, we can't make a very thorough statement. We can, however, share some observations based on our experience with other clients. **Meaningful savings in Private Equity are best achieved upon time of reinvesting.** The average life of Private Equity investments (not specific to PSERS/SERS) is around 10 years. We, therefore, assume that within the next five years, the average of the mandates will come to the end of their lifecycle / reinvestment phase. Although the total Private Equity costs easily reach 700 bps and more, the **fee components than have some room for negotiation** (see below table as an excerpt) **account for roughly 300 bps p.a.** From our experience, **achieving savings of 10% or more on the 300 bps is feasible upon reinvesting**. Therefore we would encourage the plans to set a fee savings target of 10% upon the next reinvesting.

Please note that the plans indicate Base Management Fees of 163 bps (SERS) and 138 bps (PSERS) in their annual and consultant reports. Since we don't have enough data on the plans Private Equity investments to give a more precise estimate.

Here are a few examples of areas in which these savings can be achieved:

- Don't pay on committed capital, only on invested (not applicable for VC)
  - Private Equity managers often charge their fees based on the committed capital, which is often subject to negotiation and makes an enormous difference in absolute fees at the beginning of the investment.
- Ensure fee reductions during the investment phases
  - Do so by trying to understand GP's budget for running the fund and negotiate lowest per-investment phase management fees upon it.
- Cap monitoring, oversight and legal fees
  - These, like other fees are often subject to negotiation.

Private Equity Savings – SERS and PSERS (cont’d)

Examples (contd.):

- Negotiate carry terms carefully
  - The mechanics of how carry is calculated must not leave any room for interpretation and one needs to simulate potential carry fees, based on different return scenarios, carefully.
- Re-calculate GP reported carry calculations
  - This could either by done by internal resources or using third party services, including software based solutions.
- Make pitch materials part of the IMA
  - Marketing materials often suggest terms that later on disappear in the IMA’s.
- Add language to prevent Zombie funds
  - Negotiate most favorable terms for the ability to the removal of GP for non-performance.
- Invest the smallest amount possible and negotiate Sidecar / Co-investment access (as was already suggested by PSERS)
  - This has already been suggested by PSERS in their savings suggestions.

Summary of Savings Potential – SERS

SERS		
Asset Class	**Savings Potential, p.a.**	**Implementation**
Public Equity	$4.87 M	Assumed, immediate
Private Equity	$12.18 M	Assumed, upon reinvestment
Other Asset Classes	*No view to date*	
Total (p.a.)	$17.05 M	
Total 30 Years (compounded) (@ 7.25% assumed return)	**$1.51 B**	
	Assuming 30 years for Public Equity = $584 M *Assuming 25 years for Private Equity = $926 M*	

For SERS, we are confident that savings can be achieved but because **we don't have unredacted contracts** to base our view upon, there remains a **level of uncertainty**.

Due to a lack of data on Private Equity for both plans, we are working under the following, conservative assumptions based on our experience:

- Negotiable fee components of 3.00% p.a. (whereas, total Private Equity Costs are higher)
- Average life of Private Equity investment of 10 years, resulting in an average 5 years before reinvesting
- Achievable savings of 10% upon reinvesting of each Private Equity allocation

Summary of Savings Potential – PSERS

PSERS		
Asset Class	**Savings Potential, p.a.**	**Implementation**
Public Equity	$4.91 M	Firm, immediate
Private Equity	$15.48 M	Assumed, upon reinvestment
High Yield	$42.50 M	Firm, upon reinvestment
Other Asset Classes	*No view to date*	
Total (p.a.)	$62.89 M	
Total 30 Years (compounded) (@ 7.25% assumed return)	**$4.96 B**	
	Assuming 30 years for Public Equity = $560 M *Assuming 25 years for Private Equity = $1.17 B* *Assuming 25 years for High Yield = $3.23 B*	

For PSERS, we have a **high-conviction** view of how **savings can be achieved in Public Equity and High Yield**, as detailed in the report. For HY we have assumed an average life before reinvesting of 5 years, identical to Private Equity, although it is likely to be shorter.

Due to lack of data on Private Equity for both plans, we are working under the following, conservative assumptions based on our experience:

- Negotiable fee components of 3.00% p.a. (whereas total Private Equity Costs are higher)
- Average life of Private Equity investment of 10 years, resulting in average 5 years before reinvesting
- Achievable savings of 10% upon reinvesting of each Private Equity allocation

Shared Investment Mandates – Additional Savings ?

We were asked to give our view on whether shared investment mandates would bear the potential for additional savings. Both the Plans very likely have different coverage ratios or investment objectives based on their own liability profiles. But, wherever there are opportunities on the investment side, it would be wise to look for synergies.

We believe there is potential for some additional savings, but that depends on:

- **Asset Allocation** – **SAA/TAA decisions** contribute the most to returns. The Plans could look to homogenize their Macro views to come up with uniform asset allocation.
- **Manager Selection** – **Manager due-diligence** is a time-consuming and manpower intensive process. Both the Plans will greatly benefit by pooling their highly skilled resources.
- **Passive Mandates** – These will be the easiest to streamline but will probably bring the smallest savings.
- **Assets per Mandate** – An asset manager's **production costs** for each mandate are not related to its asset size. By combining assets, the Plans will not incur these base costs separately and will benefit from **reduced marginal rates**. In our experience, tiered schedules reduce fees by 10-15% per tier. PSERS currently has $3.7B in active mandates, compared to $3.4B for SERS. **Cutting half** of the total mandates and **doubling the other half** would accrue significant **additional savings**. However, we can't currently put a number to this as the mandates of the two plans don't overlap by much.

Please note that **we refrain from any statement on organizational savings**, as we neither have data nor a view on it. Also, in order to generate above savings, we have assumed there are similarities in Plans' objectives.

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