COMMONWEALTH OF PENNSYLVANIA
JOINT STATE GOVERNMENT COMMISSION

PUBLIC PENSION MANAGEMENT & ASSET INVESTMENT REVIEW COMMISSION HEARING

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IRVIS OFFICE BUILDING
ROOM G-50

THURSDAY, SEPTEMBER 20, 2018
10 A.M.

BEFORE:

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TESTIFIERS

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SUBMITTED WRITTEN TESTIMONY

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(See submitted written testimony and handouts online at the Joint State Government Commission's website.)

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P R O C E E D I N G S

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CHAIRMAN TOBASH: Welcome, everyone. The hour being ten o'clock, we are -- it is time for our second hearing date on Public Pension Management and Asset Investment Review Commission. We are happy to be here today. And we've got a very, very full schedule.

The first hearing that we had dealt primarily with transparency, and today we're going to have more of an analysis of the two systems in Pennsylvania, SERS and PSERS. We're going to talk a little bit about investment strategies. We're going to have testifiers talking about benchmarking. We're going to spend some time speaking about private equity and there's going to be some testimony from peers of our systems, and I think it's going to be a very informative hearing today.

I just will mention in the onset that the testimony of the people that will be going at the end is just as important as the testifiers in the beginning, so we're going to try to move this along. We have a really, very full agenda. I want to make sure we keep it moving. So if I interrupt a testifier or a commissioner, realize I'm doing that in order to keep the meeting on track so that everyone has an opportunity to be heard.

As we move forward, I'd just like to thank the Joint State Government Committee. We do not have minutes to approve as the last meeting was a hearing. However, the commission has taken time to compile a momentous amount of information.

And, Glenn, do you want to mention where that information can be found and just what is on your site?

MR. PASEWICZ: Sure. Yeah. It's all on our website from the first, the last meeting we had. The presentations are on there, the transcript of the meeting is on there, video of the meeting is on there. And that's on our site. That's -- I'll give you the address, it's jsg.state.pa.us. So if you go on there -- jsg.legis.state.pa.us. And we have a link on there to the, an Act 5 section on the website that has all that information.

And it will have everything from this meeting, will go up, you know, as soon as we get it all together and load it to the website, including video.

CHAIRMAN TOBASH: Terrific. Thank you very much, Glenn.

And, Vice-Chairman, is there any comment before we get moving?

VICE-CHAIRMAN TORSELLA: Sure. Thank you, Chairman.

Good morning, everyone.

And thank you, Chairman, for arranging the marching band welcome for the commission today. I think that's a good precedent set.

Happy to be here for our second meeting, or second hearing. I thought our first was very productive. My only opening comment would be -- I'm sure I'd be joined in this -- that we're delighted to hear from a variety of practitioners and academics, but I also want us to remember, as we should at every hearing, who's not in the room today, or some are, but who's not on the testifying panel, and that's the beneficiaries' system. The work of this commission is crucially important for the Commonwealth, but it's important because what we are doing -- if we are successful in our charge, and I believe we will be in identifying some savings -- is shoring up and protecting this, the pension system that we have for policemen, for teachers, for state workers, and government workers of all kinds, and shoring up and ensuring that the system will be there to fund their retirement that they've earned through their hard work and public service.

So keeping that front of mind always, happy to be here and get started.

CHAIRMAN TOBASH: Thank you very much.

And we're going to get right to business. Our first testifier -- and all of the commissioners have had an opportunity to have a conversation or meet with Dr. Ashby Monk. He is the consultant for the commission. We are anxious to hear the work that he's done so far in laying the ground work for a report that, as the Treasurer has mentioned, I think is going to be very important in disseminating information, how both our pension systems, who have got tremendous responsibility, can perform optimally.

Dr. Monk comes to us in Harrisburg by way of Princeton and Oxford and the University of Paris and Stanford. And I just found out today that he was in Mongolia and Des Moines, to add a few stops to his list. But we are gratified for the work that he has done so far. We are anxious to hear about that.

And with that, Dr. Monk, welcome.

DR. MONK: Thank you, Mr. Chairman.

And thank you to the whole commission for inviting me and giving me this opportunity to speak on a topic that, I say this quite sincerely, has kind of formed the foundation of my life's work. That's a bit almost embarrassing to say, but the topic of fees and costs and pension fund governance, I think, is one of the most critical topics facing our governments, our societies, our economies today.

My plan is to set the stage. I was asked to set the stage with a bit of introductory remarks, 10 minutes or so, move into my presentation on performance and fee and cost performance, offer some reflections on what we've learned, and reserve any recommendations for the October hearing.

As I understand it, the October hearing is the opportunity at which point we will begin to put forward concrete ideas to help this commission save the $1.5 billion per plan over 30 years in terms of actuarial saving.

So this commission is here because of Act 5 to study pension-related expenditures and to save money. I congratulate you for that. This is a rare commission in the United States of America that seeks to unravel an incredibly complex ecosystem with incredible context that needs to be understood. And rather than just papering over it and allowing things to go on, the fact that you have stepped up as one of the few states to investigate this topic warrants our appreciation as a country, because the pension fund industry needs this, but also my gratitude because it aligns so closely with our work.

I think I'm here, if you permit me that, because I've focused on fees and costs for over a decade. I believe they are an entry point to broader discussions of governance, organizational design, management, and even pension fund strategy. And so I think it's an incredibly important topic, albeit I will acknowledge, uncomfortable for parties.

Fees and costs are not a topic that most pension investors are taught to focus on. We're taught to think about risk, we're taught to think about asset allocation, we're taught to think about portfolio construction. Too often fees are the afterthought, but they are important and we need to get over that to help these plans achieve their objectives.

It was noted that I've been working around the world to help similar governments, in Des Moines yesterday helping the public pension plan design an innovative investment system, in Mongolia last week helping the government of that country think about how to manage the subsoil assets which will be emerging and converting into financial assets. These are wildly different places, but I've gone to them all with a similar objective: To help governments design or improve investment organizations that are required to meet some specific and idiosyncratic social obligation.

I've dedicated so much of my life to this topic because our societies increasingly rely on these investment organizations to pay pensions, to fund education, to pay for medical research, to create intergenerational equity, so on. We call them pension funds, sovereign funds, endowments, foundations. Our social welfare literally relies on these funds today and their ability to execute at a high level is critical. They have to be the best they possibly can be if our social welfare state is going to maintain its integrity, but more than that, please recognize, if our capitalism is going to maintain its integrity.

These plans, according to the OECD, have $100 trillion sitting in them. If they aren't operating in an efficient manner, what are the incentive structures they're setting for their agents, the hedge funds, private equity funds, asset managers, brokers, bankers? They are the foundation with their 100 trillion. So in this weird ironic twist, our pension funds, our sovereign funds, they are the foundation of the future of our social welfare state, and ironically, they are also the foundation of our capitalist system at the same time. If that doesn't mean we have an incredibly complex issue at hand, I don't know what is.

If we keep these plans on this path, improve them, make them more effective, help them generate higher returns, we can literally reduce the cost of those social benefits. It's a simple mathematical problem. Higher returns means lower contributions or higher benefits. That's the math magic of this prefunding of obligations. Higher returns, quite simply, means cheaper pensions.

So we in America and around the world, to be fair, have asked these organizations to generate higher returns. The boards of pensions, their consultants, their actuaries, their service providers, have pushed staff sometimes out over their own skis into riskier investment strategy, often more expensive asset manager relationships, in the pursuit of, as I said, cheaper pensions.

Now, I would say this is not on its own problematic, as the returns for some funds have been remarkably good. The problem, in my personal and humble opinion, was that we did not explain to the American people what we were doing. They did not fully appreciate the decision to take more risk via complex strategies and high-cost managers, nor did they appreciate the consequences, which I will get into in the rest of this presentation.

The pension funds did this, as in did not explain the full extent of this decision to stakeholders. People today don't understand the complexity of the strategies and they most surely do not grasp the sheer scale of compensation we are now paying to external asset managers. And this lack of understanding is, I would argue, a recipe for stakeholder conflict, and at minimum, part of the reason for why we're seeing a loss of trust among plan sponsors, stakeholders, and pension funds around the country, and I would wager, here.

Before I dive in, I have two broader points I'd like to make and then I'll move into my performance and fee and cost analytics. One, I want to talk about why there is a lack of understanding of the fees and costs. There are reasons. The pension funds deserve those reasons to be described. Two, I want to offer some secondary and tertiary consequences of this lack of understanding. Yes, there is a reason for why we might keep some of the fees and costs opaque, but there are consequences.

On number one, the why there is a lack of understanding among stakeholders about the external costs. Well, there is a basic reason, and that is because much of the compensation data has been buried in fund footnotes, it has been hidden in net asset value calculations, it's been waived away as profit sharing or ignored by pensions under the false protection of an MFN provision. I will get into the false protection of MFN provisions later in my presentation.

And so the information was not reported, was not measured, not tracked, and thus not managed. It was hidden away by staff, not staff just in America, but staff almost everywhere, because they were afraid that if the public, armed with the true fee and cost information, found out how much it costs to run these pension plans, they would prevent them from investing in the complex and high-cost asset classes that the plans thought they needed to generate the higher returns.

As staff at these organizations saw it, these strategies were strengthening the pension promise by reducing the cost of the benefits. "So what?" they thought. If the cost of the investment strategy was astronomical, the pensions were, after all, more secure. And so an all-too-common deal has been struck here in America and around the world, where pension funds literally will protect managers from scrutiny so long as the returns keep coming. That's the deal and that's why there's so much hiding of fee data today. It's a deal.

Number two, consequences of that deal. I don't think we have fully appreciated the secondary and tertiary consequences for our pension plans or the systems from that deal. Because those high hidden fees created new advantages for the managers, what we would call economies of scale, they could wield those economies of scale back against the pension plans at the negotiating table, which they did. The gap in skills, capabilities, and resources between public pension funds and private managers grew. We didn't know why they were growing because we weren't tracking the fees we were paying them, but they grew and an asymmetry was forming.

This asymmetry was based on information, they had more, we had less; skills, they had more, we had less; and ultimately power, they had it, we didn't. Because they had the money, they had the fees, they could build the organizations that we couldn't. The managers could thus begin to demand more and more of those hidden fees, and of course, they did.

Today we have a world in which asset managers often set the terms for pension participation in their funds with endowments and pension plans literally begging -- maybe that's a strong word -- but asking and thanking their GPs for granting them -- them, the people with the money, the controllers of the purse strings -- just a chance at an allocation in their fund.

The agents are now disciplining the principals. For those of you with an economics background, you will understand that is a perversion of the principal-agent theory that is so fundamental to how capitalism functions. Principals, we know, must discipline the agents for any of this to work. The opposite now is increasingly common in the investment business, and I would argue it is due to a lack of fee and cost transparency right from the beginning.

The consequences, as you are understanding, hopefully, as I go through these initial remarks, are really about resourcing the public pension plans that we rely on.

The responsibility, I'll just remind you, of a board and a senior management team is often as much about building professional and effective investment organizations as it is actually picking things to invest in. The board should be helping to ensure their plans remain the principals in this complex chain of principal-agent relationships that makes up capitalism.

But in order to properly resource an investment organization for success, to remain the principals, one has to first assess the true cost of producing a return. That's the input. The output is the investment performance. Without full fee and cost information, the make-or-buy decision -- do we buy the internal people to build the investment return or do we acquire the people to make the investment return outside the fund? Those resourcing and make-or-buy decisions are made incorrectly. This is why we often see people overseeing these pension plans pushing incredibly hard to keep internal resourcing to a bare minimum.

I can think of many op-eds written by plan sponsors and stakeholders shaming government employees working at pension plans for making $15,000 bonuses at the end of a good year, while unwittingly signing checks to Wall Street GPs that are literally 1,000 times larger. It's all part of the same process of generating returns.

By minimizing the importance of fees and costs and keeping them a secret from the public, we've allowed our pension organizations to go underresourced. We're not understanding all the costs of the inputs to make the return. We've allowed the for-profit asset management industry to enjoy an incredible advantage at the expense of this critical social welfare institution, American public pension plans.

I personally think it incredibly ironic that in trying to bolster the solvency of our most important social institutions, we have unwittingly created more billionaires on Wall Street than in any industry in America. You are twice as likely to become a billionaire today by setting up an investment business than you are starting a technology company. If you want your children to be billionaires, send them to New York, don't send them to me at Stanford.

So in short, hiding the fees may have allowed the pensions to pursue riskier and higher returning strategies, but it also prevented the boards from properly resourcing and thus overseeing and holding accountable their pension organizations and the associated strategies. And while this might have seemed, especially in the short run, a way to optimize a portfolio given some serious governance constraints, I've heard that story many times. "We did this in spite of the board," not because of the board. But this has actually weakened the plans' operating capabilities and created an incredibly precarious position with stakeholders. The very existence, I would argue, of this commission is an example of that loss of trust and that precarity.

Here's the good news: Pennsylvania has, with this commission, joined other courageous states tackling this issue head on. Reporting regimes are emerging around the country, places like California. We've seen other pension plans, like CalPERS, own up to their past failures on fees, in terms of monitoring, and work to remedy the process and provide a true, coherent, and detailed analysis of what it actually costs to generate a return. The SEC has investigated fees and costs of alternative managers and they have uncovered, in their words, "startling amounts of overcharging." Newspapers, this commission now is probably aware, are more than willing to put fee and cost numbers on the front pages of newspapers.

Transparency is now on a path to inevitability. That's going to be hard for some. I personally think it's healthy and will hopefully lead to a realignment between our pension funds and Wall Street. This change will be painful if you are working at a pension plan, if you are a board of a pension plan, if you're a consultant, a service provider, an asset manager. All these players may see some of their roles shift or change. But this, this is what we need.

I've seen this around the world. The process of achieving fee and cost transparency is one of the most powerful catalysts I've seen for boards to become reinvigorated and re-empowered to consider, literally from first principals, how they should design their organizations to achieve their investment organizations.

In my view, bringing our public pensions into the modern era of finance and leveling the playing field with external managers will really require fee and cost transparency. We need to spark change in the way we manage these plans, from the board, through the staff, through the service providers, through the way we engage with managers to the way we negotiate fees. Innovation will be required.

Next month, we can offer options for you, as the commission, to take forward. But right now, I would simply say we need innovation. That's why I'm here today.

I'm here today to help your plans get a better deal. I want them to make more money. More than that, I want them to take home more of the money that their managers make. As part of our project, we are writing a report that will document some of our ideas, some of the things that I've said, some of our initial findings on performance, some of what we've been allowed to study on the fees and costs of the plans, and that will be reported in the next month or so.

In the next 25 minutes I believe I have, yep, I will offer some of our preliminary findings. I will seek to get into the local context of Pennsylvania. I have been asked here to give you a sense of two specific things: The relative investment performance of PSERS and SERS, and the fee and cost performance of the funds. How have they done in terms of managing these fees and costs?

I have two caveats before I get into the core analysis that the commission should be aware of, and I take these, both caveats, quite seriously. The first is I find performance an incredibly challenging thing to measure, particularly for comparisons across peers. The context of the performance is often so important in understanding whether a fund is generating strong risk-adjusted returns.

To be honest, this is partly why, over time, I have tried to spend much more of my time thinking about fees and costs than I have about performance. It's easier to compare the process for fees or a mandate specific fee budget than it is to understand how a pension plan is performing relative to a peer. If you have the data on fees, you can measure exactly what a fund has been paid and compare that directly to other funds with the exact same strategy, and sometimes manager. The performance stats can be manipulated. You can use illiquid assets to smooth assets. You can play all kinds of interesting tricks. It's much more difficult to do that with fees and costs.

You can think of the fee and cost issue as the exhaust coming out of the tailpipe of a car. We are trying to see, by measuring that exhaust, whether that machine is running in a healthy manner. This exhaust tends to be very helpful.

That's caveat one. Pensions are hard to compare. Fees and costs are easier.

Caveat two, now that I've said fees and costs are easier, I need to say that I'm sorry, but I do not believe we have been given sufficient data to properly do the fee and cost analysis correctly.

No private equity data. One of the funds failed to provide public equity contracts that were unredacted. This data was requested by a commission set up by the state legislature for oversight of plans for which they own the liability. The fact that this was not shared is noteworthy, and so I'm noting it. It's not something I would expect to see.

Notwithstanding these two constraints, the difficulty of doing peer comparison and a lack of useful data, we persevered as a team. And I should mention that it's me, Dr. Rajiv Sharma, we have a team of cost consultants and we have a team of performance experts that have been working with us on this. This is the product of a team effort, very hard work over the course of a few months to get this together. And again, these are the preliminary findings. We will have the full report in a few months.

The first analysis was to compare the asset allocation and performance of the two funds with a peer set of funds. The second was to examine the fees and costs of the two funds with regards to their external managers.

For the peer analysis on performance, data was obtained from the Public Pension Database of Boston College. The data from the database was audited against individual fund performance to ensure accuracy. Furthermore, it is our understanding that both SERS and PSERS have validated the data from the PPD database. My friend, J.P. Aubry, from the Center for Retirement Research at Boston College will be here this afternoon. He will elaborate on this and the quality of the PPD database, and I will not steal his thunder.

For the analysis on fees and costs, data was obtained from the two pension plans themselves, but as stated, that was significantly withheld. The reason given was that the data was confidential and combined trade secrets. Notwithstanding, given what I had already said about hiding data, the fee and cost analysis that we presented here focuses, by our requirement for the data, just on public equity mandates where we could obtain reliable data. We didn't want to do an analysis that was questionable, and so we restricted our analysis to public equity data where we felt we could give this commission a confident assessment of the plans' ability to manage their fees and costs. Nowhere else could we do that.

Do we have slides?

CHAIRMAN TOBASH: Dr. Monk, yes. I'll just take a break here for one second to make sure that -- what would a hearing be without an IT glitch?

(Interruption.)

DR. MONK: I have a few more caveats as I'm going in, if you like --

CHAIRMAN TOBASH: Yeah, why don't we do that? And if I could just maybe go back to a question right now.

DR. MONK: Sure.

CHAIRMAN TOBASH: And so, look, the information that we're getting right now is disappointing to the commission as a whole. I'm sure the public will find it very interesting, as well.

And I understand you've laid the ground work for the difficulty in the process and how pension systems find themselves in this position and the gap that is forming between principals and agents. How many pension plans have you worked with, Dr. Monk, in your career?

DR. MONK: It's probably about 30. So in the U.S., it's a smaller number. If you count the funds that are affiliates of our research center at Stanford University, I think it's probably seven to ten in America.

CHAIRMAN TOBASH: Some of them very large?

DR. MONK: Yeah, oh, yeah. Yeah, over 100 billion in many cases. I've worked with the five AP funds in Sweden, I've worked with APG in the Netherlands, I've worked with the Middle Eastern Sovereign Funds, I've worked with three of the largest superfunds in Australia, I've worked with multiple Canadian pension plans, and these are all formal consulting engagements to do a project.

CHAIRMAN TOBASH: And costs have been your main focus, as you mentioned earlier?

DR. MONK: My main focus is design, governance, innovation. I focus on costs.

I actually don't like staring at contracts. I only got dragged into this space because these are, as you may have been aware, bureaucratic and conservative organizations that need a very good reason to do something innovative. They herd, they follow the leader, they operate under a prudent person rule, and they believe in their fiduciary obligation, which often means "let's run an efficient organization."

Efficiency runs opposite to innovation. The problem is financial markets are innovation engines. This entire industry is about innovation, being first to a trade, moving your capital into regions where the supply and the demand of the capital are skewed in your favor.

And so, to innovate and generate high returns, we needed a catalyst. We needed to, I'm sorry to say, have a little crisis. And the crisis that is most obvious and the lowest hanging fruit is the crisis of how much we're paying external managers.

CHAIRMAN TOBASH: So I got -- so one of your main areas of focus is governance and then we talked about transparency. You've worked with more than 25 plans, large scale, sophisticated operations. Your ability to get information through this commission as our consultant from SERS and PSERS compared to the other, more than 25 plans you worked with?

DR. MONK: To be fair, this is the first consulting gig where I have been working with a treasurer and commission and not directly with the plans themselves. There's been a few instances where I've helped plan sponsors build sovereign funds from scratch, in which case you're designing the ultimate client.

This is the first time I've been given

unredacted contracts in all my work.

CHAIRMAN TOBASH: Okay. With that said, we're back on schedule. I think we have got your PowerPoint here. Thank you very much.

DR. MONK: Yeah, my pleasure.

So shall I just tell you "next slide" when we're -- yeah, great.

Next slide, next slide, thank you.

This is an eye test, apparently. I was hoping we'd have some giant screen. But, Rajiv, if you're listening, I was right.

Sorry, he told me it would be fine. Okay.

So as discussed, we've acknowledged there are considerable challenges in carrying out a peer analysis in these areas. Different strategies employed by the different funds. It's so hard to find funds with the same strategy. They have a different liability profile. They have a different governance structure. They have a different -- oh, thank you so much. That's kind of you -- they have a different geographic setting, which means they can recruit different types of talent. Context, I have learned over the years, is crucial.

So while we are here today as consultants to provide relative fund performance, I would simply note, as I noted already, that it's hard, it's almost impossible to find true apples to apples comparisons. It's why we ended up gravitating towards the fee and cost issue as a catalyst for innovation instead of the performance issue as a catalyst for innovation, because the performance issue can usually be explained away. The fee and cost issue, if you can highlight incredible amounts of money and wealth being transferred from a pension plan to a GP in New York, that gets people's attention.

So nevertheless, we have taken steps to ensure our methodology is as robust as possible and is at least in line with best practice industry assessments. So what you're seeing is the best practice. (Indicating.) I'm just telling you as an academic doing this for a long time, it's still hard.

The asset allocation performance analysis was conducted on a peer group that was selected from the Public Pension Database, we've already talked about, and was based on three main criteria: The size relative to SERS and PSERS, the discount, again relative to those funds, and the asset allocation. The time frame for the data collection was between 2007 and 2017, fiscal years ending '08, '17. So that means it is near the end of the peak pre-financial crisis, all the way through the cycle down and back up to the current crisis. We've got the full cycle.

The final funds were determined also by data availability. Some of the funds as we dug in -- you will probably not be surprised to hear, the standards across funds in the United States is incredibly lax. Some funds report with gross, net, some combination of the two. Some pull out the net fees and then say they're presenting a gross. Incredibly complicated.

Next slide, please.

Here is the peer group. (Indicating.) It has our two funds plus nine other state and local funds. PSERS and SERS rank toward the middle of the group in terms of size. You can see the discount rate averages there (indicating) range between 6.5 and 7.5. The funded ratios vary widely, but they are within the boundaries of what we're dealing with here.

I will just say simply, we focused on these factors because, well, we believe they should, at least in theory, guide the risk tolerance and strategies employed by the funds, thereby allowing us to focus on more relevant peers to compare.

You'll note the SERS inconsistency around the fiscal year-end. We wanted to take that into consideration. To solve this, our team manually inputted data from the fund's consultant report to ensure consistency in the data from a time period analysis. So we even tried to make sure where the fiscal year-ends were off, we were getting that dialed in.

CHAIRMAN TOBASH: And I'll mention, if anyone has difficulty seeing it, at Dr. Monk's request, we have a larger version on the back. So if you can turn your head around, anyone, you may be able to view the data a little bit more readily.

DR. MONK: That's awesome. Good job, guys. Thinking on your feet.

Peer group -- next slide, please. Okay.

Oh, man. Yeah. So on the bottom of those (indicating), you're going to be seeing the different funds, which I will tell you what they are. You've got, on the far left, PSERS, then SERS, Arizona, Georgia teachers, Illinois, Iowa, LA County, New Mexico, Oregon, South Dakota, Virginia, okay? All looking fairly similar in terms of asset allocation. Diversified allocation strategy, this was 2017. In general, equity is the largest for all of these (indicating), followed by fixed income, private equity.

We can observe SERS follows a very similar asset allocation to the rest of the group, except for the omission of commodities. PSERS, however, is a clear exception given that it uses leverage finance and has considerably lower allocation toward equity and higher fixed income allocations. Otherwise, as you noted on the prior slide, we're looking pretty good.

Next slide.

Here (indicating) is just some context on the asset allocation of our two funds, how they have transitioned over time. Starting with SERS, we can observe that SERS has maintained a somewhat consistent asset allocation strategy with some fluctuations within and across asset classes. If we look to PSERS now, we can see more differentiation. It reduced its exposure to equity significantly in 2009 after the financial crisis. It has used leverage through derivatives and a few other things. I would describe it as a more innovative fund in terms of its asset allocation.

Next slide, please.

This slide, I will warn you, is at first incredibly confusing. Please note, you are not looking at investment performance. You are looking at benchmarks.

I want to show you the benchmarks because these are the goals of the organization. These are the benchmarks upon which they will assess their own performance. We put this in to highlight how these similar pension plans, as we've shown you in the prior few slides, can still have incredibly different benchmarks that are guiding their risk tolerance and their investment approach. It is hard to find apples to apples, okay?

For those of you unaware, a fund benchmark is usually a low cost and investable portfolio that should be set to provide guidance as to the necessary risk and return required to meet the discount rate, the expected return target. This is a way, this benchmark, for the boards of directors to assess the value added activities of the investment teams and their returns. In other words, we use these benchmarks to judge how good the plans are at value added above a benchmark, a low cost portfolio.

With the exception of Georgia teachers -- who has chosen, for reasons I would love to understand better, the consumer price index as their benchmark. I can understand some reasons, but I don't think it gets them anywhere near their discount rate -- PSERS has consistently the lowest benchmark, which I'm sure is something this commission would want to note. SERS has a much higher benchmark, much more in line with their peer set. In fact, it's above the average.

So in looking at the performance figures, which I'm about to show you, I just want you to appreciate these benchmarks, have a look at them. Over the 10-year period, PSERS benchmark is 2.8 percent, SERS benchmark is 5.3 percent. Those are the low-cost alternatives to running the portfolio.

Next slide, please.

So now, when we jump into data that is often presented, peer group, differences between a return and benchmark, you can see the two funds here (indicating) have performed against their benchmarks in each asset class over the three time periods, okay? For those of you that can't read, blue is one, orange is five, gray is ten.

As you can see, PSERS appears to have beaten its benchmark over most time periods. They've done incredibly well, while SERS has not beaten its benchmark over the 10-year time period. This would appear to suggest that PSERS is far outperforming SERS.

Next slide, please.

Although both SERS and PSERS exceeded their one-year benchmarks in 2017, they both have overall been low performing funds relative to their peer groups. You can see the data for yourself, and undoubtedly in our report, we will dig into this and provide much more context.

For me, I do not enjoy looking at one-year returns. I don't think it's useful. I think it's noisy. I understand that in a pension fund context, one-year returns matter because you may need liquidity, but in my view, building a long-term investment organization demands looking at a long-term return, and that is the 10-year return. So let's skip to the 10-year.

Both SERS and PSERS didn't fare as well as we might have liked, 4.1 percent and 3.8 percent respectively over this time period. And you can see in that cohort of peers that we selected based on the criteria noted before, they are in the bottom.

Next slide, please.

Keeping in mind all of the caveats we started with, where I reminded time and time again that apples to apples comparison is incredibly hard, we wanted to create a secondary set of analysis focused on a smaller subset of the -- sorry -- a larger subset of the population. We pulled generic data and it seems to confirm what we have already said, okay?

These (indicating) are from the other databases. And I'm sure J.P. of Boston College will be talking about this data today. So again, I don't want to steal his presentation's point.

Either way, the way that we see it, there's many caveats about performance. These organizations are running different strategies. PSERS in particular is running a unique strategy. It's very hard to find apples to apples. But it appears, based on the objective data, that over a 10-year time horizon, which includes a full cycle of economic activity, that these plans have underperformed on a performance basis.

So now, I'd much rather get on to a topic for which I think we can be much more confident, and that is the issue of fees and costs.

Next slide, please.

Performance on fees and costs is operation, as you recall I defined as -- or I created the metaphor as exhaust coming out of the tailpipe. We can look at the exhaust, the fees and costs paid to assess the health of the vehicle, to see if it needs an oil change, to take the metaphor just a little bit too far.

The focus -- if you can go to the next slide, please. Again, an eye chart, if you need to look behind you, please feel free.

The focus of the analysis was on public equity mandates, as we did not have access to private equity fees data. The objective of the analysis here was to analyze the appropriateness of terms for public equity mandates, and specifically, the fee levels, shared scale benefits, length of mandates, and benchmarks. We were constrained, and so we did the analysis we could on the public equity portfolio to highlight for you areas where you could save 1.5 billion per fund.

Some of this may seem very niche. This is not the "look at the total cost of the fund" presentation. We can't do that until we see the contracts and the performance data and the transaction costs and the holding costs and all of the fees paid to third parties. We can't give you that total fund. What we can do is show you how they've done in private -- sorry -- public equity.

SERS did not provide unredacted contracts. Due to this lack of data provided by the plan, it is difficult to make a statement of the potential overcharges which is what we were trying to find, again, 1.5 billion. We want to find areas where we can give them back their money. That makes it hard. So our analysis was based on assumptions and average rates and consulting reports. We did, however, have access to PSERS public equity contracts.

For private equity, despite not being able to analyze these mandates, it's important to note that that is a huge loss for our study. The SEC found in 2014 that overcharging is likely present in 50 percent of private GP relationships, as Ludovic will elaborate on further today.

Through this analysis, I should mention, we make reference to specific managers. But in order to protect the -- I guess we'll call them innocent for this case -- in order to protect the innocent, we've anonymized them. So where you see us say "Manager 1" or "Manager 12," just know that back in a spreadsheet, they refer to a specific manager.

Next slide, please.

Executive summary of SERS, from the data analyzed at SERS, we feel some of what they have is very fairly priced. Some of it is quite good. I don't want this all to be about saying how bad these plans are because in investigating, for example, SERS' passive mandates, they're almost at global best practice.

We have identified, using the proprietary method from our cost consultant, Novarca, out of Switzerland, four candidates for in-depth review and potential renegotiation that could result in considerable savings for SERS. We refer to them as Mandate 1, 7, 8, and 11.

One is almost nine years old with poor returns. And normally you would update fee and cost schedules and investment management agreements on a much more rapid clip than that to ensure that fees were reflecting performance and asset levels. Nine years is very long.

Mandate 7, incredibly expensive for developed world, small cap based on the database of funds that we have, or they have, at Novarca. This was way out of line.

Agreement 8, eight years old, again, too long to have left something like that.

Mandate 11, five years old. Another opportunity to investigate. Whether or not we'd find it, who knows, but these are things that need to be reviewed, if not on an annual basis, on a biannual basis.

Hopefully at the next meeting, where we will be presenting solutions, and the CEO of Novarca will be here, we will offer more details on these anonymized mandates to give you a better sense of how much savings we can generate for the Commonwealth of Pennsylvania and the pension plans.

Please note also that in many cases plans, not just here, but everywhere, refer to MFN clauses as a justification for claiming good fees. MFN clauses do not guarantee best terms over time. The people here, by the way -- and I've met many of them -- are too smart not to know that. They know that.

Any hedge fund is willing to signed an MFN. It's easy. In fact, it reinforces the hedge fund's negotiating position because the next fund that comes and says, "this is insane. I need lower fees," the hedge fund then gets to say, "if I lower your fees, I have to lower everybody's fees because I sign MFNs."

Over time, MFNs weaken pension plans and strengthen managers, not to mention that when a manager actually wants to bypass an MFN, it's not that hard. Change a few terms, change a duration, change an instrument, and you've got a new mandate. MFNs should not be seen as the end-all be-all of fee and cost perfection.

As mentioned, again, we would have loved to have a chance to take a hack at the private equity contracts. It's by far the most expensive asset class in the industry. This was the big crisis at CalPERS that led them to completely rethink the way they run their business when they realized, "holy cow, we're spending billions on a single asset class and a single fee category. Maybe there's another way."

Next slide, please.

PSERS --

CHAIRMAN TOBASH: Not to be rude, we're going to keep moving now quickly. If there's a couple points you want to make with the end of your presentation and then we'll leave a little bit of time for questions, if that's fair?

DR. MONK: Sure.

CHAIRMAN TOBASH: Thank you.

DR. MONK: Yeah, yeah.

So, look, I'll just simply say, this is all, it's going to be in a document, it's in the slides. I'll go through PSERS and then I'm going to talk briefly about the self-reported survey and then I'm going to stop, and that will take three to four minutes, okay?

So PSERS, through their own initial analysis on fees, they produced a report, which I commend them for taking the initiative on and beginning the process of trying to rein in their fees and costs. Some of the statements in that report, I might want to sit down and have a deeper discussion.

One of the things the report said is that high fees need to be paid in order to get access to the best performing managers. Except when we look inside their public equity's portfolio, we noted that in international all cap equities, the best returns were from the cheapest mandate, 44 bps. The average of that, the other four mandates in that section, was 81.75 bps. So the logic that paying the most gets you the most is contradicted in their data, their own data.

On top of this, we have found a number of areas that could be improved. We list them here. (Indicating.) Why don't I just say we're going to come back to them when we bring Marcel and the team from Novarca.

If you go to the next slide.

This is a cost stack. In general, we put this picture on here to simply highlight that there are many, many things that are missing from this cost stack. Transaction costs analytics, fees paid by asset managers to third-party providers, income and revenue from investment banks and brokers to asset managers, all this should be inside of a healthy fee and cost analytic.

Next slide.

When you have a moment, we'll show you that, again, benchmarks really matter when you're thinking about how well a manager is doing. The PSERS benchmarks are much lower for their managers than the SERS benchmarks, which gives the impression that every one of their managers is completely knocking it out of the park. I would say that PSERS could and potentially should do a better job of setting those benchmarks for their managers more in line with the risk tolerance that they're taking.

Next slide, please.

We have two charts now, one for SERS and PSERS, that show you -- it's a normalized graph so it's a bit confusing, but it highlights, if you look in the worst categories, how much of the return they are capturing in fees. There are several in the bottom left quartiles that are definitely available for us to renegotiate with because their fees capture most of the returns they're generating for your systems.

Next slide.

Same thing, there are opportunities here where the fee structures allow the managers to capture most of the returns they're generating.

Next slide, next slide, next slide, okay.

So because the data was not forthcoming and it was not our choice or our preference, we had to get data somehow. And so we provided a survey to PSERS and SERS that sought to ask them to self-report some of their processes so that we could understand, in their words, how are they thinking about this issue. And I will give you a quick run through of some of the answers because I think they indicate areas for which we might be able to help them save the money and get to the objective of the commission.

Question 1, "On a scale of one to ten, where do you think your management fees are placed in the market?" One low, ten high, they both said ten. Ten, they are the best they can be. I love the optimism, okay? They justified that based on MFN, which is a common thing to do. But I would simply tell you as a expert in the space focusing on fees and costs, an MFN cannot be a justification for a 10 out of 10. That's the first thing.

We then asked them, "What is the average age of the fee schedules in your portfolio?" Neither of them track that issue. Again, I think they're relying on an MFN when they shouldn't be. And they should be tracking the ages of their contracts in order to renegotiate. As assets go up over time, you should be renegotiating.

We asked them, "What is the average age of investment mandates in your portfolio?" Again, untracked.

Four, "What percentage of your asset managers have confirmed in writing that they don't receive commissions, rebates, retrocessions, and the like?" PSERS does not maintain this information. SERS does some of this in their due diligence, but didn't directly answer the question. In our view, as cost experts, we think this needs to be recorded, as the managers may be benefiting from their investment activities in other ways.

Next slide.

Question 5, "What percentage of your managers have confirmed in writing that they don't pay and have not paid any commissions, introduction fees, or the like?" PSERS does not maintain this information, so there could be whole fee streams in there going to placement agents that they don't know about. SERS didn't directly answer it, but at least SERS talks about it in the due diligence.

Six, "Does your plan operate under a fee budget? Do you have a set of fees at which point you will reevaluate the way you run?" Both said "no." We find this problematic because how else do you know if a fee load has gotten to the point where you should reconsider your operating model? Isn't there a fee at which point you might consider bringing assets in-house, or doing it differently? If the fee for private equities here for one of the plans was a billion, wouldn't you want to know? Wouldn't you like to change the way you run that private equity portfolio? Without a fee budget, that type of information isn't triggered and revealed.

"In negotiating investment costs, do you have a process for determining the best alternative to the investments under consideration?" Good news, yes, they do, and I congratulate them for that. Not everyone does that. Having an alternative to the risk exposure you're looking to get is always a smart way and helps you negotiate and get the best deal.

Eight, "Do your brokers or these managers make use of bundled brokerage?" Both PSERS and SERS, "yes." I'll simply note that this is today illegal in Europe because of the intense conflicts of interest. It's illegal. It's not illegal here, but I would say if it's illegal in Europe, we should probably pay attention to it.

"Are you conducting regular transaction cost analyses on equities, fixed income, and FX?" PSERS, "no"; SERS, "yes, quarterly." PSERS has realized, as stated in Number 8, that their managers might be making on the side. Yes, in some cases, they said, "The brokers have bundled brokerage, but they do not do the transaction costs analysis," which means it's incredibly hard to unravel what is baked into their transaction costs. These bundled brokerages means when you do a transaction, whole areas of that transaction become more pricey because there's different things baked into those transaction. Without transaction costs, you can't have that full cost stack.

I know we're running late.

Look, despite the limitations and constraints posed on us for carrying out our work, we've done our best to present a balanced review of performance of fees. We note some inconsistences in the survey which gives us confidence that we can help the plans. The plans, in my view, are motivated to do the right thing. And I think with our help, we can help them save that 1.5 billion easily.

And with that, I'll simply turn it back to you, Chairman, for questions.

CHAIRMAN TOBASH: Thank you. And we do appreciate your hard work and your travel, and we apologize for cutting you a bit short on your presentation. But I want to give the commissioners an opportunity to ask some questions as we might develop more thinking and direction as we move forward.

Mr. Vice-Chair.

VICE-CHAIRMAN TORSELLA: Thank you, Chairman.

Thank you, Dr. Monk.

There were some bright spots in what you said, but there was a lot that, frankly, is deeply disturbing and may be nothing as much as the lack of information provided to you, which reflects a broader lack of information that, in the end, as you've argued, accrues to the benefits of planned beneficiaries -- accrues to the benefits of the people who are depending on these pensions, when the information about how their money is being spent is out there and is in the marketplace. Based on -- so it is -- I am disappointed to deeply troubled by that fact.

But based on the limited information that you have, do you think this commission's goal, which we intend to reach, of 1.5 billion in savings for each plan is reasonable, conservative, ambitious, I mean, to characterize, based on the slivers you've seen, of what you think we can do without compromising returns?

DR. MONK: Okay. Nothing I do compromises returns. I accelerate returns, as we have a fiduciary duty to do that.

So the good news about lowering fees and costs, it's magical, like almost literally, because we're taught in finance that there is no such thing as a risk-free return, unless you cut fees and costs and get the same exposure. That's a risk-free return. So we should be pursuing it. That's the first thing.

And the second thing is, if we could actually get in and read every single one of the contracts unfettered, I think 1.5 billion is conservative. I mean, on an annualized basis, that -- we talked about it, it's -- what is it -- 11 or 12 million bucks compounding per year.

I mean, there's -- we saw one mandate that would do that. High yield in one of the plans, you could restructure that and get your money out.

Look, the thing is pension plans in general are focused on the really important things, which is asset allocation, manager selection, portfolio construction, et cetera. The fee and cost issue, despite the fact that they will say they're doing a great job, they don't have the purview, they don't have the market knowledge. They talk to their peers, but often their peers are locked up under NDA, under trade secret rules. And so, just as they were unwilling to give a state-commissioned body this data, they can't share it with their peers.

And so inside this plan, even if these really smart people behind me don't want to admit it, we will find the 1.5 billion quickly.

CHAIRMAN TOBASH: Commissioner Gallagher, do you have a question?

COMMISSIONER GALLAGHER: Yes. Thank you, Mr. Chair.

Dr. Monk, thank you for being here.

And it's clear that you're eager to assist and I'm grateful for the acumen that you bring to the table. But there's a lot to unpack here and I'm doing my best to make sense of some of the assertions made within.

But I'm optimistic that your findings are preliminary and not final, because contextually, as something that you brought up in your verbal presentation, it is crucial. And this state has underfunded its pensions for 15 of the last 20 years. And in many ways, that dictates some of the decision-making downstream, and I think we need to be mindful of that, because some of the funds that we're being compared to have been fully funded. Their state leaders took it upon themselves to dig deep and make it happen. All along, we did not. So being compared to other states that may have a very different funding profile may, in fact, not be appropriate.

But I also want to bring up the fact that in your materials, you know, it's my understanding that risk and return are inextricably intertwined. In the presentation, only return is discussed. What about risk? Risk-adjusted returns is what as -- some of the roles and hats I wear are absolutely critical. Have you done a peer-to-peer analysis on risk-adjusted returns?

DR. MONK: We have.

COMMISSIONER GALLAGHER: How did our systems stack up?

DR. MONK: We didn't include it because we didn't want it to drive the debate.

I agree with you. I mean, I think

risk-adjusted return over long time periods, whether it's a sharp ratio or some other ratio, information ratio, something, is incredibly valuable.

Our analysis that we did, which we did based on best practice standards, did not exactly correspond with the RVK analysis, which Bill Sharpe himself worked on. And so, rather than putting forward an analysis which was basically in line with what you saw today, we held it back to do the homework to make sure that our statistics were robust enough to merit presenting at a commission sponsored by the state of Pennsylvania.

COMMISSIONER GALLAGHER: Okay. Thank you for including what I think is a really mission-critical component of this.

DR. MONK: We agree with you. We just want to make sure that we are not contradicting the guy who invented the ratio.

CHAIRMAN TOBASH: Are there any further questions?

COMMISSIONER BLOOM: No, no. I just have a comment.

You were very nice to the commission in congratulating us for being here, okay? But we're really here because of what the state legislature and the Governor did in Act 5. And they should probably get as many or more kudos than you gave us.

DR. MONK: I congratulate them.

CHAIRMAN TOBASH: We thank you for your testimony.

And I'll just make a point consistent with what Commissioner Bloom said.

In 2013, we did a brief study based on public information. And there was some concern that the costs of the system were higher than their peers and that the performance was lower. At that point in time, we began the discussions and the legislature took that into account. And some of the testimony here today in your analysis confirms the concerns that the legislative body have had.

So we're happy that we're doing the work. We're gratified that you are willing to be our consultant and do this deep dive, and we're anxious to move ahead.

So thank you very much.

DR. MONK: Thank you for your time. Thank you, Commission.

CHAIRMAN TOBASH: We will move right into our next testifier, who is a colleague of Dr. Monk, Professor Tim Jenkinson, a professor of finance at the Saïd Business School, Oxford University. He's the director of Oxford Private Equity Institute and is one of the founders of the Private Equity Research Consortium. We appreciate --

And I'll mention again that this commission is gratified with the level of expertise that is coming to the assistance of the commission and the state of Pennsylvania, and inevitably, everyone who is a participant in the plan.

So, Dr. Jenkinson, thank you very much for being here today. We're anxious for your testimony.

I will mention before we get started, as I have done before, we're up against some time constraints. If I am so rude as to start to try to nudge you along, understand it's because other testimony will follow.

Thank you very much.

DR. JENKINSON: Sure. But no, thanks very much. It's nice to be here. It's -- I spent a happy year at the University of Pennsylvania back in my youth. And many of my close friends are beneficiaries or taxpayers of Pennsylvania, so it's relevant to me.

What I was going to do, I was just going to go through the presentation I think you have in front of you and will be up on the screen for us. But I'm going to try to answer sort of three questions, really, which I hope are relevant to you. They are not really about costs, actually, in this part. They're more --

CHAIRMAN TOBASH: I noticed it before, maybe move that microphone in a little bit. We apologize for maybe the acoustics, but some people are having difficulty hearing.

DR. JENKINSON: Sure. Okay. Is that better?

So what I'm going to answer, try to answer, are three questions. One is -- and this is going to focus on the private equity side of the plans -- which is why invest in private equity when it cost more? Certainly there are cheaper alternatives to that. What are the general trends in the market for private equity in terms of the returns relative to cheaper alternatives? And then to give you a, I hope, a sort of relatively simple and helpful sort of analysis of how Pennsylvania has done relative to the market. So that's really the three things I want to do.

So slide three now, which is, why invest in private markets at all? And I mean, this isn't a time to give you, you know, a Finance 101 tutorial, but you know, there's really only two main reasons why you invest in any asset class, which is really diversification and returns. And in some ways, the returns will come on to you, but the diversification argument is one that's been evolving quite a lot.

If we could have the next slide, please, which is that -- and I'm sure many people are aware of this, but public markets have been changing very rapidly over the last 20 years. To give you just a few facts, there are now half as many public companies in the U.S. than there were 20 years ago, half as many. It's exactly the same in the U.K. It's roughly half the number of public companies.

The stock market capitalization has actually continued to rise, but not by as much as you'd expect given the growth in the economy. So basically, the public markets give you a smaller chunk of the U.S. economy now and a smaller chunk of most other economies. And you've got a sort of -- one of the ways that's happening is that small firms are sort of disappearing from public markets. So if you look at the -- one way of looking at it is if you look at the proportion of firms, you know, which have a market cap of less than $100 million, it's halved in the last 20 years.

And a stunning figure, which is, if you look at the average -- and I say the average, by which I mean here the mean market cap of a listed company in the U.S. is now $6 billion. So they're big companies.

And so that's what you get when you invest in public markets. Nothing wrong with that. Big pension schemes have got big sums of money to invest and they have got to put it somewhere, but you are getting a subset of economic activity through the public companies.

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So, you know, again, stating the obvious, that what pays pensions is ultimately economic growth and equity gives you a slice of economic growth and public equity gets you a good exposure to the more mature companies, in particular, sectors and countries, because many countries don't really have mature public markets. And I think one of the reasons why people look to private markets, in particular buyouts, growth equity, or venture capital, is that it gets you access to other sources of economic growth and those can be important to pay the pensions of the future.

And indeed, I think that many pension schemes around the world and many institutional investors now no longer really think of private equity as an alternative asset. It's really just an alternative way to get equity returns and should be judged against equity returns. And this is important because, actually, the way that the industry has tended to sort of declare its performance is not normally relative to equity returns. It tends to be more absolute-type returns, which can be very confusing and not necessarily as relevant.

I'm not going to do that. I'm going to focus laser-sharp on how private equity has done relative to the cheap alternative in public markets.

So next slide, please.

And this is not, in a sense, that innovative.

If you look at a report from the *FT* the other day, you see that the world's largest public equity manager, BlackRock, is actually expanding its private investment activities and recruited one of the CIOs of the Canadian pension plan to do that, with a very good reputation. And he says that most investors are heading in that direction, in other words, towards private market investments because the liquid public markets are shrinking. And that's a reality that faces everybody. Every institutional investor around the world is facing this same issue. And that's why private markets, in general, and private equity, in particular, have been growing as the public markets have been shrinking.

Next slide, please.

So that's just a little primer, if you like, on diversification and why you might be interested in some of these more challenging, a bit more opaque -- sometimes they're doing things which are quite innovative. But, you know, there can be good returns to be made there and it gets you access to other forms of economic activity. But the case for private equity has to ultimately depend upon the returns, the net returns, that are owned by the asset class.

And so that's what I'm going to talk about. And if you're thinking about, "Well, why might they actually differ in the first place? How might private equity actually add value over a public market investment?" I think is worth -- there's much that can be said about this. And I might spend a couple of classes in any course that I ran on these sorts of issues.

But essentially, the way I think about it is, you should think of private equities as just a different form of corporate governance in the 21st century, and that where you've basically -- rather than having ownership and control separated, which is what happened with the growth of stock markets and joint stock corporations through the 20th century where there were lots and lots of shareholders who could own companies, and then you had to worry about things like the operation of the board of directors, nonexecutive directors, protecting minorities, and all those things. Private equity has just glued them back together again.

And ownership and control reside in the same hands and that can be very effective. You can focus on medium term, three- to five-year performance. And ironically, many people, including me, think of private equity as longer term in their focus than public companies. And that's not the way that people used to think about it in the early days of private equity. They thought, "Oh, these are short-term, it's financial engineering guys who are trying to get in and earn quick bucks." And there was some truth in that in the early days. No longer is that true.

It's hard these days to make returns in any asset class and you have to work quite hard at it. And it often involves significant transformation, growth, investment away from the public gaze, I think.

Now, having said that, one other way they do it is through extremely sharp economic incentives for the management teams. You know, if you're a manager of a private equity bank company and you perform, you will do well, very well. Very well, actually. Most people will never know how well you did because it's private. But you will do well.

And I think the other thing to mention is, and of course, this gets a lot of attention, is that, you know, private equity uses leverage, uses debt. And I think that they are in some ways very good and effective at managing leveraged, highly leveraged companies, which can actually lead to, you know, higher equity returns.

And I say here (indicating) for managing risk, I think they are masters, actually, of pushing risks on to other people, like banks, collateralized debt or obligation funds, things like that. So I think that you as an investor sometimes can benefit from that.

Next slide, please.

And just final things to where the returns come from. I think one can't avoid the fact that there is a sort of talent issue, as well. Because I think that over the years, being in the C-suites of public companies has become much less attractive to many successful businessmen and women. And you know, as there's increased regulation scrutiny following every crisis or scandal that comes along, it's ratcheted up the amount of regulation and scrutiny and publicity and that's made it a less attractive place to work.

Now, these are decisions that politicians make, they're not decisions that we can do anything about. But the outcome is that you've got a lot of the talent being pulled in this direction. (Indicating.)

And you see many new innovative businesses trying to stay private for as long as they possibly can. You wouldn't have predicted even five years ago that you could possibly have 20-, 30-, 40-, 50-, 60-billion-dollar companies private. You wouldn't have thought that was possible. You would have said, "Oh, they must have gone public by now." And yet, now you see companies who claim, who say they never want to go public if they can avoid it, and those are companies you'll miss if you don't get into that sort of sector. So I think that they -- there are some talented people in this sector, on both the portfolio company side and the fund side, but they don't come cheap.

And I'm not going to talk to you much about that issue, but I would acknowledge that the fees are high, the salaries that you can earn as a manager for a portfolio company can be high, or at least -- not so much the salaries, but your equity stakes in them can do very well, if the firm does well.

So next slide, please.

The rest I want to show you, like what the returns have been like as a context for this sort of discussion. And the industry does tend to focus on the return measures, more like absolute return measures, like internal rates of return, money multiples. These can be extremely hard to interpret. You know, a high IRR in a market where everything is going up is hardly clever. You're just lucky that the market is going up. And so IRRs, in a sense, you sort of have to market adjust them. You have to market adjust the returns to make clear, you know -- a rising tide raises all boats, it doesn't show skill.

And so I'm not going to give you any information on IRRs and money multiples to address that balance because many academics say there is far too much focus on these metrics. I'm going to show you private equity returns relative to public equity returns, which allows you to answer the question, which is my sort of main question, which is "why bother?" You know, why would you allocate funds to private equity, when there's a cheap, low-cost alternative, namely, passive index funds?

Next slide, please.

So what I'm going to do is -- also, just to be absolutely clear -- is I'm going to focus on net returns.

So this (indicating) is after all the fees, carried interest, any portfolio company fees, or anything like that have been paid. So there's nothing more to be paid. These are the net returns. (Indicating.) This is really the checkbook of the pension scheme, okay? So you send them money and they send you money back. And what I'm using here (indicating) is your bank account and the bank accounts of institutional investors around the world.

So, you know, as opposed to what Dr. Monk was talking about, I'm actually going to talk about the returns, not the fees. I don't actually have any major information on that. But the returns themselves, I think, are useful.

And for public equity, just to be clear, I'm going to use the gross returns. In other words, I'm not allowing for the cost of that. But to be honest, I don't think there's a huge bias in that because running a private equity program internally costs you a bit more money; and so therefore, not allowing for the fees that it costs to run an index fund or the like, I think it is sort of a bit of a wash, actually. But that's, just to be clear, what I'm going to present.

So next slide, please.

So when you're looking at public versus private returns, the standard measure that academics have come up with is the so-called public market equivalent return, or PME, and that's what I'm going to show you. And essentially, what it does is it sets up two mimicking portfolios, one where you send the check to the private equity manager and the other one where you send it to Vanguard. And every time you get payment back from the private equity manager, you divest that from Vanguard and you see how much money you've got left at the end of the day, whether you've got more in the public pot or the private pot.

And so if you -- these are sort of wealth relatives, market adjusted multiples, if you like. And if you have a PME of greater than one, you've done better with private equity than public investing. And if you have a PME of less than one, then you've done worse. So it's actually rather easy. And if you've got a PME of 1.2, you did 20 percent over the life of the fund -- important to mention that -- over the life of the fund than if you had your money in public equity.

And I'm going to generally focus on the returns over the life of the fund. I'm going to look at a vintage year returns, which says, "If you put your money to work in 2003 in a private equity fund" -- because these are long-term investments, you can't easily trade them -- you know, "would you have earned more money, would you today in 2018 have more money than if you had stuck it in an index fund," which I think is a relevant question, okay? So that's what I'm going to do.

There are some complexities. Next slide, please. It matters what you benchmark to, which index you use. That's particularly important when you're talking about international investing. It's quite hard actually to benchmark the portfolios when you're putting your money to work all around the world. Currency is also an issue.

I don't want to -- I'm not going to go into any of this stuff, but I'm going to tell you -- I've given you a little bit of information in the appendix which shows that it doesn't make a huge amount of different. There's sort of rough and smooth with some of these things. Some indexes are better than others, give slightly different answers, but it's a relatively second order issue.

Okay. So, just before I give you the results, just -- next slide, please -- one mention of data. It's very important because there's been lots of work done on private equity and you see lots of analyses done, which uses very selective data. I'm going to use what I think has become established as the sort of gold standard that is now used increasingly in academic work, which is sort of the

Burgiss data, which Burgiss databases is sourced entirely from institutional investors. There's no data gathering from the funds themselves, which would cause all sorts of worries because there would be possible adverse selection issues and things like that. These are the portfolios that exist in the world of institutional investment. Actually, both of your pension schemes use Burgiss, as well, so they're already in the system. And it includes a lot of funds.

I'm going to focus mainly on these buyout funds and venture capital funds. And I'm only going to look at vintage years up to 2014. The reason being is that the funds after that are too immature. The ones that were -- they're not fully invested, they wouldn't have actually probably gotten any returns yet. And so I think they're sort of too immature to really say anything about it, in case you're wondering why I'm not going to look at the more recent vintage years. I'm going to show you these vintage year-type of returns.

Next slide, please.

So before we look at the Pennsylvania funds, I just want to show you the figures for the world as a whole. So this (indicating) is the largest sample of funds. It's basically all the funds globally in the Burgiss database. The thick blue line in the middle is the median fund return for each one of those vintage years. And the critical number here is one. Did you do better than the public market returns? So if you're above one, you were actually better off putting your -- if you imagine you had no skill at all and you were just getting the median fund, would you have been better off as a result of going into private equity?

And the answer is -- and it's actually a very surprising answer. You know, it was surprising when actually myself and a few other coauthors in Chicago and Virginia actually found this, that there's basically hardly any vintage years you can find where you don't -- where private equity actually hasn't beaten public market returns, on average, after all the fees and carried interest payments and portfolio fees and all that stuff. It hasn't really happened, you know, a slight dip in 2008, but actually, the median fund has beaten the public markets after those costs.

But there's high variability. So you know, if you're only picking three or four funds each year, you can be all around, you can be the other two lines in the quartile range, the top and the bottom quartile. So you can certainly be within those. That's globally.

Next slide, please.

If you look at local markets, again, you have to be a bit careful in terms of things like currency and the like. Actually, it still is true for -- I sometimes call this my Ryder Cup slide, which is the U.S. versus Europe. And if you look at that (indicating), where the red line is Europe, Europe versus European markets in euros, and the blue line is America versus -- U.S. private equity versus U.S. public markets in dollars, you find that the same is true, that you don't actually see any of the vintage years where the median private equity firm didn't actually outperform the public markets.

Having said that, anybody looking at those charts will see that that premium has been falling over time and has been getting, you know, closer to one. So it's, you know -- there's no doubt that I think that as competition and growth in the sector has happened, people have been attracted to this sector. The returns have come down. And that's what we expect. That's what you expect in any asset class. That's what we've seen in hedge funds, some real estate funds, and others. The competition and growth tends to limit returns. That's on the buyout side.

It's a very different story in venture capital, not that either of your funds puts much money into venture capital, but it's -- next slide, please. The experience has been completely different.

We had these extraordinary returns before the dot-com bubble burst, so high that, you know, you can barely fit them on a chart, you have to adjust your scale. And then, really, a lost decade of the 1990s, where venture capital returns were pretty bad relative to public markets. You were definitely better sticking it out, sticking your money in the S&P 500. But as you see, actually, the returns have been going up over time. And so -- and actually, in the last vintage years since about 2009, actually, your median venture fund has done better than the public markets, so a very different story.

But bear those in mind because I'm now going to superimpose on them the performance of your pension schemes, if you like, to see how they did relative to that market.

So next slide, please.

Just by a little way of background, I'm going to split them up in PSERS and SERS.

You know, the vast majority of PSERS money is being put into buyout funds, about 20 billion over the long period, some into VC, and some into special situations. I'm actually going to put the special situations in with the buyouts because it's hard to find a benchmark for them and many of them are not that difficult from buyout funds, although they are a bit different.

COMMISSIONER BLOOM: This chart reflects the special situations there are?

DR. JENKINSON: The one which I will come on to, yes. The next one does, yeah.

It's also worth pointing out they started a coinvestment program in 2012. You probably know what that is. It's where you can basically invest in deals normally on a no-fee, no-carry basis. So in other words, it's sort of almost zero cost, which can help bring down the average cost of investing in private equity. And PSERS started that in 2012.

I'm going to include those deals here. (Indicating.) I'm going to try to just include them all into a sort of vintage year performance for each of the asset classes.

I'm going to just use the benchmark that they use, which is a blended benchmark of 70 percent Russell 3000 and 30 percent MSCI World ex US. I think that's not an inappropriate benchmark given there's quite a few of these investments that are actually international. So it's not sensible to compare it just to a U.S. return. And so what I'm going to do on the next few charts is sort of show you how they did relative to that benchmark return.

So, the next one -- next chart, please -- this is -- so here (indicating) the blue line and the other dotted lines are much like the ones you saw in the earlier chart. They're the sort of global figures. They're a bit different because they use the PSERS benchmark for private equity, the 70-30 benchmark. And then the red dots are the performance in those vintage years of those funds.

Now, just to absolutely reiterate, these are the years, these (indicating) are the returns for the investments made in those years. They are not like year-by-year returns. The 2003 figures show you the returns that have been earned up until like the latest data, Q1 2018 of investments made in 2003, okay? So they're long-term returns is what we're saying.

And you can interpret those -- people can interpret those in different ways, but let me give you my very brief interpretation of the performance.

I think before the financial crisis, PSERS buyout performance was actually generally below that of the median fund, I think is what I would, how I would interpret it. But actually, even though it was below the performance of the median fund, it did still outperform public markets in each of those years. So it was -- even though you weren't getting the median returns, you were still doing better than if you had your money in low-cost alternatives.

I think since the financial crisis -- and there was a couple of years where PSERS wasn't making any allocations at all. The performance has broadly been in line with median returns and coinvestments have held to that. It's been quite positive to the returns to have the coinvestment program.

And so performance has generally exceeded public markets, but by less in the early years. And those would be my simple sort of conclusions. You could -- there's more nuance conclusions I'm sure one could draw, but we probably don't have time for that.

Next slide, please.

In terms of the venture capital side, it's a bit different. Actually, the performance, again, you can see the performance of the PSERS funds. I should say here that where there's a hollow market, it means there's less than three funds in a year, which it makes -- I mean, it could be one or two funds in a particular year. So take it -- be aware of that.

And, you know, it looks slightly different story there, I would say. My interpretation -- next slide, please -- is that obviously, they've made far fewer investments in VC, but in general, PSERS VC investments have actually exceeded the median fund return and have actually sometimes been in the top quartile, so been pretty good. And as a result, even though venture capital itself has actually, as an asset class, generally disappointed in eight of the thirteen years they made investments, actually, the investments in venture capital have beaten public markets for PSERS. So that's the way I would interpret that data, anyway.

Just to finish off by just looking at the -- I never quite know which way to do it, SERS, PA SERS scheme, they've invested rather less, obviously because they're smaller, about 10 billion, but the same sort of balance, mainly buyouts and special situations and a bit in venture capital. I think they stopped doing venture capital since the financial crisis, more or less. They tend to use the S&P 500, and so that's what I've used here (indicating), as well. And I do basically the same sort of analysis.

So next slide.

You'll see that the performance is a bit different there of the Pennsylvania SERS buyout performance. You'll see that, you know, in general terms, the -- I'll tell you how I interrupt it and then maybe change the slide later because it's easier. Maybe go back a slide because it's easier to visualize it and then I'll tell you what I think it is.

I think that, generally, the buyout performance has been at or above that of the median fund. Nine and ten were obvious exceptions to that, but there was actually relatively little investment going on in that period post the financial crisis.

The SERS doesn't have a direct coinvestment program. It hasn't started one, so that's a difference, as well. And so as a result, the private equity performance of the SERS has beaten the public markets in every vintage year except for 2007 to '10, where it didn't.

So that's on the buyout side. Just finally on the venture capital side, the -- so if we go forward two slides, please, you'll see a similar sort of analysis being done. And my interpretation is the early years were, the performance was generally a bit below median, at or below median, but since, from 2003 to 2008, it was generally at or above median. And at that point, actually, the program was more or less winding down because there were very few. I think there were only six investments made since then, 2008.

So that, I think, is just a -- if you go to the final slide, the conclusion slide, please.

So just to conclude, that's my answer to the three questions, you know, as to why you invest in private equity, what the returns have been, and how the Pennsylvania funds have done.

There's no doubt that the private equity premium has been falling over the years. And it means that you have to try a bit harder to find those sorts of returns. Strategies like coinvestment strategies and the like can help because they can help bring down the costs. Many times those will be zero cost or close to zero cost investments.

And so, those sorts of things are things that are worth thinking about, at least if you want to continue doing it.

CHAIRMAN TOBASH: Thank you very much. We greatly appreciate your testimony.

Just a couple of things so, you know, I understand. And I really appreciate, I'm grateful for -- not really a debate, but a conversation between colleagues from Oxford. We are going to have three of you on the agenda today. It's quite amazing. Maybe next time, we'll come to Oxford and visit you there.

So private equity, a growing sector of our economy and a need for investment in that sector should be engaged in by pension funds. I understand it. So during this period of time, this sector has been increasing. Have fees been coming down generally in the private equity market? And if they have, can they continue to come down?

And the work that you're doing, are there efforts to try and make certain that as this sector grows, that we get a fair price, or pension funds, individuals, or whoever invests in this space is getting a fair price for the investment and the work that's being done?

DR. JENKINSON: Yeah. I think, as -- I think it differs a bit between the buyouts and the venture capital side. I think on the venture capital side, the fees have remained reasonably similar. And I think there's a scale issue here. If you're running a $100 million venture capital fund, a two percent fee is not egregious because that's $2 million a year and, you know, you're going to -- you have to do a lot with that. So I think that it's a scale issue.

The answer to the question, "Have they come down?" is, I think as the fund sizes have gone up, the fees have come down a bit, but not as much as one might have expected. So you know, when a large buyout fund was a billion dollars, broadly speaking, that was still in the two and twenty era, so you did pay, very often, a two percent management fee and a twenty percent carried interest.

In the era of the $10 billion fund, you would have expected it to come down more than it has. I mean, it might be now 1.25 and 20 or something like that, but 1.25 -- you know, there are economies of scale in this business. And so you would have expected them to come down faster than they have. I think the reason why they haven't is because each individual investor doesn't have much market power.

Organizations like ILPA, who I know you heard from before, have been the sort of focus, I think, of attention to try to address some of that balance. And there's no doubt that some of the large buyout funds, the funds will get rich even if they lose your money because of the management fees. I think actually very few institutional investors worry too much about the carried interest payments. You know, giving 20 percent of the profits to somebody is sort of -- there has to be profits to -- you know, that sharing rule doesn't seem too worrisome. I think many people worry more about the management fees, which I think have not come down as fast as one might have expected.

CHAIRMAN TOBASH: Yeah. So some of the conversation that we're having here and the previous hearing focused on transparency. Do you think that transparency is a worthwhile endeavor to help accelerate the reduction in costs of these funds?

DR. JENKINSON: Yes, I do. I think it is. I think, in general terms, transparency is a good thing.

Across the -- actually, we're talking here about private equity, but I've spent quite a lot of time battling to get more transparency in public equity, as well. In fact, I served Freedom of Information requests on every single public pension plan in the U.K. to get them to reveal what Dr. Monk was talking about earlier, about full brokerage commissions and things like that that can eat up a lot of costs.

It's always the case that intermediaries don't want to reveal this sort of information. And over time, it will come out, I think. But it does take initiatives and I think it's the sort of initiatives that, you know, you would see from people like ILPA, I think can help that. And also the fact that, you know, databases and the like, are just generally, they are finding more information, you know, through FOIA and things like that over the years. It wasn't so long ago that you couldn't get private equity return data, you know, but you can now. Funds have gotten used to it.

I think in five to ten years' time, funds will get used to the idea that the economic terms of the funds will probably be in the public domain or they'll have to stop taking money from public investors. Because I think there will be some private investors. I mean, these are private transactions, right? You could go along to a family office and the like and do a deal, and say, "Look, we will only do this, we'll only take your money if you don't reveal that information," and a private, a family office has the liberty to do that. But for endowments, public pension schemes, I think it's going to be expected.

CHAIRMAN TOBASH: Yeah. So these businesses have a need for capital. And as it's a growing sector, we would think and hope that fees will come commensurate to the increase in the sector and the market.

Just one more question. So have you dealt directly with SERS or PSERS? You've got a lot of data here.

Has much of that been gained through information that you can collect publicly or have you been in contact with the systems themselves and how have you found their dissemination of information?

DR. JENKINSON: So when I was asked to do this, I said, you know, I'd like to do this final bit, which is put the spots on the chart. And I asked them for a breakdown of their data. They're subject to different confidentiality agreements, I think. But for SERS -- for PSERS, I got it by fund, and for SERS, I got it done by vintage year already. So I don't always see the names of the funds, but I don't need that. Because they use Burgiss, I know what they're doing and I can -- I'm using it, as well. So we're sort of on the same system and I can, I know that the calculations that are coming out of their spreadsheets are basically the same calculations. So it was actually relatively simple. Not to say it didn't take a couple of days, but it was relatively simple.

CHAIRMAN TOBASH: Thank you.

Mr. Vice-Chairman, questions?

VICE-CHAIRMAN TORSELLA: Thank you, Dr. Jenkinson.

And I think we may have, Chairman, a Cambridge problem given our Oxford presentations.

But I know that you spent a happy year at

Penn, I spent a happy year-plus at Oxford.

DR. JENKINSON: Yeah, good.

VICE-CHAIRMAN TORSELLA: But thank you for being here. Glad to have you.

And I think it's important to remind us of the sort of larger context around private equity particularly because I think there's somewhat of a misinterpretation that our efforts to understand the costs and returns translates to an effort to abolish the asset class, which is not true, but good to have you as part of what the Chairman accurately referred to as a conversation.

And, Chairman, I'd like to -- we can follow up with this later. Good for you also for getting the data to do this kind of analysis from SERS and PSERS. But I want to reserve the right that I'm misunderstanding previous comments and commissioner requests, but if it is the case that the systems gave you data that we requested as the commission, I want to underline my earlier comment about being troubled. I say good for you for your analysis, but it raises some real questions for me.

Did dividing things into venture and buyout -- it's interesting and important to understand the difference. But that's not the same as looking at the whole portfolio with the dollars that went into each fund and whether the years where the dot was above the chart or the years where the dot was below the chart, how they balanced out, is it?

DR. JENKINSON: No, that's right. I mean, you could do this capital weighted across the whole program. That's a different way to do it. That's the different sort of analysis that you could do. Because some of those -- yeah, because your worry is, and it's probably a legitimate worry, is maybe some of the really good performing years were very small and some of the very bad performing years were very large. Yeah, sure.

VICE-CHAIRMAN TORSELLA: One could do the same analysis on a PME basis with the whole portfolio, correct?

DR. JENKINSON: Absolutely. Sometimes called a pulled PME across the whole program. I would say do it. I mean, you could do it with buyouts and venture capital. I would caution you to keep them separate because they have such different dynamics, and so I think -- and you know, they are slightly different types of investments that you're doing. But yeah --

VICE-CHAIRMAN TORSELLA: Or even within those, we could look at the cash flows in heavy years and light years and see how the whole VC --

DR. JENKINSON: Yeah.

VICE-CHAIRMAN TORSELLA: -- portfolio or

buyout portfolio did.

DR. JENKINSON: That's right. And there are -- I mean, I think that -- yeah, you can get, it's a relatively simple thing to output at the end of this analysis. I mean, there's lots of calculations going on in the background here, but thankfully, that's what Burgiss has for you.

But in general, the answer to it is that, as I understand it, that the weighted, the capital weighted returns are still above public equity returns as you'd expect because almost all the dots are above the line.

VICE-CHAIRMAN TORSELLA: And looking forward -- I read a few of your recent papers, which were fascinating. And you had a couple of comments that sort of repeated in some different papers about -- since 2005, returns have roughly been equal to public markets. Along with a really fascinating sort of finding that the connection between returns and cash is that the more cash that's flowing into the asset class, the worse it's done. How should we think about those going forward, looking at those two facts?

DR. JENKINSON: Yeah.

VICE-CHAIRMAN TORSELLA: And I want to, by the way, mention your wonderful comment about how little value investment consultants add in picking managers, which

I think bears on this.

DR. JENKINSON: Oh, yeah. That's another string to my bow.

I think that certainly, I mean, you can't help, when you're looking at that chart, but see that there's a downward trend in the premium. Where it ends is really not clear. I mean, in terms of the, over time, because obviously this is like an evolving story. Even I say look at what's happened since 2005 or 6. Well, those funds, some of those funds, are still going. They're still working their way out. And if you look at like the 2009, '10 funds, they're still quite immature.

It looks to me as though, you know, the market currently has sort of flattened out at a positive premium, but it's less than it was. It might have been 1.2, it's now 1.1 or something like that. So I think, we don't really know where it's all going to end up. And fees and carry do have a role to play here because in equilibrium, investors will quit this asset class if the returns don't meet public markets, right? What's the point?

So therefore, that may be another reason, or that is another reason why I said earlier that I think that the fees will continue to come down because the returns have been coming down. So therefore, the investors will eventually quit this. But some investors look a little bit too much in the rearview mirror and not enough in the headlights, I think, when they're making their allocations.

Now, having said that, it is certainly true that when markets are hot for private equity, the subsequent returns tend to be less good. Having said that, it's quite hard to tie in your private equity allocations. I think it's quite hard to manage that internally, to say -- you know, because with the best will in the world, plan sponsors tend to move quite slowly in terms of strategic asset allocation. So saying, "Oh, you know, fundraising is hot at the moment, I think we should, you know, chop back on private equity and go up, you know, on something else" isn't so easy.

But I think what I would caution, or what I would say is relatively simple, but actually would get you most of the way there, is pretty flat dollar allocations over time would get you most of the benefits of, you know, smoothing things out. In other words, don't get too excited when the music is really loud and keep playing when the music is soft. You know, that's -- if you like -- if you look at most funds and your schemes are not at all atypical, you know, they were quite large investments in six, seven, eight, and then virtually nothing in nine, ten. And you know, it would have been much better to basically say, half the amount in six, seven, eight, and half -- and just keep going in nine, ten.

So steady as she goes is a long-term asset class. Don't get too excited by, you know, very high returns or what everybody else is doing. Just keep committed to it and build the good relationships with the managers and bill coinvestment programs. But don't, you know, put 15 billion in one year and one billion in the next.

CHAIRMAN TOBASH: Thank you.

Commissioner Gallagher, you have comments?

COMMISSIONER GALLAGHER: Thank you, Mr. Chair.

Again, Dr. Jenkinson, thank you for being here.

I've learned a lot. In fact, I feel like I have earned some credits at Oxford after this morning's presentation and from Stanford, as well.

So early on -- there's two parts to this question and it's just general analyses that you typically conduct. When looking at asset classes, what is considered long-term, five, ten, fifteen, twenty, twenty-five, thirty? We've got, at these pension systems that we're speaking of today, we've got time horizons of up to 70 years in terms of paying annuitants. So I'm just trying to get relative -- what you consider long-term.

And then second, our two pension systems combined are about $80 billion. We heard from Dr. Monk this morning that the total institutional pools, pool of assets, is around 100 trillion. How much leverage do we have in the marketplace? Are we a market maker or a market taker, in your opinion?

So two parts there. Thank you.

DR. JENKINSON: Yeah. I think, it's difficult to answer the first question, but my view would be that, you know -- because it does depend on what the funding horizon for the scheme is, whether it's in deficit or the like.

You know, when I think of Oxford University, I think, you know, our horizon is infinite. You know, we've been going for 800 years. So therefore, you know, a medium term return might be a century. You know, if we could earn .1 percent more every year for a hundred years, we will be much richer than Cambridge as a result. And so therefore, that's one way of thinking about it.

In your case, I think 10, 20 years would be the sort of horizon over which I would be trying to optimize and build. And that would mean, you know, maybe, if you're buying assets -- I'm not suggesting this, but you know, if you were going to go into commercial real estate or something like that, do it yourself by private assets. You know, holding these things for 10 or 20 years with the aim of getting more to pay pensions seems to be a perfectly reasonable thing to do.

I'm a personal believer that liquidity is much overrated. It's something that needs to be handled within a fund, but you don't need like 100 percent of your fund to be immediately realizable at any point in time. And I think that that's -- so, you know, and I think it might be true if you had a different type of fund. But for most pension schemes, you know, you do need to manage liquidity quite carefully, but that doesn't mean to say you have to have everything being very liquid.

In terms of the second question, how much -- whether you have any buyer power, I would say close to zero. I mean, 85 billion is a lot of money, but there's actually a lot of money out there. And so, you know, of course, they want your check, but at the moment, there's plenty of other people who are prepared to write checks, as well. Collectively, it's not close to zero.

So ILPA and industry initiatives, you should support them because, you know, combined, they make a difference. And also, ILPA is sort of -- you know, I mean, some of this is about public relations and politics rather than just simple economics. And ILPA is quite good at making, you know, moving the dial. It might be slowly, but they're moving the dial in the right direction. It's details of the remediation contract that you don't want to know about, but you know, they have been moving it in the right direction. So I would say, throw your weight behind the industry initiatives, but don't believe that you've got a huge amount of market power.

Having said that, you can -- there are specialists, consultants, and the like who go in there and they pore over every single detail of your limited partnership agreement and make sure you're, you know, getting a good deal. You should definitely do it at the site, small level and at the big level. But I think that if you go along and say, "Oh, if you don't change your management fee from 1.5 to 1.2, you're not having Pennsylvania's money," many GPs would say, "Well, that's a shame, but we'll move on."

COMMISSIONER GALLAGHER: Would critical mass target within that 100 trillion? What is that critical mass where GPs will start saying, "Oh, okay, all right. You're twisting my arm. I have to drop it"?

DR. JENKINSON: It's a bit market sensitive, I think. So you know, in a market which is very, which is -- it's basically a sort of fund market at the moment. They're not having to give too many concessions.

Back in eight, nine, that's when a lot of the fees came down because they were scrambling around and they did want Pennsylvania's money in eight and nine. The problem was you weren't putting it in to work. You know, so in a way, you get more market.

It's all supply and demand. So you know, when there's investors who are not going in there, you can get better deals. And that's one of the, that's again one of the reasons why I say "be steady" because one of the reasons why you'll get better deals is because if you're consistently investing through bad times, which all the evidence says you should do, then you can get better deals on those. And some of them stick. That's the good thing.

So if you go from 1.3 to 1.1, it's very hard for the fund to then say in the next fund, "Oh, by the way, it's going back up to 1.3." It almost never happens. It's a ratchet effect in private equity. It goes down 1.3 to 1.1 then to 1, sticks there for a while in good times and then can go down further. So I think don't overestimate your bargaining power.

CHAIRMAN TOBASH: Thank you. And we'll wrap it up with one more question.

Commissioner Torbert, please.

COMMISSIONER TORBERT: Well, actually, you may have already just answered my question. But logically speaking, as the private equity funds become more and more popular, the funds tend -- costs tend to go down as they become more known. But also, as PSERS looks at a private equity fund and SERS looks at a private equity fund, if they combine and say, "Hey, listen, we're going to buy X million and we're going to buy another X million," and together you have a little more bargaining power, logically speaking, that should be the case. But from what you just said, I'm not so sure.

DR. JENKINSON: No, I'd go with that logic. I think there are -- and again, I'm not going to talk too much about Pennsylvania. But in general, there are too many pension funds in the world. 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, you know, each one of them was much smaller than you, but you know, the odd couple of billion didn't have much bargaining power, of course.

So I think there is a general tendency towards consolidation, which I think is a good thing. I think also, as you go into private markets, it is, you need more specialist staff and expertise, and you might need some more manpower, as well. And it can be, there can be economies of scale in putting these schemes together.

Now, I have no idea what the, 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.

COMMISSIONER TORBERT: That kind of answers my question, as well.

CHAIRMAN TOBASH: Then one last question.

Commissioner.

COMMISSIONER BLOOM: Just a quick question. You've seen the size of our allocations for -- I actually have two questions -- the size of our allocations towards private equity and venture capital. Do you -- it seems to me that the commission here has already indicated that we think it's a valid place to put our money. Do you think that we should become more aggressive, less aggressive, or we're sort of about where we should be, or do you feel uncomfortable commenting on that?

MR. JENKINSON: Yeah, it's tough to comment on that in a way. I mean, because it does depend a little bit on the governance of the scheme, I think, and what sort of things are acceptable within the sort of governance of the pension schemes themselves. By which I mean, I think there's quite a strong case for some schemes doing more coinvestment and things like that as a way to bring down the costs because they are exactly what you want, they're sort of zero cost, zero profit share-type schemes.

But obviously, it's quite difficult to do that. You have to commit to do that at scale, I think. And so I don't know whether you have the, you know, whether your governance would enable that to happen. It's a long-term game to do that.

When I look at the allocations, I would say that they look not unusual in private equity. I would say, you know, they are not high by the standards of, for example, the endowments of the world which tend to be more like 20, 25 percent private equity. Obviously, they're more down in the sort of single digits to early teens. I think it's something where --

I suppose, personally, I think the first question is decide your equity allocation, how much in equity? And then decide how much of that you think you can, where you think the best return will be for that equity allocation. And if you think you can pick good managers and that you can get above median returns and things like that, then -- or even if you think median returns are enough, which they still have been, you know, then I think you go with it.

There is a sense, it depends on the expertise that you have within the schemes, because you know, this is -- you know, you and I can easily allocate to Vanguard because we just click one button. But this involves due diligence, care, quite a lot of work. And I think you have to have a suitably resourced investment office to do that.

So there's a few thoughts. It's not really giving you a direct answer, which I apologize because it's not -- I like to give direct answers. But I think on that one I can't. I don't want to say, "Oh, yeah, you should up your private equity allocation." I don't feel comfortable doing that because that's a complicated decision that sort of other people have to make.

COMMISSIONER BLOOM: No, and I appreciate it. I think you answered that part of the question very well.

The second question is, there are three different places where we are in private equity, one is buyouts, one is venture capital, and the last is special situation funds. Could you just give us a very brief idea of what some of those special situation funds are and how they function? I don't know.

DR. JENKINSON: They're quite varied. To give you a classic example, it could be a distressed investing fund. So therefore -- these were very popular in 2008 and 9 when everybody thought that lots of companies were going to get into financial trouble. And they were basically buying both the debt and often the equity of companies, and then sort of buying them when they were in distress and turning them around into functioning companies again. So that would be one example, but they're quite varied. They could be things which are close to debt, as well. So -- but that gives you one example, or you can have very opportunistic funds which are looking at particular types of investment.

I'll give you an example. I don't know whether your funds have this, but things like litigation finance funds, which are sort of in this scheme, as well, where you start to share in the risks of litigation. So they're quite varied. It's actually quite hard to benchmark those things. And so that's why I actually put them in -- they normally have an equity component to them, which is why I put them in with the buyouts.

COMMISSIONER BLOOM: Well, I thank you very much. And you know, your testimony is very enlightening and I very much appreciate it.

Thank you, Doctor.

CHAIRMAN TOBASH: So we -- once again, I really appreciate your testimony here. We appreciate you being here. And your academic knowledge really goes a long way in, I think, improving fees in the long run.

You're here as a result of the request of the commission and we appreciate taking care of expenses. Have you ever received any compensation from SERS or PSERS in any form?

DR. JENKINSON: Nope, absolutely not. And a condition I made was that I would not accept any payment. They never offered it to me, I have to say. But I said I only wanted to do this if it was on the basis that I could do it as part of my -- I'm sort of in the old school where I think academics should actually do some public service. And we don't get a huge opportunity to do this. So I like doing this sort of thing.

CHAIRMAN TOBASH: It's tremendously useful and that's why we're so grateful that you're here and testifying today. Thank you very much.

Why don't I make the introduction and if commissioners want to get up and walk around for a minute, then I will introduce our next testifier. And then when we get back, we'll start immediately.

Our next testifier will be, again, from the Saïd Business School, Dr. Ludovic is here and from the University of Oxford. Dr. Ludovic is an author of many texts dealing with private equity, and he teaches management and private equity. He's got a master's degree of mathematical finance from the University of Southern California and a Ph.D. from INSEAD.

Dr. Ludovic, we very much appreciate you being here today.

I'll just take another moment to recognize one of our colleagues who has joined us. Representative Brett Miller is here. And he's got a piece of legislation in the House of Representatives that has to do with transparency and reporting. We're happy for his work in the pension arena and happy that you're joining us here today, Representative Miller.

What House Bill number is that?

REPRESENTATIVE MILLER: House Bill 1460.

CHAIRMAN TOBASH: HB, House Bill 1460 of 2018. So take a look at it. It's an important piece of legislation. I think it was voted on unanimously by the House of Representatives and awaiting action in the Senate.

Thank you very much, Representative Miller.

Great. Dr. Ludovic, thank you so much for joining us today and we're anxious for your testimony.

Thank you.

DR. PHALIPPOU: Thank you. Thank you very much for having me.

I will talk about the costs and benefits of investing in private equity funds.

Private equity funds are investment vehicles in which the two PA pension funds have invested a total of $40 billion in over the last 25 years. They've received 62 billion back with these funds, which coincides with a rate of return of about 11 percent per -- and for this, they have paid an estimated fee of $12 billion.

Fees have not always been reported to pension funds and this may explain partly why no pension fund has reported the actual amount of fee it has paid. And this is why this 12 billion is an estimate and this is why despite this estimate being probably on the low side, 12 billion is much higher than the officially reported number.

For instance, other than the last 10 years, the total fees reported in private equity by the two PA pension funds sum up to $2.2 billion, while I estimate that the actual amount was $6 billion. Again, this is an estimate. It is based on extensive academic research I have conducted over the past 10 years, but I have had access to only very limited data on the PA pension funds. People of the Treasury have requested a number of documents to the PA pension funds that would have helped to compute a more accurate number, but these requests have all been denied.

This situation is common to all the pension funds in the world. It is not unique to the PA pension funds at all. And this point has been made by many other people. For instance, there's an excellent cartoon I will show you in a sec, which appeared in a magazine called *Institutional Investors*, and it illustrates that point very well.

If we could see the slide on that cartoon.

However, some pension funds, most notably in the Netherlands, are now required to report the actual total fees they pay. Public pension funds in California and in some other American states have also very recently been required by the legislature to report more of the fees they pay, even though it is not always all of the fees they pay.

Many people argue that the amount of fees paid is actually irrelevant because private equity funds deliver high returns after all the fees. I've been hearing this argument since I started researching this field 15 years ago. To evaluate this argument, I will both think about it theoretically and empirically.

First, theoretically, and starting with fundamental theory, a large body of research in financial economics has taught us that you should always get what you pay for. There are very few, if any, good deals out there. Good deals are basically investments paying you more than the fair returns. The idea that an entire industry could offer a good deal for more than 15 years puzzles many financial economists, who necessarily reason that if private equity fund managers can generate high returns, why would they not keep the excess returns to themselves? In other words, why would fund managers not just increase fees to the point where excess returns are gone?

There is always a level of fee that is high enough to turn any great investment into a fair one. And even if fees do not move, there is always a level of capital flows that is large enough to push up prices to turn a great investment into a fair one.

The usual response to this theoretical argument is that private equity funds need to share excess returns with their investors to compensate them for private equity investments in liquidity and higher risk. If an investor is more tolerant to reveal liquidity and risk of private equity funds, then the average investors are there. Then it should invest in private equity because it will earn these compensations while not caring much about the associated throwbacks.

Virtually all the pension funds, endowments, and sovereign wealth funds I know of, and I know a few, argue that they have a low horizon, and as a result, do not care about illiquidity and the higher risk. As Tim just said, illiquidity is highly overrated.

And as a result, they reason that they should invest in private equity in order to earn this illiquidity premium. But if such a massive amount of capital does not care about compensation for illiquidity and risk, then it is less likely, at the very least, that these features would be rewarded with higher returns. An excess return can only be rewarded if enough people care about the associated drawbacks.

Just slides to summarize what I've just said.

(Indicating.)

There are two important theoretical arguments that could actually make matters worse. First, there were basically no rules for presentation of private equity funds' track records, and there are still very few rules. As we know from extensive research on mutual funds, it is relatively easy to window dress past performance to make it look better than it actually is. Research on investment consultants from prominent scholars, such as Professor Jenkinson at Oxford who you just heard, and some obligations of fundraising prospectuses from private equity funds indicates that it is a widespread phenomenon. If investors are influenced by window-dressed numbers, then there would be excessive capital flowing into private equity funds and that could push returns below fair value.

Second -- you could show the other slide.

Second, it is a lot more interesting to invest in private equity than in any other asset class. Private equity is a fascinating, hands-on investment approach. It is highly rewarding to travel to visit actual investments to hear from very clever people who invest and run actual companies. Investing in stocks and bonds is extremely boring in comparison, especially if it is done by so-called passive strategies. As a result of the margin, investors may be tempted to over-allocate private equity, which might also push expected returns down.

This said -- so that will be the next slide.

This said, private equity may offer important diversification benefits, especially when one considers the reduction in the number of publicly listed stocks. In addition, if an investor is able to select above average fund managers, then these investors can obtain excess returns, of course. More generally, there are many different types of private equity funds and investments, each with different costs and benefits.

It may be also worth pointing out that ESG initiatives -- environmental, social, and governance initiatives, ESG -- for example, are more impactful if executed by private equity. Hence, overall, I think that the case for investing in private equity can be made in theory, but it is not a simple case. The usual argument saying that "if I need high return, therefore I invest in private equity because I will earn an illiquidity premium" lacks theoretical soundness, to put it mildly.

How about empirical evidence, then, of the existence of excess returns? First, we need to avoid window-dressed figures. The industry is nearly always showing so-called internal rates of returns, IRRs, which are presented as rates of return. But IRRs are close to rates of returns only in some very specific cases. Therefore, we should ignore recurrent claims that some investors or funds earn 30 percent or more over long periods of time in private equity. These numbers are all IRRs.

For example, the Yale endowment is world famous for its investment in private equity funds and it has often said that to earn the spectacular 30 percent per annum in private equity. Its latest annual report is available online and shows that its investments in LBO funds, which is the largest type of private equity funds, returned nine percent per annum over the last 10 years and 13 percent over the last 20 years, which are not, numbers that are not far from the pension funds here.

While it is clear that some LBO fund managers have become spectacularly rich over the last 20 years integrating the Fortune 500 list, it is less clear that investors have had an equally spectacular fortune across their entire portfolio, at least as far as LBO funds are concerned.

But how much did investors actually earn overall by investing in LBO funds? The landmark study on this issue is that of Bob Harris, Tim Jenkinson, and Steve Kaplan, published in the *Journal of Finance* data as of 2008, and they find that U.S. LBO funds basically outperform by three percent per annum.

A few remarks. First, note that this is the most accurate estimate we have as of 2008 and it is likely to be slightly optimistic because investors who gave the data consented to the data being shared for research. These investors might have been more advanced than the average investor in private equity, backfilled, and it is only, it was a U.S. only sample. But hopefully, the biases are negligible, and there are reasons to believe they are negligible. Either way, this is the best data academics have access to.

Second, note that some costs are not included. Due diligence, legal advice, currency management, illiquidity and credit line management, higher investment risk, higher government risk due to a lack of control on underlying investments, and on the ultimate fees and expenses charged by fund managers, et cetera, all of these are costs for the pension funds, but are not included. But maybe they are all negligible, as well.

Third, note back that in 2005, 2008, most investment presentations, be it for gold or for private equity, were using the S&P 500 as a benchmark. Coincidentally, perhaps, the S&P 500 was one of the worst performing stock indices back then. It was not the only one. Russell 3000 and 2000 indices also had poor returns and were also very popular benchmarks.

Let's look at more recent history. Over the last 10 years, using the same comprehensive dataset as that of Harris, Jenkinson, and Kaplan, I find that private equity funds have basically the same returns as the S&P 500, as shown also in the previous presentation. Similar results have also been derived using other data sources by other people, like Pitchbook or CEM. One interpretation, which we have just heard, is that private equity has returned as much as listed equity because too much capital went into private equity over that decade, and that the returns have compressed as a result. It is a possible story.

There is another possible explanation, though. From 2008 to 2007 (sic), the return of the S&P 500 index has been exactly equal to the return of the average listed stock. And the average listed stock had strongly outperformed the S&P 500 over the previous 10 years, which means that over the last 10 years, just like over the last 10 years before, private equity just matched the return of the average listed stock. So maybe in the graph you may see that better.

You have here (indicating) the S&P 500 floated from early 90s to 2007. And you see how the average stock in the U.S. has outperformed the S&P 500 mainly in the early 2000s, which is exactly when private equity outperformed the S&P 500. Private equity returns basically match extremely closely the ones of the average stock here.

If you go to the next graph, to the next decade, these two lines (indicating) are basically undistinguishable, and that's the S&P 500 versus the average stock in the U.S. And therefore, again, private equity performing in line with the average stock, performs therefore now in line with the S&P 500.

As a side, over the last four years, the S&P 500 has disappeared from any investment presentations. And the MSCI World Index has appeared instead. Coincidentally, perhaps, the MSCI World Index is one of the worst performing indices over the last 10 years, mainly due to the underperformance of emerging markets. It is, therefore, important to be aware of strategically chosen benchmarks.

But let's accept that private equity funds returned 18 percent gross of fees, charged an estimated 6 percent a year, and returned 12, and that private equity returned only 9. Let's also assume that private equity will continue to deliver twice as much as public equity before fees going forward, which is basically what happened in the past.

I think it is not controversial to assume that the expected returns are currently lower than past returns for any asset class. If private equity would deliver -- if public equity would deliver five percent and private equity does twice as much, ten percent gross of fees, then after fees, this ten percent will be five percent going forward, similarly applying the average fee structure that is currently in place and has been agreed to. Which means that even if private equity would continue to deliver twice as much as public equity before fees -- which is extraordinary -- in the low return environment, given the existing fee structures, investors might earn, or might find it difficult to earn, even as much with private equity as they would with listed equity after fees.

The bigger point is that the enduring belief of great past performance mostly based on the leading return metric, IRR, means that a lot, and perhaps too much, capital has gone into private equity. And any serious conversation about reducing fee levels and having better alignments of interest has not occurred. Perhaps, as a consequence, many large asset owners have aggressively pursued various alternative strategies to access private market investments, which basically consists of reducing their reliance on traditional private equity funds.

To conclude on the empirical evidence, past performance has not been bad overall. But it has not been this large outperformance many people invoke when justifying private equity investments. Yet, private markets have an important role to play in asset owner portfolios, not least because of the decaying role of public markets. But if people base their investment decisions on false information and statistics, they will not obtain what they're hoping for out of private markets because they will not have the bargaining power to negotiate the contracts. And this is why transparency and honesty are paramount.

As mentioned earlier, many people actually argue that if we like the soup, we don't need to know the recipe. Fees are therefore irrelevant. Performance, net of fees, is all that matters. I disagree. First, because future performance is uncertain. But most other fees are certain, knowing how fees are computed better informs us about expected net of fees return, which is what we ultimately care about. We don't care so much about what happened in the past. More accurate expectations should lead to more balanced negotiations and better outcomes for the asset owners.

Second reason why I think it matters is that we may care about fairness. In this case, we may care to know how much was paid in total to private equity funds to compare with what they have delivered.

In the case of the PA pension funds, it is at least 12 billion that was rebated by private equity funds to deliver 11 percent per annum. Some will find this fair; some not. But there cannot be a debate and then endorsement without knowing the actual fee.

It is my belief, and the conclusion I draw from 15 years of extensive research in this arena is, that we ought to care about how much fees are paid and about how good or bad past performance has really been. There ought to be a transparent and honest conversation.

Fund managers for years argued that no one should look into their fees and potential for conflicts of interest. They resisted regulation because they said investors should only look at the net of fees returns. An individual fund that would use this argument would be shown the door anywhere, and very quickly. For the health of private markets of the many great private equity fund managers out there and the many pension funds' executives who want to do the very best they can for pensioners, and there are many of them, I believe that we ought to apply the same standards of transparency and performance reporting to private market managers as we do to public market managers.

Thank you very much for listening and your attention. And I want to particularly thank the commission for this very important endeavor that they are undertaking, and also the people in the room, the journalists, the people working for pension funds. Everybody is working for a very noble cause.

So thank you, everyone.

CHAIRMAN TOBASH: Thank you, Dr. Ludovic.

I've noticed, from looking at your biography and reading some of your work, that you've also worked with the CalPERS system, California system. Can you compare the information that you received and the work that you've done and analysis with Pennsylvania and the California system?

DR. PHALIPPOU: I haven't been hired by CalPERS, but I was highly involved with the discussions that CalPERS had on this very same topic a few years back. It was an indirect way. It was by helping some people who were on the board of CalPERS to ask the right questions and to help the journalists write the right story, which ultimately led to a change of legislation in California that asked for more transparency. And in my opinion, it has led to a change of the person in charge of private equity at CalPERS.

The situation at CalPERS is virtually identical. The performance is exactly the same one. This is actually fairly fascinating. But about any big public pension funds in the U.S., as the same we've done in private equity, it's about 1.5 times the money they gave, they got back. And therefore, the theory is basically always in the same order of magnitude, which is about one-third of the money that has been given to private equity firms has been taken as a fee.

So the situation at CalPERS has been very simple. The data that CalPERS has provided me with a while back, before these discussions for my own research for one paper, I had asked by a Freedom of Information request for their detailed cash flows on all the funds that they invested into. And within a few weeks, they sent me 700 pages of a PDF document with all of this information, which was very helpful for my research.

I note that a member of the commission here, the Treasurer, has tried to get us that information to the PA pension funds, and they said that they couldn't provide this information. So indeed, CalPERS, for example, without even a commission or a treasurer or anyone, just a regular academic just saying, "Just for my work, I would like this information," they gave it pretty quickly and in great details.

CHAIRMAN TOBASH: Thank you.

Mr. Vice-Chairman, you have a question?

VICE-CHAIRMAN TORSELLA: Thank you, Dr. Phalippou.

Can you go over the math of -- in the last, you said in the last 10 years, you estimate fees in connection with PD to be a total of six billion --

DR. PHALIPPOU: Six.

VICE-CHAIRMAN TORSELLA: -- of which 2.2 billion have been reported.

MR. PHALIPPOU: That's right.

VICE-CHAIRMAN TORSELLA: Meaning the, in your estimate, there are 3.78 billion in fees that have not been reported?

DR. PHALIPPOU: About two-thirds, yeah.

The fees are basically almost always about half, half between carried interests and management fees, roughly. Carried interests are not reported. And for the other half, the reason why it's not fully reported is because a number of fees are taken directly from the assets that the fund have got on behalf of pension funds. And some of this money is rebated against the management fees, which means the management fees are not called from the pension funds and the pension funds then take the view that if they're not called for fees then it is as if they hadn't paid for them, and therefore, not reported. So it's been under a big source of discrepancy between what is being reported and what has been --

VICE-CHAIRMAN TORSELLA: I actually wanted to ask -- and that's a staggering number, 3.8. But is your view that those, that that's money that would otherwise go to the beneficiaries of the fund? I mean, are those really fees? And there are people who say those aren't fees, that they're something different.

DR. PHALIPPOU: That's correct.

Now, if you would have negotiated that private equity managers work for free, then you would have gotten six billion over the last 10 years. They would not have accepted that contract. But I think it is important to have the belief, that magnitude in the mind in comparison to the returns. Also because people -- we just heard it -- people tend to think that carried interest is okay because you get, you pay only if things are going well. The argument is more subtle than that.

The situation here, for example -- let's say only 11 percent net of fees returns and there is more than six billion of carried interest for the entire length of a program that have been charged. So how come one gets six billion for having delivered 11 percent, which is not that far from the 8 percent total rate?

And the reason for that is that the contracts are symmetric. So you give 20 percent of your profits to all of the fund managers that have performed, but the ones who underperform do not give you anything back, which means that you can have it both -- you can have two managers, one who doubled your money and one lost everything. The one who doubled your money keeps 20 percent of that and the one who lost everything doesn't give you anything back, so overall you have lost money and you have paid a massive carried interest, and yet, you have lost money. So the carried interest, it might seem like a lot more than people usually assume because you distributed to all of the people in your sample that have done well.

So the fees are more than what often people think. So having the real numbers like this enable people to be better equipped to have the right conversations. And also when thinking about the different model to invest in private markets, it equips them with like thinking the right way about another model.

CHAIRMAN TOBASH: Thank you. I'm going to be mindful of your time also.

But, Commissioner Gallagher, you've got a question?

COMMISSIONER GALLAGHER: Thank you, Mr. Chairman.

Yes. Thank you for being here. I've learned a lot, personally, from the book that you authored, *Private Equity Laid Bare*. And I find it to be a very approachable way to understand the mechanics of private equity, and thank you for that. You've made it more understandable.

Actually, the Treasurer already just asked the question, but I think I want to better understand in a different nuance to the understanding of carried interest.

There are some camps that will call it profit sharing and some camps that will call it a fee. And I appreciate you saying that there is this time where if they don't perform or underperform, they still get paid. Now, that doesn't sound like a very equitable deal. But can you help to dispel which way or the other? Is it profit sharing or is it fees?

DR. PHALIPPOU: So there's been a pushback on the notion that carried interest should be treated as a fee. The definition of I think, most academics would agree on what constitutes an investment fee, is that if a fund manager that you have hired to manage your investments wouldn't have earned anything on the investment, how much more would you have taken home? If that is a definition of a fee, then the carried interest is a fee because the manager earns it.

If you go on the annual reports of BlackStone, KKR, who are publically traded companies, the largest private equity fund managers in the world, they will have a chart showing you their revenues, and they will say that revenue line number 1 is carried interest, revenue line number 2 is management fees, and revenue line number 3 is company fees. So if you go to private equity fund managers, they would tell you, "I have three sources and here they are." So why would two of them not be called a fee?

I've heard the argument, as well, that because they just keep it from the distributions, then you haven't paid it, so it doesn't count.

Imagine that Vanguard has your money on your 401(k) and whenever there are dividends paid by the stocks they hold on your behalf, they keep these dividends and tell you, "Don't worry, I'm not going to charge you any fees." We do not treat this retaining of dividends by Vanguard as a fee that they have charged you.

So I think that if we go for the definition that the fee is what the manager has taken from the investments directly or indirectly, but otherwise would have come to you, then carried interest is a fee. Just like if Vanguard was keeping all the dividends of the stocks they have on your behalf, that would be a fee.

COMMISSIONER GALLAGHER: Yes. I appreciate that. I think when we conflate different analogies, it can really go down a spiral of confusion. I mean, we have to just stick to private equity.

DR. PHALIPPOU: Okay.

COMMISSIONER GALLAGHER: Because we ventured into a very different industry with different federal and state laws associated with it. So if we can, just stick to private equity.

So can you just clarify, is it -- I mean, you gave me some examples of underperformance, but when they do perform and there's a alignment of interests, is that -- is it -- what is it at that point?

DR. PHALIPPOU: Yeah. So this other point that has hardly ever been made -- and I wrote an op-ed in the *Financial Times* this summer to make it, not everybody understood that in private equity. So I will insist on that point. I'm going to repeat the example I just gave.

Imagine you invest into two private equity funds. You give 100 to each of them. One generates 200 with your money, and the other one loses your 100. The one that has generated 200 with your money will keep 20 as a carried interest because it generated 100 percent of profits. Therefore, you, as a pension fund, you end up with 180 back from the good manager, zero from the bad one. So you gave 200 to the industry and you got 180 back. So you have lost money, even though all of your contracts, in my example, were performance-based.

And the reason is, this wouldn't happen if people underperforming would give you 20 percent of what they have lost, right? So if you had a contract, which is a bit like a derivative contract whereby there would be a margin account, and when you start losing money, people lose collateral for the 20 percent they would virtually owe you for having lost some of your money, then that wouldn't happen. So one of the hidden costs of carried interest is also that in a diversified portfolio, you may be in a situation where you have paid a lot of it without having overall a very good performance.

COMMISSIONER GALLAGHER: Sorry, I hate to consume so much of the time. But just one last question.

When we look at private equity versus public equity, the barriers of the entry are different, right? And the cost associated as such. So buying a stock can be purchased on a cell phone versus buying a private company. Can you tell about why there are some embedded costs associated with each as far as you understand it and practical?

DR. PHALIPPOU: What do you mean by embedded costs? You mean that the cost to do private equity is much higher from a private equity fund manager?

COMMISSIONER GALLAGHER: Yeah, just, you know, swimming through the legal papers and getting through to actually purchasing the underlying asset.

DR. PHALIPPOU: Yeah. So if what you elude to is the fact that when I say 12 billion in fees have been paid, it doesn't mean that people walked home with 12 billion because it's an extremely expensive business to run. So this is not for billions of profits that private equity managers have made. With that said, there are a lot of billionaires that have been made from being private equity managers.

It is not profit because it is indeed an expensive type of investment strategy. So it is normal that the fees and the costs are going to be a lot higher. But we do not know because we do not have access to this data, how much profit private equity fund managers do. The only ones we know are the ones that are listed, like Blackstone, KKR, et cetera. We know pretty well. But we don't have a good sense of overall how much profit people make. The small funds do struggle with this kind of fee structure. Like Tim said earlier, if you have 100 million in funds and you charge a two percent management fee and 20 percent carried interest, you know, you're not going to be very rich with that.

CHAIRMAN TOBASH: Thank you again, Dr. Ludovic. We appreciate you being here, your testimony. And we appreciate you're here on behalf of all the pensioners in the Commonwealth of Pennsylvania and taxpayers, as well. So thank you for your testimony.

We've gone a little bit over and I'd like to ask if we can just convene at -- 12:55 is when we'd like to convene, but our next testifier is Craig Lazzara. Is he with us here?

MR. LAZZARA: (Indicating.)

CHAIRMAN TOBASH: Craig, is it okay if we start at 12:55? Are you comfortable with that?

MR. LAZZARA: No problem.

CHAIRMAN TOBASH: Great. Very good. We'll convene again at 12:55. Thank you.

(Recess.)

CHAIRMAN TOBASH: Okay. We have the testifiers who are seated and we've got the commissioners that are back. We have our stenographer here. We're about to get started again.

I want to apologize. I'm going to apologize again because I may want to move you along a little bit. There will be some people who will be standing by. And we will try to move this along quickly.

We'll keep our questions brief, please, Commissioners. And I'll try to be mindful to give you enough time to testify. But if we can, try to keep it moving along.

So we have Craig Lazzara, managing director and global head of index investment strategy, and Aye Soe, managing director of global research and design of Standards & Poor Dow Jones Indices. So thank you very much. We appreciate your being here and your testimony today. Thank you.

MR. LAZZARA: Mr. Chairman and members of the commission, thank you very much. We're delighted to be here.

What we thought we would discuss is a topic that's near and dear to both our hearts. We call it the growth of passive, what is happening and why?

Before we get into the formal presentation, sometimes we make analogies for the growth of passive. There's a quotation from Hemmingway. In one of Hemmingway's books, one of the characters goes bankrupt and one of his friends says, "What happened? How did you happen to go bankrupt?" And he says, "Well, there's two ways: Gradually and then suddenly." And that's how passive is grown, gradually at first and then suddenly.

Next slide, please.

We put a quotation here at the beginning. We'd like to set the stage with a notion, a sentiment of Charlie Ellis, who said that "Active investing has been subjected to increasing abuse, particularly by those whose opinions are driven by the persistent accumulation of hard data and logical arguments." And sometime when I read that, I think, "Who would stoop to that?" But that's what we're going to aim to do.

Next, please.

And it's important to keep in mind that when we talk about the growth of passive, what we're talking about happened within the past 50 years, in the lifetime of at least some of us who are here today.

The first institutional index fund was launched in 1971. The first -- which was not an S&P 500 tracker, but soon became one. The first mutual fund that tracked the S&P 500 was launched, barely launched by Vanguard in 1976, ETF followed in 1993. Passive assets, as I've alluded, were negligible for many years. Today, depending on how you count and what you count, between 20 to 30 percent of U.S. equity capitalization is held in passive portfolios. So the question is "why has that happened?"

And we're going to talk about, really, three heads. One is evidence -- what did people look at when they were making decisions to move from active to passive? Secondly, explanations, why did the evidence come out the way it did? And finally, if time permits, I'll address some of the controversies that have arisen as a result of the growth of passive.

So starting with the evidence -- going two slides, please -- my colleague, Aye, is going to present some of the work that we have done for the past 18 years on measuring active versus passive performance. But I want to make it clear that this did not start with us as an index provider. The earliest study of active/passive performance that I'm aware of goes back to 1932.

I put two quotations in the presentation, one, again, from Charlie Ellis from the mid-1970s, demonstrating that even that long ago, there was lots of evidence that the average active manager was underperforming the market index. Paul Samuelson wrote a famous article in 1974, which someone bitingly said, included that the world would be better off if most portfolio decision-makers stopped what they were doing and did something useful like become plumbers or teach Greek or something like that. So those of us who know Samuelson only from his economics textbooks would not have suspected that he had a sense of humor, but in fact, he did.

We have taken up that torch, if you will. And my colleague, Aye Soe, has led that effort for the past dozen or so years. So let me ask her to present some of the work that we've done on documenting the active versus passive phenomenon.

MS. SOE: Sure. Next slide, please.

And again, thanks for having us here. This is a great opportunity for us. And we're happy to be speaking on our research.

Could we move to the next slide, yes.

So as Craig mentioned, we -- the next slide -- yeah -- so you know, passive has been in investors as an allocation process for a long time. But when we really start to see the attention and interest and the explosive growth is really in the aftermath of the 2008 financial crisis. And that is leading us to what I believe, or we believe, is the structural shift in the asset management industry. And the flood gates are open and, you know, it sees no signs of stopping. All the trends are reversing.

So if we look at the flow and the chart in front of you, you'll really see that passive has always had a place in investors' portfolios, but it's only in the wake of the 2008 financial crisis you really see this divergence in trends. You see the flows into passive funds going up one direction and the flows into active funds going down in one direction. So what gives? What happened in the wake of the 2008 financial crisis?

Well, there's a few trends that happened concurrently. But we will touch upon the single most important one, that is, in the wake of the 2008 financial crisis investors -- whether it's institutional, retail, mom and pop, high network -- they woke up and they realized that, "My goodness, the manager that I've been paying fees failed to provide downside protection."

But if we go back and retrace our steps and go back to history -- because we've been publishing what we call the SPIVA Scorecard since 2002, so we have a live track record of the past two bubbles -- you will see that by and large, managers, particularly in the equity space, have been underperforming the respective benchmarks.

So the next slide, please.

So this is the SPIVA Scorecard that we produce around the world in nine different countries and regions. But what we will focus on is the data and the analysis that we're doing in the U.S.

The next slide, please.

So what we're seeing in front of us, these (indicating) are institutional equity managers. And to be fair, we're using gross of fees because we understand that institutional plans like yourself, as owners, can have favorable, you know, agreements with managers. So we're using gross of fees returns and these are the institutional equity funds.

You will see that over the last 10 years, even one measured on the gross of fees basis, the majority of actively managed equity funds underperform their respective benchmarks. We actually have data going back 15 years, and trust me, it's no different.

So moving on to the next slide.

So now fixed income, we do see a little bit of mixed results in fixed income. Again, fixed income as an asset class is not like equities. It's complex. There is an opaque pricing structure and there are some structural inefficiencies, so we give that credit. However, you can still see that only a handful of fixed income managers beat the benchmark in two categories, even after using gross of fees returns.

So what we can conclude from these two slides is that managers by and large struggle to beat the benchmark over the long-term investment horizon. We might see in one year, based on market conditions, managers doing better, but again, as we heard from the Stanford professor this morning, one year is noisy. We like to look at it over three, five, ten, and preferably over fifteen years to establish the tend and to find patterns.

And I don't have it in front of me, but this morning, there was a question that was asked on risk-adjusted performance because risk and returns are two sides of the same coin. I couldn't agree with you more. And we have published a study looking at risk-adjusted performance of actively-managed equity and fixed income funds. What we -- because we believe that you should be compensated for the risk that you take. And if you're taking compensative bets, it should show up in your results. And what we find is that, even after using risk-adjusted performance figures, managers by and large struggle to beat the benchmarks.

So next is the other topic that we focus quite a lot of our time on -- next slide, yes -- which is the persistence. You know, performance persistence is very much studied in literature. There's a lot. And the literature has always said, "There's a lack of performance persistence."

So we have been producing what we call the Persistence Scorecard. And the way to look at it is, in any given year, we're looking at what is the likelihood of this top-quartile manager, you know, consistently staying in that top quartile. And what we find is that by and large, right, they fail to -- the probability of your top-quartile manager being in the top quartile by the end of a three-year period is less than the probability of a random coin toss. So it's very, very small. And that tells us that we shouldn't chase performance because your given top-quartile manager in a given year may not be in the top quartile by the end of the third year. And if you extend the horizon -- because we've done so much research in this space and it's so fascinating -- the longer your investment horizon, the smaller your performance persistence. So by the end of five years, what we typically find is that there is zero performance persistence -- I mean, zero funds that remain in the top quartile.

Moving on to the next slide.

Now we will focus on the fixed income funds, performance persistence of fixed income funds. We see slightly better performance persistent figures with fixed income funds. But again, it is nothing that is, what we would call substantial or significant. It's just a slightly better than your average equity active manager. So the figures are slightly better. But again, if you extend the investment horizon, that figure also declines, as well.

The next slide.

So this is based on the study that we published last year called Fleeting Alpha. And one of the motivations of our study is -- we always get this, Craig and I -- you know, "I have my manager and my manager is Warren Buffet," or something akin to that, "and he's going to beat the benchmark every year. You just haven't found the right manager, but I found mine."

So that inspired us to take on this study. Okay, let's take a look at a manager in a given quarter. Based on his past three years' performance, let's take a manager, let's track that group of managers that manage to beat the benchmark in that quarter and let's do that every quarter, and let's repeat that exercise for 15 years. And what is that average persistence rate?

So the way to look at it is, in a given year, about 27 percent of domestic funds managers beat the benchmark. However, come the next year, out of the 26 or 27 percent, only 30 percent will go on and beat the benchmark. And after that, in year two, it declines to 10, in year three, it declines to 3.7 percent. So what we are really seeing is this, the decline or the decay in the performance persistence of your, you know, your so-called Warren Buffets of the world.

And last, but not least, we want to touch upon fees because we hear so much about fees, right? "Oh, the reason I'm underperforming is because I'm charging you fees." So we really want to understand, do fees contribute meaningfully to a manager's underperformance?

To do that, we looked at all the institutional asset managers and the institutional accounts, right, separately managed accounts. We compared the performance on a gross of fees basis and also a net of fees basis. And we look at it for equity managers, as well as for fixed income managers. And what we find is that in equity, when you add the fees back, your manager's underperformance improves, but it's not enough to move the dial or change the conversation.

For example, your underperformance in large cap will go from 80 percent underperforming to 70 percent underperforming, so you get about a 10 percent improvement, but it's not enough to change the conclusion.

We picked fixed income because sometimes fixed income is interesting. It's a fascinating asset class to study. When we add fees back, we do find that some fixed income managers do end up drawing parity with the benchmark or end up outperforming the benchmark. So that tells us a lot, that in fixed income, returns are very tightly clustered so the opportunity to beat the benchmark is very little, but that alpha gets eaten up by the fees.

So that is the conclusion that we've reached. We've published a lot of studies, written a numerous number of papers on that. And with that, I'm going to turn it back to Craig for the explanations.

MR. LAZZARA: Thanks, Aye.

If I had to summarize the burden of many years of Aye's research, I would say there are really two conclusions. One is that the average active manager underperforms most of the time; and secondly, that even if you find one who's been successful, either relative to a peer group or relative to a benchmark, historical success has no predictive value in predicting future success.

Now, this in a sense cries out for an explanation because active managers are smart people. They work hard, they've gone to good schools, and gone through a lot of training programs and they certainly have tremendous financial incentives to be successful. So why do so many of them fail? And we've suggested that -- two slides, there you go -- four reasons that we'll try to discuss quickly: Costs, the increased professionalization of the investment management industry, the skewness of returns, which is something not well appreciated, and finally, the level of innovation that we see in the indexing business.

So let me take cost first. And I have not much to add to what Professor Monk said this morning. The slide in front of you simply tracks our estimate of the amount of assets or the assets under management that are tracking the S&P 500, explicitly the S&P 500. As of the end of last year, our estimate was about $3.4 trillion.

The reason I show you that is to try to get some quantification around the magnitude of cost savings. In the U.S., roughly there's a 70-basis-points difference between the average fee charged by active managers versus the average fee charged by passive managers. Seventy basis points times $3.4 trillion is about $24 billion a year. So 24 -- and that, by the way, counts only the S&P 500, not our other indices, not our competitors' indices. So if $24 billion a year is being saved by investors who are using passive trackers and not actively managed portfolios, you might expect the active management community to push back, and they have, in fact, and we'll discuss some of that in a little while.

Next, please.

The second reason that active managers find it difficult, other than cost, is that there's no normal source of alpha. I use the word "alpha" sort of loosely in this case. I mean outperforms. There's no natural source of outperformance. What I mean by that is if we are all, in this room, all the investors in the U.S. stock market, if I'm going to be above average, one of you has to be below average. There's no source of my outperformance other than someone's underperformance. If the commission on this side of the table (indicating) are all above average, the weighted average sum of their outperformance is exactly matched by the weighted average of underperformance of all the losers on the other side of the room. There's no natural source of alpha.

Now, the reason that's particularly important is because when assets shift from active to passive, arguably it is the least capable active managers who lose the most assets and that makes the active management game harder yet and kind of a ratcheting mechanism.

Next slide.

And to illustrate that, we have a very simple example here. We have posited two scenarios. Say that a market of $20 trillion in scenario A, all of it is actively managed. Now, 20 trillion is actively managed, 10 trillion above average, 10 trillion below average. If you want to know what the supply of alpha is in scenario A, you have to ask the question, "How much do the losers underperform by?" So I've made an assumption. Say it's five percent on average. Five percent times ten trillion is five hundred billion. So in scenario A, $500 billion is the amount of outperformance divided up among the winners.

Scenario B, we change two things. First of all, we provide a passive alternative, so only 90 percent is actively managed, 18 trillion actively managed, 9 trillion above average, 9 trillion below average, and 2 trillion takes the average and goes home happy with low fees. The question now is, "What is the performance of the underperformers now?" And the argument I want to make is whatever it is, it's not as bad as five percent, because presumably, it is the least capable active managers who lost assets to passive.

So we assumed in this case four percent -- it could be anything -- four percent times nine trillion three-hundred-sixty million. So simple and simplistic example to show you how a 10 percent reduction in active assets leads to a 28 percent reduction in outperformance, and it goes on and on from there.

The existence of passive makes it harder for the active managers who remain. Another way to say that --

and we'll come back to this perhaps later. It's kind of a crude analogy, but if you think about it, the lion will catch the slowest zebra in the herd. After the lion catches the slowest zebra, the average speed of the herd goes up. The bar gets lifted. And that's what's happening with active managers.

Next slide, please.

Then I mentioned the notion of skewness earlier. It's kind of the jargon, a statistical term. It's something that helps explain why active management is so difficult. It's not terribly well-appreciated. So I want to take just a moment to tell you about it.

You know what a bell curve looks like, right? Sort of normal distribution. Stock returns aren't like that. A stock can only go down 100 percent. It can go up 100, 200, 300. So there's a natural -- it's called positive skewness, or right skewness, built into stock return distributions. And a simple definition of skewness is that the average return of a distribution is greater than the median. That's because there's some big outliers that are driving the average up.

So you ask empirically, "How often in the U.S.," for example, "is the average above the median?" The answer is, for the S&P 500 the last 27 years, 23 of them. The returns have been skewed to the right. It's very similar. This is not an American phenomenon. We looked in Canada, Europe, Asia. They're all in the same kind of ballpark.

Next slide, please.

When you go back over longer periods of time, the result is even more distinct. This (indicating) is a look at the last 20 years of returns for the S&P 500, the median stock. The one in the middle, over 20 years, was up 50 percent. The average was up 228. The one all the way out on the right, by the way, people always ask, that's Apple. But the average is much greater than the median.

Next, please.

What that means, there's a number of consequences for that kind of distribution. One is, the obvious for today's purpose, it obviously handicaps active managers. If you're selecting stocks with no skill, half the stocks you pick will be above median, but in this kind of distribution, well under half will be above average. So there's an automatic handicap that active managers have.

A secondary thing -- we didn't mention it here particularly, but it came up this morning in the discussion of venture capital. This helps explain why equal indices do a lot better than capitalization weighted indices. There's more likelihood of an equal weighted index of having a big position in one of the stocks that does extremely well.

A secondary consequence of skewness, as we have said here, is that the probability of outperformance rises when portfolios are more diversified, not when they are more concentrated, which is exactly the opposite of what most active managers believe, by the way. And that suggests a possible equilibrium between active and passive. If time permits, we'll go into that at the very end.

Next, please.

The final reason that passive has grown has to do with what I sometimes call index evolution or index innovation.

Indexing, even as young as it is, in 50 years, has gone through a number of generations. In the beginning were what I would call broad market indices -- S&P 500, Russell 1000, MSCI EAFE -- designed to represent an asset class, typically capitalization weighted. There was a second generation, I call them specialized, which we think of as subdivisions of the first generation or extensions down the cap scale, so S&P 500, large-cap index begets S&P 400 mid cap, S&P 600 small cap, and then of course, divisions in the sectors and industries and so forth.

Final generation is what the world typically calls smart beta. I like to refer to it as factor indexing, a completely different approach. What factor indices try to do is to give you, as an investor, exposure to a pattern of return or a characteristic with which excess returns are thought to be associated. Fama and French said many years ago that cheap valuation and small size are factors of returns. So you can obtain those factors via an index fund. You don't have to hire an active manager to get them. And that's the sense which we set here. Factor indices let you indicize active strategies, and therefore, create more competition for the active managers.

Next, please.

One example -- we could talk for hours about this one -- the S&P 500 low volatility index. This is the 100 least volatile stocks in the S&P 500 rebalanced every quarter. You can see over time, it's done much better than the S&P 500. This is, in the academic literature, sometimes called the low volatile anomaly. And again, I'll skip over it now. There's a long explanation of why this thing exists.

Next, please.

But if you look at the patterns of return, what you see here is that low volatility indices -- and others, as well, but this particularly -- tend to underperform if the market is up a lot. But they outperform when the market is down. So they give you protection in down markets, participation in up markets.

Now, this index, Aye, developed in 2011?

So it's a little more than eight years old now, seven years old. We did not invent defensive equity indexing when this index came out. But because of indices like this, you can now, as investors, indicize patterns of return that you formerly would have had to pay active fees to get. So the great opportunity is for cost savings and also increased competition for active managers helping fuel the rise of passive. So those are four main reasons, in our view, why passive has grown to the point it has and continues to do so.

Now, the final things I want to cover relate to the notion of, I called it controversy, active managers challenge to indexing. And there are a number of these that are out there. We've tried to list here four of the more common, and I think more respected ones.

Remember what I said earlier, if $24 billion is being retained by investors and not paid to active managers every year, you might expect them to resent it and try to muster arguments why this is a bad idea. And these (indicating) are some of the ones they have mustered. And we'll talk about all of them relatively quickly: Common ownership, stewardship, bubbles, and market efficiency.

So common ownership, the complaint here that active managers raise -- next -- is that because large index -- and the three big indexers, Vanguard, State Street, Blackrock -- own maybe 20 percent, roughly, of every company in the United States, certainly every one on the S&P 500. The suggestion is that because these companies have common owners, they are not incented to compete against each other as vigorously as they would otherwise do. And therefore, there's diminished competition and higher prices.

Our response to that is that there is some data that supports this thesis, but there's no causal mechanism that's ever been identified. In other words, the most important study here is one that deals with airline prices in the years 2000 to 2014. True ticket prices have increased in those years, that indexing certainly was bigger in those years, but there's no causal link between the two. This is something that some economists believe, some do not. Our contribution is simply to say, particularly with the airline ticket example, airlines are half a percent of the S&P 500. Even if the big three could do it, why would they increase the revenue of half a percent of their holding and increase the cost of the other 99 and a half? That somehow doesn't make sense. But that's the first argument.

Second is around the issue of stewardship. Again, coming back to the big three, for example, index funds are substantial owners of more or less every company in the U.S. and many foreign ones, as well. The complaint is that index funds have no incentive to engage with corporate management on governance issues. And in response to that, we'd say, it's actually just the opposite. Index funds in a sense are permanent capital. If they don't like what the management is doing, they don't have the opportunity to sell as an active manager would do. So index funds and indexers have a greater incentive to engage with corporate management, not a lesser incentive.

And the reason this is importance is that the index funds themselves may be locked. If you're an S&P 500 index fund, you hold all 500 stocks. You're locked into your investments. But your investors are not locked into you. If the investors find that there's a way to improve their returns by shifting to an active manager, they have the option of doing it, which give index funds the incentive to try to improve the performance of their portfolio companies.

The big three, by the way, in this regard, have all been very vocal, have staffed up, enlarged their corporate governance staff, and have been quite vocal about the importance of governance in their investment process.

Third issue relates to, I call it here (indicating) bubbles. The complaint is, that flows into index funds and causes distortions in the pricing of index constituents and that the money flowing into funds makes it hard for active managers to compete. And we've all heard complaints that say, "Well, of course, because of the money going into passive, it's really hard for active managers to take place." A couple of responses, one is that index flows themselves do not cause distortions in relative valuation. I can show you this with a simple example.

Apple, for example, is four percent of the S&P 500. Let's suppose you were to allocate $10 billion to an S&P 500 index fund to be invested between now and the close, which I suppose is actually possible. You would buy, in your -- Apple is four percent of the S&P 500 now. It's going to be four percent of your buy program. And when you're finished, it's still going to be four percent of the S&P 500. There's been no movement in relative valuation because of this punitive flow. Apple could be overvalued. That's not the issue. It could be grossly overvalued, but it didn't get to be overvalued, if it is, because it flows into index funds. It got to be overvalued because it flows into the stock itself.

The second response we'd make relates to the whole notion of, "do index funds accentuate momentum?" There's maybe a momentum effect as underperforming active managers are fired and replaced either by active, outperforming active managers or index funds, but the effect occurs because institutions generally and individuals generally tend to fire underperforming managers. Underperforming managers by definition own stocks with low momentum. Outperformers own stock with high momentum. So this dynamic of the replacement of low momentum with high momentum occurs regardless of the status of indexing, and indexing actually reduces its importance because index funds are typically much more diversified than the active portfolios they replace. So I think the bubble argument is not a particularly strong one.

Finally -- and this is really the most serious, I think, of all complaints -- index funds do not contribute to market efficiency, the active managers say. The backdrop of this notion is that market efficiency comes about because we have lots of managers looking for valuation disparities and trying to drive market price toward fair value.

So if I have a view of a stock that it's overvalued, anything that's undervalued, I might sell it to her. That's a process we call price formation. Index funds don't do that. They're what -- the jargon is called price takers. They simply buy what's in the index at whatever price they have to pay for it. And therefore, the argument is market efficiency is reduced. Again, a couple of responses or several responses, to make to that.

First of all, factor indices, as we

discussed, are not price takers. Value-tilted factor indices buy stocks because they're cheap. Low volatility indices buy stocks because they have low volatility. They follow, in other words, some of the same kinds of disciplines that active managers follow, granted on a different time scale and different metrics, but they do contribute to price formation in that sense.

Secondly, index trading at an aggregate level, the most actively traded securities in the U.S. are -- ETFs attract S&P 500. So aggregate price formation is driven in large part by trading in index vehicles and then through the arbitrage mechanism. This trickles down to the microeconomic level.

Thirdly, we talked earlier about the lion and the zebras. The growth of passive raises the quality of the surviving active managers. The better the active managers are, the more efficient the market will be.

And finally, market efficiency in this paradigm depends on trading, not assets under management per se. And what we put on the next slide is an illustration of that.

The assumptions behind this slide are the average active managers turnover is about 50 percent per year. The average index managers turnover was about 10 percent per year. Those assumptions are quite conservative, I think, in both directions. The ratio is actually much greater than that. But what this shows you is that if indexing amounts to about 20 percent of access under management, active managers do 95 percent of the trading. If index management rises to 50 percent of all assets under management, active managers will still do something like 80 percent of all trading.

Jack Bogle, the founder of Vanguard, said six or so months ago that he thought indexing could easily get to 70 or 80 percent of the U.S. market without any loss of market efficiency, and these are the kind of data that support that view. You have a very long runway for index funds before there's any impact for market efficiency at all.

Final thing to share with you is, it comes back to the notion of skewness. And I want to illustrate an important consequence of skewness, which also gives us a way to think about how active and passive may finally settle into some kind of equilibrium.

So what we're looking at here (indicating) is a very simple example. We have a market of five stocks, four of them go up 10 percent, one of them goes up 50. They're all the same size, equal weighted market, the average return of these stocks is 18 percent.

Now, what we're going to do next is to form portfolios out of these five stocks. We can form one-stock portfolios, two-stock portfolios, three-stock, four-stock portfolios. And the results are shown here. (Indicating.) There are five possible one-stock portfolios. Four of them underperform. There are five possible four-stock portfolios. Four of them outperform. You'll note -- and the two and three cases fall in between.

You'll notice in all cases, the average return is 18 percent. The market gave you 18, doesn't matter how you slice it up, you got 18. But the average return is 18, but the likelihood of an active manager's outperforming goes up as he holds more stocks. More concentrated portfolios are more likely to underperform. The median return in this case is 10 percent for the one-stock portfolio. The median manager underperforms by eight percent. The one winner outperforms by 32, because he has a stock that's up 50 percent. So in other words, in this scenario of skewed returns and relatively concentrated active managers, the majority of active managers underperform and that enables a minority to outperform.

And as we think about the future of the active/passive debate, my suggestion would be -- and it's only a suggestion -- is that the way it will finally shake out is that we'll get to a place where the majority, maybe quite a large majority, even larger than we see in SPIVA today, a large majority will underperform by a relatively small amount. And that will enable a minority to do spectacularly well.

Obvious question is, "What is a relatively small amount?" And it's not a precise term of art, but an imprecise definition is not so much that you get summarily fired. Imagine a situation, for example, where 90 percent of the managers underperform by 1 percent a year. That means the 10 percent who outperform have an alpha of 9 percent. That's the kind of disparity I'm talking about.

Final thoughts, most active managers fail most of the time. The rise of indexing has saved investors billions of dollars in management fees without requiring that they make a sacrifice in performance. The growth of passive alternatives, including factor indexing of smart beta, has created an increasingly difficult challenge for active managers. And finally, we think indexing has considerable capacity to grow without damaging market efficiency.

So with that, happy to have your questions, and thank you for your time and attention.

CHAIRMAN TOBASH: We appreciate the extensive information and your willingness to testify today. You've been in touch with the commission and our consultant, and I would ask that if further questions are developed, that you would be good enough to continue to communicate with the commission.

MR. LAZZARA: Happy to.

CHAIRMAN TOBASH: It's important work that we're doing and the work that you have done is important as it will be utilized for our final product.

I'm going to withhold any questions I have in the interest of time. We're going to try to get caught up a little bit, but I'm going to give my fellow commissioners an opportunity to ask a quick question, quick, brief.

VICE-CHAIRMAN TORSELLA: Mr. Chairman, real quick.

Thank you for your work.

You often hear indexing makes sense for large-cap U.S. stocks, but international, small cap, not so much. Your work clearly shows that's not the case, correct?

MS. SOE: Absolutely.

MR. LAZZARA: Correct.

MS. SOE: It's particularly in the small-cap space. You know, on average about 80 percent of small-cap active managers underperform the S&P small-cap 600 benchmark. That's a myth.

CHAIRMAN TOBASH: Mr. Gallagher, if we go quickly, I think we're okay.

COMMISSIONER GALLAGHER: Yes, very quick.

Fortunately, our systems apply an index first mentality, so a lot of ideas that you're sharing with us today have been shared in the boardroom. And so your ideas are carrying forth.

I think the time frame with SPIVA is a little limited. I'd like to see it expand a little further back to give us a sense of real performance over a tumultuous time period.

MS. SOE: Yes.

COMMISSIONER GALLAGHER: And then -- let me continue, thanks.

And also, just finally, that passive is an active decision and it's not a zero cost bargain. There's not a zero cost in it. I'm afraid there's a misperception.

So thank you.

MR. LAZZARA: That's fair. But any decision to invest in an asset class is, it can be classified as an active decision. The important thing in terms of cost is that the costs of passive are typically dramatically lower than the costs of corresponding active.

CHAIRMAN TOBASH: Thank you very much. I appreciate your testimony.

And now we're going to be spanning the globe. We've got a next group of testifies that are going to come to us through Skype, virtually. So we appreciate you holding on. We're running a few minutes behind schedule. We're making some of that up.

Matthew Clark manages investment functions for the state of South Dakota financial assets, including the South Dakota Retirement System.

We also have Robert Maynard who's going to be joining us, and Mr. Maynard is currently the chief investment officer for the Public Employees' Retirement System of Idaho.

So through our conversations, we believe that it's important for the commission to get information on peer organizations. And the fact that you are managing pension funds and involved in their assets and investments is important for us to hear. We appreciate your testimony today.

I'm not sure who is up first. We are so close to getting you on screens here in Pennsylvania so we will all be able to see. So thank you for joining us today. Thank you for your testimony. And you are live.

MR. CLARK: Who do you guys want to go first?

CHAIRMAN TOBASH: How about we have Mr. Clark testify first? Thank you.

MR. CLARK: Can you hear me?

CHAIRMAN TOBASH: Yes. We can hear you now. Thank you.

MR. CLARK: Wonderful.

My name is Matt Clark and I'm the state investment officer for the state of South Dakota. The South Dakota Investment Council, where I work, manages all the financial assets for the state, including the trust funds and retirement system. I think you will have a seven-page presentation that was provided, where I'll discuss our goal of governance, investment policies, and staffing. I understand you may also have been provided with a copy of the transmittal letter of our annual report. That would talk about our long-term performance, future returns and expectation, and our cost of managing assets.

On page 2 of the presentation, the Investment Council's goal is to add value over the long-term versus market indexes. Our observation is that it's very difficult for most funds to keep up with the indexes. I listened in at the end of the previous subject and we could concur that's it's difficult to outperform. Thus, we think that if we can outperform those indexes, that's a good job and we're adding real value.

The accomplishment of this goal of beating the market indexes gives us the best chance to meet all of our obligations to pay our benefits and other distribution needs over the long-term. We believe, though, given that we're a long-term investor, that everyone has to agree on your goal. Probably no matter what your goal is, everyone needs to agree on it if you're to have any chance to succeed. So to us, we think that comes first and you really need to identify it. And for us it's the win over the long-term. And because of that long-term goal, we believe we have to sacrifice worrying about how we do over the short-term.

And on a day-to-day basis, our investment team and myself, we focus on, you know, updating our assessments of fair value for all of our assets and maintaining our discipline. We do not look at short-term performance at all.

On page 3, there's a discussion of governance. Similar to a few other states, the Investment Council and the Retirement System have separate boards. I think you'll hear that that's the case in Wisconsin and Florida later, as well. This allows the investment function to be overseen by individuals that are selected on the basis of their investment and business experience, as opposed to merely being a constituent of the Retirement System.

To aid in coordination, the executive director of the Retirement System sits on the board of the Investment Council. So he's one of my bosses. Likewise, my position sits on the board of the Retirement System, so I'm one of his bosses. The legislature appoints the majority of

Investment Council members based on the experience requirement.

And the legislature also approves our annual budget and a 10-year long-term business plan. The Governor can also recommend changes to the budget and definitely monitors the impact of investment performance on the state's overall financial condition, as that's important to the state staying sound and to our rating agency issues.

The council selects and monitors my position, the state investment officer. And their primary focus, other than that, is to maintain a nonpolitical environment. Some of the details of what they do is they establish the policy benchmarks, what our asset allocation benchmark is, the benchmark for each asset category, and then the ranges around the benchmarks. They also approve the budget, the compensation plan, and the long-term plan. My position and the rest of the investment team, we recommend the policies to the council and implement all the investment programs within the approved policies.

On page 4, a business-like environment is encouraged by selection of successful business executives as council members by focusing on maximum risk-adjusted returns, by maintaining the long-term business plan, and that's intended to foster a stable environment for internal management. And essential to that is being able to hold on to successful investment staff. And also, it's important to fund the assets, or the budget from assets, under management. That makes it's easier to have a business-like approach to budget issues.

The emphasis on budget matter is on managing costs as a percentage of assets, what we call unit cost. Our internal costs here are targeted at approximately one-tenth of one percent on average.

On page 5, the investment process is focused on long-term value, which for us, is the present value of future cash flows. Our research focuses on the estimation of probability weighted cash flows and on risk assessment, which affects the discount rates we use to discount cash flows to present value.

We believe the only reliable way to add value long-term is to buy when valuations are cheap and sell when expensive. We want to be that one out of ten managers that wins at the end at the expense of the nine out of ten that may underperform, discussed in the previous presentation.

Many investors, in our minds, would rather focus on achieving, you know, favorable results in the short-term, but we just think that chasing immediate gratification is just too crowded for us to succeed. So we try to go where no one else wants to go, which is the very long-term.

Now, it's difficult to stay focused on the long-term and so there are some things that we have found that can be helpful to maintaining that discipline. The most important is to have common sense measures of long-term value. Also helpful is to have successful experience navigating past cycles. That boosts your confidence and helps you to understand the amount of patience that's required to be a long-term investor.

Finally, contingency planning, we think, is essential to have a road map so that when tough times do come, you have a plan and you're not having to have to figure out what to do under duress.

Most assets are internally managed. This would be pretty much all the publicly tradable assets. This can save money, as our internal costs are lower than external active management. We do manage everything actively, as well, that is internal. Internal management can also improve returns, at least we believe they can, and they have for us. And we think that's because we have a greater ability to keep our teams focused on long-term value internally. And also we think doing your own work increases your conviction. Of course, doing asset management internally involves a lot more work, requires a lot more internal resources, but it has been worth it for us so far.

Risk measurement focuses on the overall

portfolio equity-like and bond-like risk. This includes embedded equity or bond exposure from all asset classes, not just stocks, but private equity, high yield, real estate, and so on. Conventional, statistical risk measures are calculated, but they're adjusted to reflect the higher real world frequency magnitudes of market crises. Risk is managed through diversification and within the permitted asset allocation ranges by reducing exposure to overvalued assets so that when the markets do stumble, you suffer less.

A strong financial condition is also essential to being a long-term contrarian investor. That helps you stay the course through difficult periods. To aid this, we focus by migrating to a hybrid pension model. The outcome is 100 percent funded status with additional benefit flexibility so that we can maintain 100 percent funding through a reasonable range of market outcomes. This makes it much easier for the investment process to focus on achieving the highest risk-adjusted long-term returns.

On page 6, investment staff start as interns that are recruited from area universities. We look for top of the class students with emotional resiliency necessary for contrarian approach and that have technical aptitude for our cash flow modeling that drives our investment process. We also want them to have an appreciation for our region. We want them to want to live here and to appreciate our mission.

Training is focused on the rationale behind our approach, you know, why we're a long-term contrarian investor and how we evolve the approach to the current process, and also how it fits into our competitive position. And then we really drive down the cash flow modeling proficiency.

Once they're trained and put on a portfolio, a buddy system is used. There are two portfolio managers who also serve as analysts assigned to most industries. This allows internal discussion to happen and aids continuity if someone leaves. Each of these portfolio managers/analysts manages their other portfolio. We think this helps heighten focus and accountability.

And finally, on people, compensation is based on private sector comparable positions with a discount and is linked to added value through an incentive compensation component. That's described more on page 7. So that compensation is linked to added value versus benchmarks.

Incentives are mostly longer term, tied to four- and ten-year performance. That encourages investing for the long-term and there is a large component of stretch incentives to encourage maximum performance. The use of performance incentives causes pay to vary up and down with performance. This helps us keep successful team members when they're winning because our winners are most attractive to competitors and so we want to make sure we pay people extra when they're most attractive to being stolen away. It also helps save money by paying people less when they're doing poorly and are less sought after. We also think it's important that incentives encourage adding value in difficult markets when we need the extra return the most and not just in up markets.

And that's the end of my prepared remarks. I'd be happy to take any questions unless you want to wait until after Bob goes.

CHAIRMAN TOBASH: If it's okay, why don't we go ahead and hear testimony from Mr. Maynard, Public Employees' Retirement System, Idaho.

Thank you, Mr. Maynard.

MR. MAYNARD: Certainly. I'm Bob Maynard. I just want to check at the start here, is my volume level appropriate or should I yell or whisper?

CHAIRMAN TOBASH: Yeah. We can hear you just fine. Thank you.

MR. MAYNARD: Okay. Great.

And secondly, I'm not sure who's controlling the slides going forward. Am I controlling them from here, are you seeing me, or is there someone there who is advancing the slides?

CHAIRMAN TOBASH: So we can do it from here if you give us an indication when you want to move to the next slide.

MR. MAYNARD: Perfect. I'll give the indication.

It's a pleasure to be here. It's a pleasure to be here with Matt, as well. I'm Bob Maynard. I'm the chief investment officer for the Public Employees' Retirement System of Idaho. We're about an $18 billion fund. I've been in this business since the 1980s. I've been chief investment officer in Idaho since 1992. And one of the things that -- as this commission probably is realizing -- and one of the big changes since I got in the business is that the range of ways of people to appropriately invest a portfolio widen dramatically. The width of the spectrum of appropriate ways to invest is unbelievable. We tend to be on the simpler side of the equation, more conventional, but there are many, many different ways.

You have three of my heroes here in investing testifying between Matt, David, and Ash. And we do completely different things. Washington State Investment Board has even more private equity. And any one of these can be appropriate.

The key is to make sure that the way the one invests is appropriate for the history, the tradition, the particular liabilities, the nature of the constituency, because one thing that we have found in our industry over the last 40 to 50 years, it's not what you do, it's whether you can keep doing it consistently over the years. You'll find that the better performing funds have been consistent and not switching back and forth depending on the slings and arrows of outrageous markets.

For us, for PERSI, we have found for our particular condition that conventional investing as traditionally explicated is best for us. I'll go through these points going forward, but the --

By the way, I intend to talk about another 10, 15 minutes and then stop for questioning, if that's appropriate. You can cut me off earlier, if you wish.

But for us, our particular liabilities are set up that we only need to make market returns. An appropriate diversified market return over a 10- to 15- to 20-year period is more than enough to meet the conservative nature of our liabilities. We only need to make about three to four percent above inflation over time.

We have a small staff. I'm holding a staff meeting right now with one person absent. We have two professionals on staff. And I don't do much even with that.

We have a lay board of five people. We're a retirement board. And a conventional approach for us is easily tracked, easily followed, and easy to explain to our various constituencies when times get bad. It has given us more than adequate returns over the 25 to 30 years we've been doing this. And it's relatively very, very easy to do a straightforward approach.

More importantly, we spend a lot of time looking at what other people are doing. And we have found that over the decades, more complex approaches, while sometimes doing extremely well -- Matt is a particularly great example of that -- as an average, hasn't necessarily proved itself over time. A lot of the innovations that came up this millennium haven't -- quotable alpha 130, 30 -- but generally, the hedge fund movement, things of that nature, on average have not yet proven themselves. They're more of a matter of faith and fact. And we would rather see something stand the test of time to survive a crisis before we'd be willing to add it to our portfolio.

So on the first slide, as you might be able to see, that the, our conventional investing, our idea of conventional investing is that primarily it's simple. We rely primarily on the public markets as traditionally defined.

Generally, we're 70 percent equities, 30 percent fixed income, trying to get four to five percent real returns. We're looking to be transparent. We rely primarily on liquid daily priced securities. We do have private equity and private real estate, but they're standard. They're the names you generally know. We do have some local programs, which actually, is kind of the reason we have private equity in the first place. And our private real estate is relatively simple with 20 to 30 properties.

We tend to be focused. We use the 10 traditional asset types. We don't use hedge funds. We don't do currency hedging. We don't do high yield data. And we tend to try to be patient over a five- to ten-year time horizon. We recognize that the markets in a one- to four-year period are not normally distributed. They are abnormal, earthquake land. And so as a result, we are just set up to just ride those babies out. We don't try to avoid them by doing anything special with regard to tactical asset allocation. We have found that this produces long-term returns and are equal or better than generally alternative approaches like the endowment models, particularly in rough times.

You can go to the next slide.

Here (indicating) are the portfolio decisions. Basically, there's five basic things we focus on. We determine the basic equity fixed split, 70 percent for equities, 30 percent from fixed income for three to five percent real returns.

We have a home country bias. Many people split their equity orientation equally between U.S. and international, following the world capitalization for various reasons. And we like a home country bias for two or three reasons, one of which actually, is we tend to believe the economic systems in the Ango-Saxon countries may not just be an accident that they have outperformed over the long-term, even not having lost world wars.

The third choice is additional diversification and other additions to the portfolio than simple equities and fixed. And we tend to use the 10 traditional asset types.

The fourth is a monitoring drift and rebalancing. That is the fourth thing we concentrate on. And what we find when we have done those four, that covers about 99.5 percent of our returns. The least important part in terms of impacting our overall portfolio is active versus passive management. What that active passive split is -- and we tend to be 50 percent indexed in the public secure overall, actually. We have 35 percent traditional active managers and 15 percent private equity, fixed income, and some local commercial mortgage programs.

Next slide, please, the third slide.

These are our based allocations. Going from the left to right across your radio dial, we have an 11 percent small cap, 18 percent U.S. large cap, 8 percent private equity, 8 percent about real estate split between public and private, about 10 percent emerging, 15 percent developed market international, 15 percent standard high grade fixed income, 5 percent in the local Idaho commercial mortgage program that we direct, and 10 percent TIPS. That TIPS allocation and the emerging market allocation tends to go a little bit higher than our peers, but otherwise, it's a pretty standard allocation.

If you go to the next slide.

This is our manager, core passive 50 percent, basic exposure to the public markets. It does a lot for cost control and for risk control, rebalancing, makes for easy transition. It's the main thing. We move money around out of fund. We're generally a net payout during the year, so we rebalance. We tend to do it through the index fund.

Our active managers are about 35 percent, active public managers are about 35 percent of the portfolio. We tend to favor clear styles or concentrated portfolios. We don't use black boxes. We don't use nine box structures. We don't really do a lot of careful control of what they're trying to do on tracking error. This is more for risk control rather than necessarily trying to beat the market.

We are not depending on active management to get us where we want to go. We want concentrated relationships. We want to be able to easily see -- we have attempted in the past -- well, we basically don't want our active efforts to fail us. If we -- like I said before, if we get reasonably diversified, institutional returns on a basic portfolio over a 15- to 20-year period, we'll be fine.

Right now as we -- so the next slide.

This is our -- if you were interested, these are how our managers, all the white is where our index funds are. (Indicating.) And you can see 50 percent of the total portfolio is -- and this is as of this morning.

Next slide, please.

Why are we doing this? Well, again, we only, we have very conservative needs. We only need to make market returns. Our discount rate is seven percent nominal. Net return, four percent real. We have a three percent inflation assumption. If inflation is higher than that, we need to make more, but inflation has been below that, so we can get away with making less. And for us, there's no evidence that complexity adds to returns.

Generally, we do have historically -- this is Idaho. We're going to have a resource constraint. We have a small staff. Our board is a lay board that does retirement. We are a retirement board that does both. All the teachers and public employees, most of the cities, most of the hospital districts, are in our system. Our in-house budget is appropriated and all of our actions are public actions. We can't do anything in secret here. So there's resource constraints preventing us from doing very intricate investment approaches.

Control is a lot easier. The simpler the portfolio, the easier it is to monitor and operate. And there are other reasons, too. It's easier to explain well understood concepts to our constituency. During the crisis of the late 90s, of the Tech Wreck, we didn't get -- it was easy to explain to the legislature, to the administration, and to all our teachers and everybody, what we were doing, why we were doing it. They could read the headlines and generally see where we are.

Given the fact that we are half passive, it's relatively inexpensive. Our overall costs are under 30 basis points, so it's relevantly cheap. Our constituency has accepted this through crises. They've shown patience with us.

And by the way, when I got here, the system was in turmoil. We were 60 percent funded. I was the fifth chief investment officer in four years. They had gone outside. They had been at local bank trust departments. We were in the headlines all the time. We were at the bottom of the peer universe. So switching everything to a simple approach has worked for us. It has given us competitive returns, both in normal and crisis periods.

Next slide.

So generally, this has worked overall. By the way, we tend to believe -- I've been able to live by what I call the Swensen "J" Curve. There is a David Swensen who runs the Yale portfolio, basically has some lecture series and whatever. But he explicates an idea that he believes very simple can work and very complex can work better, like Yale does. But he makes the comment that while simple can do quite well and well executed complex can do even better in his mind, it isn't a simple direct path, that as you add complexity, you do better. What actually happens in his mind is that as you add complexity, at least initially you do worse because you add fees, you get into areas where the average return doesn't get it. You have to be top quartile private equity, you have to be top quartile hedge fund. If you get the average return, it makes it worse. And so as a result, he basically says, when we gave a look as to what the individual investors do, it was saying "don't try this at home, kids."

Next slide, please.

This is what he said in 2005 should be what the average person should do using public market index funds. I'm going to come back to that because this is another example of a relatively simple approach.

Next slide, please.

This shows basically -- this slide and then go one more slide in the future -- for us, these returns have generally given us a top third, top quartile over the long-term on peer reviews. And that's not because -- as you see, we're not doing anything special. It means the average complex approach tends to do less than average over the long-term. When we do better than most, that's not because of us. We've done the same thing since 1998.

Next slide, please.

You can also see, from our perspective, this is a time -- by the way, those last slides were as of the end of last June 30, the last fiscal year, a month and a half ago. This is our returns since 2009. This encompasses two crisis periods, the tail end of the Asian crisis, then the Tech Wreck, and then 2008, 2009.

And the simple approach for us worked. It kept us pretty high in peer rankings around, and that's why you're going to see us kind of stick where we are through the next crisis because, as of right now, we're pretty well funded.

Our actual report just came in for the last fiscal year. We're 92.1 percent funded. We have a 13.9

year amortization head. Our contribution rates are just under 19 percent for the employers, employees, fine, seven to eight percent for the employees, thirteen percent for the employers, and our Social Security state, as well. So we're in adequately pretty good shape.

But it isn't just our particular approach -- next slide. You can see that this is, that Swensen portfolio I showed, how they were doing for the five, ten years, going through the crisis in -- by the way, I'm pulling this from a previous presentation I did a few years ago. I haven't updated it, but it's still pretty good.

But you see the return, on the top line, the return of that simple peer portfolio, Yale's returns through the crisis, the median endowment, and you can see the rank of that simple portfolio and the foundation in the endowment universe. Through the long period of time, Swensen beat Swensen even with that simple portfolio.

Next slide.

Well, this is another one showing that. You can see that later.

Next slide, please.

This is not necessarily an easy approach. It's easy to implement, but the problem with this approach is -- there's an old saying that in order to perform -- and I understand my 15 minutes is up, this will be my last slide -- you need, you either have to be intellectually exhausting, physically exhausting, or mentally exhausting. Physically exhausting is that you've got to be, you've got to work harder than everybody else. But there's a lot of people doing this. The intellectually exhausting means you have to be smarter than everyone else, but being smart will resource intelligence, just gets you to the end of the game.

This way, the simple straightforward approach is the third way, but it's emotionally exhausting. You need to wait five to twenty years. You depend on equity risk and return. You have to accept short-term roller coaster volatility. You've abandoned the quest for higher than market returns. It's boring. You've just got to sit there, and at most, in the crisis you rebalance. But you don't do anything else.

And most importantly, the assumptions of normal randomness, coin tossing randomness, simply do not apply in the shorter term.

Actually, this is a Rorschach inkblot test, two same phenomenon, no deck. Now, what are these phenomena? Next slide. The first slide is out of the Sumatran earthquake in 2004. The second slide is the S&P daily price movements for eight years in 2002 and 2010. They are exactly the same phenomenon. Long periods of quiet, than earthquake movements.

If you go to the next slide. This will be my last one. If you look here, the dotted line is normal randomness that most of the risks control, the systems are built on. Most of the mathematics are, but the world is not like that. You have high peaks and fat tails. Because of that phenomenon, very complex ideas based on mathematical approaches are problematic and we want to see some of the ones that are being advanced now actually prove themselves in a crisis, but until then, we're perfectly happy being simple and straightforward.

So I'll stop there and wait for any questions you may have.

CHAIRMAN TOBASH: Bob, thank you very much.

And, Matt, thank you, as well.

Very interesting. We appreciate the fact that you've sped through your presentations and we'll give the commissioners a bit of time to ask questions.

I just had one or two. So this concept, I'm interested to study a little bit more, this "J" curve developed by the individual from Yale. I just want to read a little bit more about that. But I think that potentially complex systems come from complex governance.

And, Matt, you mentioned the fact that you're 100 percent funded and that you are largely, your council is largely appointed by the legislature and the Governor. How large is the council and tell me about the criteria that are required to appoint people to those boards?

MR. CLARK: The Investment Council itself -- I hope you can hear me -- is comprised of eight members, three are ex-officio, the state treasurer, the school and public lands commissioner, and the executive director of the Retirement System. The other five are appointed by the Bipartisan Executive Board of the Legislature. And they're selected on the basis of, you know, education and training and finance, is the statutory requirement.

On a practical basis, they're leading business people in the state. I myself will provide them a short list of candidates in case they don't have anyone in mind themselves. And so, we end up getting, you know, the highest profile business people in the state, the owner of a chain of community banks or the CEO owner of a manufacturing business or a CFO here and there, and once in a while, a finance professor. So that's the general nature of the board.

The Governor themselves don't play a role in appointing the board. Although, I work closely with them on, you know, rating agency issues and things like that because we do affect each other.

CHAIRMAN TOBASH: Great. Thank you very much.

Matt (sic), how does that compare to what you're doing in Idaho? And it appears again that you've been able to implement a strategy that's relatively simple. Now, you were underfunded some years ago. What's your funding percentage now?

MR. MAYNARD: As we speak today, it's 92.1 percent, that's a standard entry age normal, and our amortization is 13.9 years.

With regard -- ours is a much different system than Matt's. We have a five-member board. Two members are retired, are people active in the system of at least 10 years' standing. They tend to be heads of agencies. And three people are general business people from the community. We -- the Governors have been very good. They're appointed by the Governor, five-year terms, confirmed by the Senate, staggered terms, no provision for removal. So they serve and they're fairly stable.

We have always tended to have trustees who have been on 10 to 15 years, longstanding trustees. And generally, they're high ranking people. But we get them on the board, that say, "Look, you have, they have other lives. This isn't the most important thing in their life." So we make a commitment to them that on the investment side, we shouldn't take more than two to three hours a month. And that also constrains making it more, making our structure one that can be easily explained to a lay board, high quality people, but something that we should be able to explain in plain English in five minutes.

We have a relatively good reputation in the state, but as you all know, in this industry, stuff can come up like a hurricane. And all that will get us is that if something goes wrong, instead of hanging us immediately, they'll give us five minutes to explain. And if we can't explain it in five minutes, we're not going to do it.

So our board meetings on the investment side are basically, we do half an hour to an hour a month, and that counts reviews of programs and try to keep -- and they delegate stuff down and the only argument is, "Keep us informed, make sure there's a double-check, and if something goes wrong that we weren't aware of before it went wrong, you're fired." So that's kind of our approach here.

CHAIRMAN TOBASH: Okay. Thank you very much. I appreciate it.

Mr. Vice-Chairman, questions?

VICE-CHAIRMAN TORSELLA: Thank you both very much.

Mr. Maynard, you mentioned your simple strategy means abandoning the hope of kind of outsized returns, but your return assumption is seven percent. You think your simple strategy comfortably delivers seven percent return over the long run?

MR. MAYNARD: Yes. And more importantly, we've had a three and a half to four percent real return because our inflation is three percent. If inflation is above that, we're going to have to pay out more, because ending salaries would be more. But if inflation is below that, like it's been for the last 10, 15 years, we don't have to make seven percent. It's a lesser burden.

And if a 70 percent equity, 30 percent fixed income split doesn't get us three to four percent real returns over a 15- to 20-year period, the condition of the pension fund is not going to be the front page headline. That means a comet has hit the earth. Equities tend to give you five to seven percent real over prolonged period, bonds one to three percent real. We're very comfortable over the long-term, even for the next 10 years, we're going to be able to make a three and a half to four percent real return obligation.

VICE-CHAIRMAN TORSELLA: Thank you.

And, Mr. Clark, you're -- if I read -- you're recognizing different funds account for costs differently, but if I read your report properly, your all-in cost, Mr. Maynard, is 30 basis points. So you're on the order of 40 basis points for all costs, internal and external?

MR. MAYNARD: Well, for ours, this is Bob

Maynard, our total costs are 34 basis points counting running the defined benefit, the payout operation, all everything. The investment side of that is 28 to 29.

Oh, by the way, we are not a fund that thinks carried interest is a fee, so if you're doing that. Our private real estate right now is only six percent actually invested.

VICE-CHAIRMAN TORSELLA: And, Matt, yours is about 40 basis points?

MR. CLARK: Yes. Our internal costs are 10, so that's the office rent and all the investment team. And then the outside managers add 30, though they only have about a quarter of the assets, but they tend to be high cost things like real estate and private equity. And the 40, just like Bob mentioned, does not include carry.

VICE-CHAIRMAN TORSELLA: Right.

MR. CLARK: When we do really well, and the real estate, for example, does really well, well, then our fees are going to be high because they get 20 percent of the profit. But you know, we want that given that we get 80 percent.

VICE-CHAIRMAN TORSELLA: Thanks.

CHAIRMAN TOBASH: Okay. Thank you.

Commissioner Gallagher.

COMMISSIONER GALLAGHER: Thank you, Mr.

Chair.

I'm thrilled to have both of you on this conference call. I've learned a lot. I think there's a lot of thought leadership that we can garner from this. I do want to ask a question.

Now, our systems were starved employer contributions for 15 of the last 20 years. Would you be able to do the thesis you're following given that context? I mean, I see that South Dakota is sitting on 25 percent cash, I think our trustees would be going bananas about that. What is it -- what would you be able to do there under the same context?

MR. MAYNARD: Not a chance, not a chance. If I was sitting in the situation you're in, where you didn't pay your contributions for 10 to 15 years, and we were down below 65 percent funded or 60 percent funded and had a real return obligation, like many funds or endowments five, six, seven percent, there's no way you could do the type of investing that we're doing, the simple, transparent, focused, easily explained. I've been doing something entirely different.

We're only able to do this -- I mean, Idaho is an agricultural state, farming state. It tends to be one of the reddest states in the nation. What everyone may think of the politics, they have been heroes with this defined benefit system. They have always paid the contributions. They have always been reasonable about what they're promising in benefits. When they increased benefits in the 90s, they paid for it with contributions. And they let us go in and directly pull the money from treasuries across the state if someone doesn't pay. So it was a different system. If I was sitting there in Kentucky, if I was sitting there in Illinois, I'd be doing -- I couldn't be doing. I'd have to work for a living.

COMMISSIONER GALLAGHER: Yes. Thank you, Mr. Maynard.

Mr. Clark, do you have any comment on that? I see that you're on about 25 percent cash. You know, we all stand on the shoulders of giants to help us do what we do. What enables you, what kind of governance structure do you have in place there that allows you to kind of hold cash like that or just take the approach that you have, the contrarian view?

MR. CLARK: Well, we have a long-term focus and we've always had the attitude that this is our people's money. How should we manage it, like it was my friends' and neighbors' and relatives' money. If we had their money, well, we would think about how much risk we should take. If markets were fairly valued, our answer to that is the same as what Bob mentioned before, 70-30.

But we also have the idea that when markets are cheap and you're going to get above average rewards for varying risk, you should take more risk when you're paid more to do so and you should take less risk when the prospects for earning the equity reward is diminished. And so we have a range. For us, our equity risk is 50 to 85. And 70 is neutral and we're at 50 because markets are very overvalued on our evaluation work.

Our governance model is basically that we're going to run this for the long-term. We're not going to care about the short-term. We're going to pile up as much money as we possibly can. You know, every year we show how many, you know, hundreds of millions or billions of added value we've added above the benchmarks by following this long-term, contrarian approach. And we have no critics for that. Everybody understands, it's endure short-term pain for long-term gain. We fully describe that that's why we're getting our rewards. We're not outsmarting anybody. Bob talked about that before, how that's a tough game. You know, nobody here is going to get into the elite class at Stanford. And nobody here is going to outwork the folks at the hedge funds. All we can do is outsuffer them by enduring short-term pain and being patient.

And so that's our competitive advantage and we play to that. We advertise that heavily in the state and everybody understands that and they've seen the rewards from it in the past and they're happy to continued doing that. And so we have those wide ranges.

When people come on the board, they understand all that before they get on the board. And you know, if they don't want to, you know, be interested in that, well, then one of us will have to go. And I'm still here after 35 years.

And so that's basically our approach. And we're pretty blunt and simple about our competitive advantage, and that we need people that will nurture that. And if they don't have the stomach for it, well, then, they should, you know, get on a different board.

We think that since we're managing our people's money, we want to do what makes sense. And the retirement system liability has to adapt to the realities of the world. We're investing based on the world as it is, realistic assessment of it. And we don't say, "Well, gee, we need X amount of money, so let's, you know, take on more risk than is prudent to try to get that, or whatever." We just invest the same way with our people's money based upon how attractive the opportunities are without regard to our funding status. And if we were 200 percent funded or 20 percent funded, we would do the same thing.

CHAIRMAN TOBASH: Okay. Thank you.

Just one final question from Commissioner Bloom, and then we've got to move to our next testifier and group.

Thank you very much.

COMMISSIONER BLOOM: A couple of questions. How large are your staffs?

MR. MAYNARD: This is Bob Maynard from Idaho. Like I said, I'm holding a staff meeting right now with one person absent. We have two people, two professionals. Well, that's counting me as a professional, which may not actually be accurate. But Richelle Sugiyama is my investment officer, and that's it. We have a fiscal -- in our fiscal section, we have one position, but there's about two people that actually cover our stuff. And I have an administrative assistant.

COMMISSIONER BLOOM: Mr. Clark?

MR. CLARK: For South Dakota, we have 34 people in the investment division, two are administrative, four are CPAs to keep track of everything, and 28 are investment professionals.

COMMISSIONER BLOOM: Both of you gentlemen mentioned the fact that you don't count carried interest as part of your costs. Is the carried interest public information or is it private? I'm not going to ask you for it. I'm just asking is that public information or is it private?

MR. MAYNARD: For us, it's -- on an individual basis, it's not in our CAFR, I do not believe. We treat carried interest like we treat, consistently with what we do in real estate when we do joint ventures. Where we put up the cash and there's a joint venture partner, where they get five to ten percent, we don't treat that as a cost there and we don't treat it that way in private equity, although we recognize the argument for it. I just want to make sure that whatever we do, my accountants, my actuaries, the legislature auditors, all of that, are looking at the same thing.

Back in the 90s, we had four or five separate books based on how people were valuing things. We just want them all on the same page. With regard to private equity, back in the 90s, I basically locked them in a room and I said, "You all agree. I don't particularly care what it is, but as long as you all agree, I'm fine." And they came to an agreement. We're reluctant to change that agreement on this is a real industry consensus, which is still developing right now.

COMMISSIONER BLOOM: One last question, you hire outside consultants and outside money managers. How much of that is brought to the boards that you report to and is there a discussion about those managers at the board or is it just done professionally inside the organizations?

MR. MAYNARD: This is Bob Maynard again.

Our consultants work for the board and with staff. Our general consultant, Callan; our private equity consultant, Hamilton Lane; our real estate consultant, Macallan. They work for the board and report directly to the board.

With regard to what the board actually discusses during meetings, they really don't spend hardly any time at all on the active managers. Like I said before, with regard to the five things that we do? Active management, if it adds 10 basis points, plus or minus, on net fees to the fund, plus or minus, in a year, that's exceptional, whereas, the balancing decision adds 30 to 40.

So they spend all their time on the more general issues and spend very little time -- except active managers do provide entertainment value. And I'm not talking dinners, I'm talking some market intelligence and things of that nature. They will talk to active managers occasionally, but it's more for fun and interest than it is about thinking that that's going to make a huge difference in terms of the annual performance of our fund.

COMMISSIONER BLOOM: I've always thought that the presentations they made were very, very good help to me to fall asleep.

Mr. Clark, do you have anything to add to, your active managers and whether your boards have anything, get a chance to talk to them or do they approve them or anything along those lines?

MR. CLARK: Most assets are managed internally if they're publicly traded. The exceptions to that would be a new niche area or educational-based relationships.

The primary use, though, of outside managers is private equity and especially real estate because we invest through partnerships there. And for that, it's a staff-driven process. Staff sources ideas, does the due diligence, determines whether to recommend a manager or not. And then if we do, then we bring it to the board and they give final approval.

We don't have any minimum requirements or targets for any of those partnership investments. There's a default publicly traded index that that money would be invested in if we don't find a partnership manager that we like. And so it's not like, you know, we have to bring in three and they pick one. If we like one, we bring it in. They basically audit our due diligence work and make sure that we're consistent with our strategy and game plan in picking managers and our philosophy. And then, as to consultants, we don't use any investment consultants.

COMMISSIONER BLOOM: Thank you very much, gentlemen. I really appreciate you answering those questions.

CHAIRMAN TOBASH: Thank you again for your testimony.

MR. MAYNARD: It's been a pleasure.

CHAIRMAN TOBASH: I would ask that as we move forward, if -- you know, we appreciate the fact that you're willing to testify. We appreciate the information and the good work that you've done within your organizations. And as we move forward, we'd really appreciate if you continue to be in contact if we have special requests of the great work that you've done from either our consultant or the commission.

Thank you again.

MR. MAYNARD: More than happy to. Thank you.

MR. CLARK: Good luck.

CHAIRMAN TOBASH: Thanks, appreciate that.

So we'll get online now. And I will apologize as we move forward to Rochelle Klaskin. She is the interim executive director and chief counsel for the State of Wisconsin's Investment Board. And I believe that she's joined by David Villa, chief investment officer, State of Wisconsin Investment Board. And I think we have a third person on the next panel.

But, David and Rochelle, if you are the first two up, I'll go ahead and let you go first in whatever order you wish. Thank you.

MS. KLASKIN: Great. So we assume that you can see us and you can hear us. Is that correct?

CHAIRMAN TOBASH: That is correct. Thank you.

MS. KLASKIN: Fantastic.

Well, I am Rochelle Klaskin, the interim executive director and chief legal counsel here at SWIB, State of Wisconsin Investment Board.

Sitting to my right is David Villa, our chief investment officer, who's been with SWIB since 2006.

So we had the benefit of a few of your questions. So I'm going to address a couple of those, as well, and I just introduced who SWIB is to you and what our plan looks like.

So currently we manage approximately $110 billion. The vast majority of that is the Wisconsin Retirement System, which makes up about $102 billion. We also manage the state's money cash pool account called the state investment fund and then six other small funds for other agencies of the state. We have about 200 employee, 40 percent are investment management professional staff and about 60 percent are investment services that range from operations, technology, HR, legal, and so forth.

Our plan was consolidated in 1982. So the Wisconsin Retirement System covers the majority --

(Video conference connection failure.)

CHAIRMAN TOBASH: Rochelle, I don't know if you can hear me, but we have lost you momentarily, so please sit tight. Thanks.

MS. KLASKIN: -- of the WRS board and they have two constituent boards, as well. But the WRS is the main board that governs that.

CHAIRMAN TOBASH: Rochelle, I'm going to have you just hold on for just one second. Can you hear me?

MS. KLASKIN: Sure. Yes, I can.

CHAIRMAN TOBASH: Yeah. We lost you for a second.

Summer, can you tell us where we were when --

MS. KLASKIN: All right, are we -- can you hear me now?

CHAIRMAN TOBASH: Yeah, just one second, please.

MS. KLASKIN: Okay.

THE COURT REPORTER: Okay. So the last sentence we heard was, "Our plan was consolidated in 1982."

(Video conference connection failure.)

CHAIRMAN TOBASH: We thought it was bad

before.

MR. WILLIAMS: Just so you know something is working. This is Ash Williams down in Florida. I'm hearing you perfectly.

MS. KLASKIN: Sounds good, Ash.

CHAIRMAN TOBASH: Okay.

So, Summer, again, just tell me where --

We lost you for a moment. And here's where we lost you.

THE COURT REPORTER: The last sentence I heard from Rochelle was, "Our plan was consolidated" --

MS. KLASKIN: Okay.

CHAIRMAN TOBASH: Your plan was consolidated in 1982.

MS. KLASKIN: Okay. So consolidated in 1982. This is a single plan that covers almost all employers in Wisconsin, which is about 1500 employers. Other than the city of Milwaukee and the county of Milwaukee, who maintain separate plans, we have the investment board, which -- I'll go through who serves on our investment board, which is just our sole mission, is to manage the assets. And then the Department of Employee Trust Funds is our sister agency in the state, and they manage the liability and the plan administration through a WRS board. They also set the assumed rate for the plan, which is the 7.2 percent, and they set the contribution rate for employees and employers.

In connection with who serves on our board, we have a nine-member board. They are appointed to six-year terms. It includes the secretary of the Department of Administration here in Wisconsin; a constituent member of the teachers' board, so someone who represents all the teachers in the state; a local government participant, currently that's the county administrator of a larger county here in Wisconsin; and then one member of the WRS board, and that historically is always the secretary or the head executive of the Department of Employee Trust Funds.

The Governor then appoints five other members who are confirmed by the state Senate. And four of those under statute are required to have at least 10 years of relative business and investment expertise.

Inside of SWIB or the WRS, of the $102 billion, we manage internally about 60 percent in both active and passive strategies, and overall 50 percent of our assets are managed actively.

In connection with a few of the questions that were sent to us ahead of time, I think I'll just start off. I also serve as chief legal counsel, so the number one thing I always think a lot about here at SWIB is our fiduciary duty, both to the trust fund and the beneficiaries. And so in combining, in connection with combining a plan, you do have to think about the governance, because the governance of that investment board is either going to challenge your success or it's going to help you succeed.

In our case, in connection with Pennsylvania, the board owns that fiduciary duty. And the fiduciary duty is the highest standard under law, which is the prudent expert. Now, the board enforces and delegates some of its responsibilities, but it always retains the obligation to delegate to experts and the oversight of that delegation.

So when we think about governance here at SWIB, our board is a policy board. All of the specific investment decisions are delegated to professional staff who then have a number of governance checks and balances and other controls internally to manage conflicts of interest or anything else that may arise. So our in-house staff has that expertise, both from engaging with external managers, as well as internal expertise to actually run the complex investment strategies that we do in-house.

So I would think as a number one factor to think about in connection with combining to a single board is what kind of governance do you want to set, what policies do you want to set from a high level, and then ensuring compliance with those policies. Another very important duty, fiduciary duty, is that when you have a policy, you follow it. So these things are not just sort of written on the wall and forgotten about. They have to be part of who you are as an operating investment manager.

In connection with some -- we'll get into more of the details. But I'm going to let David speak to some of the specific things in connection with our investment strategy. And he wants to focus on a few things, including active internal management, the importance of funding the plan over the investment policy allocation, and then cost savings and economies of scale.

David?

MR. VILLA: All right. So I'm going to boil this down into four points. The first is that economies of scale and having investment professionals -- although Bob and his staff person may be another way to look at this -- but the 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. But I want to put that in the context of the total plan and funding. So that's my second point.

If a fund is 60 percent funded and the return is 7 percent, the real effective return on the liabilities is only 4.2 percent. So if we stay within a $100 billion fund, just for context, the target for the fund is to make about $7 billion a year in value creation. If you're only

60 percent funded and you earn 7 percent, you're only going to create $4.2 billion of wealth. The deficit is $2.8 billion. If your payout rate, if your net payout rate -- so your contribution and your benefit payments -- is negative 2.5 percent, the fund will default in 12 years. So the 20 basis points means nothing. That's my third point.

Saving 20 basis points in lower costs whether you deal with Bob Maynard's approach or the Wisconsin approach, in the context of being 60 percent funded, it is almost meaningless.

My final point is the math. I'm not going to use earthquake math. I'm going to use math we learned in the last century.

So the math is simple. A fund invests $1 and earns seven, 7.2 percent. In about 20 years, the fund will have $4. If the $1 is not invested, the guarantor of the pension, or the promise, has to come up with $4. And if no provision has been made to provide $4, the situation is indistinguishable from stealing. So that's my fourth point.

So I hope nobody runs out of the room screaming, but the -- I can take questions, but it's a pretty simple story, from our point of view.

MS. KLASKIN: And coming from a fact of a plan that's almost 100 percent funded which makes our lives a less roller coaster view of investment strategy.

MR. VILLA: Yeah. And it would be interesting to compare our benefit with Bob Maynard's benefit, because our benefit ranks about 19th among state plans and our contribution rate is about 13 percent. So Bob Maynard's contribution rate is almost 50 percent higher than our contribution rate.

CHAIRMAN TOBASH: Thank you.

I think we have one more testifier here in Ash Williams on this panel.

Ash, do you want to testify now? You're on the line?

MR. WILLIAMS: Yes, I am. Thank you very much.

CHAIRMAN TOBASH: Okay. Great. Executive director and chief investment officer of Florida's State Board of Administration, one of the nation's leading public investment organizations, institutions.

Thank you, Ash.

MR. WILLIAMS: Thank you very much. And I appreciate the opportunity to be with you today.

And I would say that the wisdom you have received today is substantial and reflects, to the best of my knowledge, the vast and clearest thinking you could have on the issues you're dealing with.

I focused the materials I prepared for you on the subject of consolidating investment operations for multiple mandates under a simple consolidated investment organization and the benefits of doing that, and some of the things that one would need to consider to do it. But I really think that the points that David Villa just made are so fundamental, so important and so ahead of anything else, that you really should take a moment and listen to those.

Florida is an interesting case historically that illustrates some of what David was talking about. When the Florida Retirement System was created back in the early 1970s, it was created specifically in response to there being a large number of state and local government pension systems around Florida that were all operating independently. And the one thing that they shared as a common characteristic was either acute underfunding or chronic underfunding or both. And so the state legislature, in its wisdom, decided that that was a problem that needed to be bounded because it otherwise threatened the credit quality of the state of Florida. We are, by the way, a AAA credit today.

And so they put all these plans together and they did three simple things that are all fundamental to the success of any pension plans. First, they rationalized and standardized the benefits to make sure they were reasonable, they were not excessive, and were not subject to a lot of gaming. Secondly, they took steps to ensure that to the extent there were ever any changes in the plan, they would be properly funded. There's a constitutional requirement to that effect and the legislature has done a terrific job over the years in making the annual actuarially indicated contributions with one small exception I'll touch on in a second.

The other thing they did was say, "Gosh, this is a disastrous fund as it now exists at its newly created point." Its funding ratio was in the 40s, which by just about any metric would cause most analysts to say, "This thing is hopeless, dig a hole and bury it and forget about it. It's never going to work."

But in Florida, the feeling was, "Well, if we really stay committed to paying the full normal cost each year, and in addition to that, making the full actuarially indicated contribution to the fees and the unfunded liability within 30 years, then we would anticipate being fully funded in no more than 30 years."

And the third thing they did was ensure that there would be prudent management of a corpus of the pension fund by giving that responsibility to the state Board of Administration, which is designed in a way to take it largely outside the day-to-day political process and to focus as much independent professional expertise on the investment outcomes as possible without having to deal with the oversight of a day-to-day operating investment committee getting involved in all the manager decisions and buys and sells and fine-tuning and that kind of thing.

So all of that is delegated to professional staff. Our three trustees, who are statewide elected officials -- the governor, the attorney general, and the chief financial officer -- hire whoever is in my job. They accept a high level policy statement, investment policy statement, that covers all of the big picture design issues of how the investment operations will work for all of our client mandates. And they approve that in a public meeting after it's been first reviewed in another public meeting by an advisory council made up of professional, or of people in institutional fiduciary experience.

So with that all in place, starting at about 1974 with a 40 percent funded ratio, the Florida Retirement System became fully funded in the late 90s in part because of the dot-com boom and in part because of good solid funding experience over that time.

Then, given the success, its funded ratio continued going up, peaking at 118 percent in 2007 -- no, I'm sorry, around 2000, early 2000. So then the legislature said, "Well, gee, we may be funding this thing too well. Maybe what we need to do is deliberately suppress contributions for a period of time, save the employers some contribution money to meet other public priorities, and we'll take the funded level down to a little over 100 percent, level it off there, and we'll be fine there, and we'll remain fully funded forever, and we'll all live happily ever after."

Well, the problem was that plan was interrupted by a little thing known as the great financial crisis in 2008 when -- well, first of all, over a period of 10 years, members and employers were saved, oh, six to ten billion dollars in contributions and the funding ratio came down a little. Then along came the great financial crisis and the fund went from a funding level of 108 percent to about 87 percent in a matter of months. And we have hovered at around that level since then. And in large part, the investment returns have been fine and the benefits have not changed. In fact, we've done, we did benefit reform effective July 1, 2014, that reduced benefit liabilities long-term.

But for the three years immediately following the financial crisis, Florida's budget, like most state budgets, was an extremist, which is to say short of money. And the legislature fully funded the normal cost, but did not fully fund the contribution to the newly created unfunded liability. Those underfundings were several billions of dollars and contributed directly to our inability to get back to 100 percent, which I would still like to see us do.

I think the key thing is, number one, yes, you can effectivity 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, but there are definitely parts of the market where I don't think passive investment is the solution.

I think Bob Maynard used the word "niches." I think that's exactly right. If we're talking about domestic equities, for example, United States small-cap or micro-cap stocks would be areas where active management pays. If you stay in the equity class and you get outside the U.S. and you're talking about emerging markets or developed non-U.S. markets, active management tends to pay there.

And lastly, I would say, in the private market classes, private equity, venture capital, and real estate, really, it's the only way to go.

We have a very unusual real estate program where we manage about 60 percent of that asset class in-house. And it's a $14 billion real estate portfolio, so it's a serious one. Our results over long, long periods are among the very best in the industry because of two things. Number one, by managing assets ourselves, we don't have the false time frames that go with partnerships.

Partnerships are commonly eight- to twelve-year vehicles that are created, they invest money, then they sell assets to realize profits, and they distribute the capital to the limited partners and the partnership dissolves and they form another one. The problem with that is, if the timing of the fund is, creates an investment period such that it's not a great time to put money to work, no matter how good the managers are, there will be a vintage issue with the returns available on that fund. The other factor is, on the backside, when it comes time to wind the fund up and sell the assets, if the sale environment is not conducive to selling it at advantageous prices, then you suffer the consequence as an investor.

The last point would be that there's some assets -- and you think about Warren Buffet's example of the best business you can possibly have, the only toll bridge across a body of water where you own the bridge and get to set the tolls. If you have an asset like that that's perfectly located with very little competition, you want to hold it for your entire life and just increase the rents periodically and maintain the quality or the physical asset. You don't ever want to sell it. And if you're in a partnership, you don't have that option.

So, then the last part, of course, would be by doing this ourselves, we avoid an awful lot of costs in fees that would otherwise be paid in management fees and carried interest.

I'd make one other point on the private asset side, and that is in private equity. I listened to the presentation you had earlier this morning from the gentleman from Oxford, and I must say I was kind of surprised that his conclusions from the standpoint that -- we have a very large private equity portfolio and for one-, three-, five-, ten-, and twenty-year periods. It's net of all costs, net of all costs. It's our most profitable investment area. So I would challenge the notion that private equity is all fees and no benefit. I think net of all costs administrators can do very well.

So I'm going to stop there and see if I can answer any questions for you.

CHAIRMAN TOBASH: Okay. Yes, so thank you very much. And as you have commented, your systems, your funds are in far different circumstances than Pennsylvania. I'll just go back and tell you some things that we've done.

In 2010, we did have a plan design change in Pennsylvania, and as Commissioner Gallagher has mentioned a number of times, the fact that we were underfunding these two systems -- and since 2010, we've been very festivous about increasing contributions to the point where we are very close to the arc. But beginning in 2019, we've got a hybrid design that's going to be one-half defined contribution and one-half defined benefit for new people coming in. We've got some risk sharing that's involved in that new plan design. We've tried to address some of the unfunded benefits that take place in the form of noncompensated or noncontemplated overtime that we end up paying with, under our classic defined benefit system.

So we've done some work in that area, and like I said, we worked very hard to make sure that we're getting to the point that we're paying our arc. I'll just ask this question -- and I think somebody said 13 percent of the payroll -- what is your contribution rates in your three systems?

MR. WILLIAMS: Well, we really only have two systems. We have a defined benefit and a defined contribution system. And I think the contribution for employees is three percent and the contribution for employers is three percent of the DC. And I guess they do a blended rate, so it's a little bit higher. But I think our overall contributions are in the 10-ish ballpark. So based on what I know about the contribution levels in other states, Florida's are substantially below most.

CHAIRMAN TOBASH: Great. How about Wisconsin?

MS. KLASKIN: We're right at about 13 percent and it's shared equally, 50 percent from the employer and 50 percent for the employees. It's been between 12 and 14 percent over the past decade. And it might be, it might be actually 13 and a half right now. It, you know, changes just slightly every year, but within that range.

As of 2010, though, it's been shared equally so previous 2010, the employer picked up 100 percent of the cost of it, and then in 2010, that switched to an equal share of both employer, employee, except for a few special classes.

CHAIRMAN TOBASH: And you mentioned at one point in time you were 87 percent funded in Florida. What was your dip, at your low level, where were you at funding percentage?

MR. WILLIAMS: The lowest, well, the very lowest back at creation of the fund, it would have been down in the 40s, 44, 45, something like that.

CHAIRMAN TOBASH: So you've climbed your way out of a deep hole. I can tell you this, that Pennsylvania's contribution right now in both systems is north of 30 percent, so we've got --

MR. WILLIAMS: Holy cow.

CHAIRMAN TOBASH: Yeah, holy cow.

MR. WILLIAMS: Wow.

CHAIRMAN TOBASH: So, you know, this commission has been convened for some real reasons and a lot of it is the pain that our local school districts are suffering, as well as the Commonwealth, in funding other much needed government requirements.

So as we take a look at fees and returns, our work is all the more important as a result of our underfunding status and our contribution limit at this point in time.

So I will turn questions over to our Vice-Chairman.

VICE-CHAIRMAN TORSELLA: Thank you all, very interesting testimony.

As the Chairman indicated, we are envious of your funding status. Although, as the Chairman indicated, Commissioner Gallagher indicated, it's a credit to our political leadership the last two years that our state has made the arc, even at those levels. Although, there were many, many years that it did not, which you know, have created some clear and huge problems.

But do I -- I thought I heard in what each of you said that somehow the consolidation, in Wisconsin and Florida's case, not Idaho, that somehow the consolidation somehow was connected to a new determination to appropriately fund your systems with the arc. Did I hear that in your histories or am I imaging that?

MR. WILLIAMS: You heard it in mine --

MS. KLASKIN: In Wisconsin --

MR. WILLIAMS: -- this is Ash Williams in Florida.

VICE-CHAIRMAN TORSELLA: I did, okay. The consolidation was part of an overall determination to get into a better place which included making the required contribution.

MR. WILLIAMS: Correct.

MS. KLASKIN: And there were three plans in Wisconsin that consolidated in the 80s. And what they have been doing over the years is working with their constituent groups to make those plan designs look similar and more similar, so that the benefit would -- you know, once there was actually the merger, that those plans would look very similar and then go to a single plan. For any unfunded liability that existed at that time, it was crystalized and then paid down appropriately by the employer.

I do not know what the extent of that underfunding was. It wasn't very substantial, but it was crystalized, and then as a requirement going forward, it be paid off going forward.

VICE-CHAIRMAN TORSELLA: Okay. Thank you.

CHAIRMAN TOBASH: Commissioner Gallagher.

COMMISSIONER GALLAGHER: Yes. Thank you, Mr. Chair.

You know, I think that there's so much to be learned from the systems that we have on the line right now about how to take this moment and apply some best practices.

Specifically, when it comes to governance, whether it's for the whole organization or the investment office itself, are there -- I recently learned that Florida went through the process of bringing performance pay into the shop again, or I don't know if it was ever there to begin with. But Pennsylvania does not have that. And I'm not advocating for it, but what I'd like to elucidate this commission, as well as myself, on is what the value for money is to have a performance-based pay investment office. And also if there are ways to educate the public why, in fact, a public entity might have performance pay. It's a private sector idea. Can it be applied to the public sector, too? What lessons were learned in that process?

MR. WILLIAMS: Would you like me to take that as an opener?

COMMISSIONER GALLAGHER: Yes, please.

MR. WILLIAMS: Yes. I think, first of all, it's exactly the right question. 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 or 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 buy-in 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."

And as I said, we started this back around, oh, gosh, it would have been around 2011 or '12, something like that, we started working on this, 2010. And we found in those days, even though Florida was bigger than all but three or four other funds around the country, and we had a very complicated asset mix covering everything from venture capital to frontier markets to U.S. Treasury, and we managed a very substantial amount of money in-house, our pay was in the bottom of the fourth quartile nationally.

So we built the argument that, look, there's a terrific value equation here, our performance has been good, it compares well with our private sector managers. And to the extent we can do it for less here, it's worth retaining the talent, but we've had high turnover, we have a lot of vacancies. It's unrealistic, I don't think we can sustain this.

And so we were able to benchmark against other public funds. We agreed to a target of being at the 50t percentile of the 10 largest funds or the 75th percentile of all public funds in the U.S. given what we could do. And we -- our trustees agreed to have a public meeting after it had multiple public meetings of our investment advisory council. And slowly, but surely, we gained acceptance of the concept.

And I'm delighted to say, and this is very counterintuitive, the only press this initiative has ever received has been positive, because any reporter who sat through the proceedings and actually saw the numbers said, "Good Lord, this is one of the highest returns on investment we could possibly have."

And I think one of the things that sealed it was we, one of the elements of compensation that makes it competitive is one that I don't believe Pennsylvania has, which is we have base compensation for each position that's mapped and checked every three years against the marketplace, and I think Pennsylvania does that. But then we also created a new level of the incentive compensation that's based on investment performance, and depending on the level of the individual or seniority of the individual, it will either be primarily quantitatively driven by investment performance if they're senior enough to really drive investment performance, or if they're junior enough and their responsibilities are more broad, it will be primarily subjective at the discretion of that individual's supervisor.

But if our entire compensation system, based on the performance of the fund, based on the clean audits, based on no compliance exceptions, et cetera, et cetera, every single thing lines up perfectly. The way it works out is the component of the total gain in the fund above benchmark that would be distributed to our employees at the maximum payout levels that are fixed, they are not (inaudible), for our incentive scheme would be 30 basis points of that gain, so 30 one-hundredths.

So the way I crystalized that was, would be to say to the casual observer, the following, "If I propose to you that you give me a quarter and a nickel, and I will hand you a hundred dollar bill, how does that sound to you?" You'd probably be willing to do that, wouldn't you? Everybody says "yes." And the answer, that's exactly what the scheme of ours does. And if that results in a portfolio manager of an asset class where they might be managing seventy or seventy-five billion dollars on their own desks, like our global equity unit does, and they outperform by 50 or 100 basis points in a year, the portion of that -- that would equal the maximum incentive compensation -- that they could earn is literally a drop in the bucket compared to the gain they produced. And it pays out over multiple years, so it has a retention capability.

There is a provision that says that if there is any risk violation, any compliance violation, any disciplinary violation, you're barred from getting incentive. And if you earned two years' worth of incentive, you've collected the first year, and the second year is in its deferral period, and you commit some kind of infraction during that period, too bad. You lost what was deferred for you.

So it's been very effective. We're in our third full year of it. As I said, it has not been an issue. It has not been controversial. I've been somewhat amazed by that. I'll tell you with absolute honesty, I'm relieved. It has worked really well and it has served its purposes and our performance has been good and we've been able to hire really terrific people and keep them.

CHAIRMAN TOBASH: Okay. Thank you very much.

With that, I will make the same request that I made to other testifiers. As we absorb the information -- we appreciate your expertise and your willingness to testify. As we move forward and absorb the information, if the commission or its consultant would like to get in touch with you, we would greatly appreciate your open lines of communication as we continue to work through our process.

So thank you very much for your testimony. And we will likely be in touch at some point in time soon.

MS. KLASKIN: Thank you.

MR. VILLA: Thank you.

CHAIRMAN TOBASH: Okay. We're moving along and trying to make up a little bit of time, but we do need to take a five-minute break right now. People that are working with us need a chance to get up and stretch. So with that, we'd like to convene in five minutes. Thank you.

(Recess.)

CHAIRMAN TOBASH: Okay. If we can find our seats, we should get going again. We're running a little behind, but we're trying to give everybody fair opportunity to ask questions and that the questions to be answered thoughtfully.

We have our next testifier, and that is Jean-Pierre Aubry, associate director of the State and Local Research Center for Retirement Research at Boston College.

So welcome very much, Jean-Pierre, and thank you for testifying, and let's carry on.

MR. AUBRY: Okay. I just wanted to thank you for allowing me to speak today about some recent research that me and my colleagues have done at the Center for Retirement Research at Boston College. It's my sincere hope that this research will further inform the pension discourse being had here at the Commonwealth.

My presentation today is going to summarize two recent briefs by the center that have focused on public pension investments broadly. The briefs assess plan performance in two ways, one, by comparing plans to each other, the other by comparing plans to their own benchmarks.

The analysis is based on the public plans database. It's a database we maintain at the center. It's 180 plans across the U.S., major state and local systems. That covers 95 percent of all members and assets. So it's very comprehensive. Any assets I have of Pennsylvania schools or Pennsylvania SERS in this presentation will be generally to kind of compare at a high level where those two plans fall relative to this public plan's database universe.

And also, just as another shameless plug while I'm here, the center has also recently released an investment comparison tool where we've collected data from the CAFRs of these 180 plans from 2001 to 2017 on allocation, performance by asset class, benchmarks. That's all available on this tool made for easy visualization in comparison of the plans in our sample. So hopefully, for those that are interested in a more detailed analysis, that's maybe a tool that you can use.

So the CRR assesses plan performance in two ways, comparison of investment returns across plans, where the observed differences between plans are the result of differences in allocation and differences in performance by asset class; and then also, a comparison of each plan's investment return to its own benchmark where performance relative to benchmark really tells you how a plan is doing in terms of executing its own strategy.

So for the first assessment, comparing plans. The long-term -- this is 2001 to 2016 -- investment return for public plans in the PPD varies greatly. So here (indicating) we have a range of returns. And I've kind of highlighted where Pennsylvania schools and SERS falls within distribution. It's kind of in the lower end, at the bottom of the third quartile and the second quartile. But you can see there's a dramatic range in terms of the overall performance of plans over the long-term.

And this difference in return is actually very meaningful. So what we did is take plans in the bottom quartile that formed the bottom quartile over the whole period and plans at the top quartile and just kind of flipped their returns, kept everything else the same and said, "Where would the bottom quartile be if they had the same cash flows, same benefits in, same benefits out, same contributions in, but had top quartile returns and vice verse for the top quartile?" And you can see they roughly switched places, right? So the bottom quartile goes from 60 percent funded today, if they had top quartile returns, they'd be 88 percent funded. For the top quartile, it's 79 percent funded, they would drop down to 63. And so it just explains how much this variation in returns explains that, the diversity of funding ratios that we see today.

So at a high level, the asset allocation in most public plans is quite similar. So we look at these four quartiles again and look at three broad asset classes, equities, fixed income, and basically everything else, which we'll call alternatives. And they generally are the same. You know, it's a difference of maybe two or three percent in every asset class at most. So from our perspective, it's not that much variation in the sample.

But the top quartile plans outperformed other plans in most asset classes. So you don't see a lot of difference in allocation, but you do see a difference in performance by asset class. And so this highlighted column (indicating) just shows that public -- in terms of public equities, fixed income, private equity, real estate -- the top quartile really outperforms.

I think what's most striking in this table is the difference in the public equity returns. In most plans, public equity is the largest part of the portfolio, so how you do in that asset class really matters. Top quartile got

6.7 percent returns over the whole period while the following got 4.7.

Looking deeper, a lot of that is due to domestic versus international allocations. So that top quartile was in international equities, more heavily weighted international equities prior to the crisis, when those did better than domestic equities. After the crisis, they were flipped and the top quartile plans were more heavily weighted towards domestic, when that's been better than international. So that's kind of what's happening there.

So given that allocation is so similar at a high level and the top quartile plans clearly outperform in most asset classes, the real difference in performance is returns. It's actually not that much allocation.

And so, right here (indicating) on the right, we show an average of all plans and what drives, what explains their difference from the top quartile. And most of it, on average, is about a one percent difference between the top quartile and everybody else. Almost all of that is due to differences in asset class returns and almost none due to allocation. So that's for most plans.

In general, plans have shifted away from traditional stocks and bonds and alternatives. So you basically see here (indicating) what's been happening in public plans at large, going from about 10 percent to about 25 percent in alternatives over the period.

And all of the plans have made a very similar shift away from traditional bonds in a relatively similar -- oh, sorry -- have made a shift away from traditional bonds in a relatively similar fashion. So you know, you see basically all the plans clustered together in terms of fixed income portfolio, and they're all kind of going down at a similar pace.

However, after the crisis, the bottom quartile plans made the largest shift out of equities. And so here (indicating) you see a really dramatic change in the ranking in terms of equity allocations between the top and bottom quartile. So leading into the crisis, the bottom quartile was heavily weighted toward equities, took a big hit in the crisis, and they also shifted out of equities right after the crisis, so they didn't get any of that rebound.

And the shift out of equities was coupled with a shift into alternatives right after the crisis. Specifically, it wasn't just any type of alternative, the bottom quartile plans shifted a lot more into hedge funds and commodities relative to others. And so what you see here on the left (indicating) is, you know, how much more. They have about 10 percent in hedge funds compared to other quartiles which are around five to, at a high maybe a nine, and they also have more in commodities. And it was during this period when hedge funds and commodities dramaticically underperformed the other asset classes.

So here (indicating) we just show some index returns for various alternative asset classes and traditional equity. You know, the private equity index we use is the Thomson Reuters Private Equity Buyout Index. Other indices show slightly lower numbers, something around the 10 to 12 percent for private equity, but nothing as low as hedge funds and commodities, which are, you know, barely breaking even.

So as a result of this dramatic shift in allocation for the worst plans, allocation actually played some role. So for most, they're generally the same. It's really asset class returns, but you do see, for the worst performing plans, a little bit of an allocation story. Being in equities leading into the crisis, shifting out of them after and shifting into hedge funds and commodities precisely when they were the worst performing asset classes.

So that was an assessment comparing plans to each other. The next is comparing each plan to its own benchmark and seeing how that, how plans measure up in that sense.

So most plans beat their benchmark for

traditional investments, but only half beat their benchmark for alternatives. So we have 72 percent of plans exceeding their long-term benchmark in equities, 92 percent of them exceeding it in fixed income, but only just over half exceeding their benchmark in alternatives.

Now, at the portfolio level, the benchmark for most plans reflects their asset allocation, but there is some variation, right? So the majority do a weighted average of their asset class benchmarks, but some use a peer universe, others use the expected long-term returns, the actuarial rate of return, and others use an index plus a premium. Sometimes that's a T-bill, other times it's S&P plus. But there is some variation.

I think it's important to note here that each benchmark is useful for very different reasons. I don't think there's a right benchmark to be used. I think the weighted average of asset classes gives you a sense of how a plan is executing its own strategy. A peer universe tells you a little bit about how a plan's strategy is performing relative to others who may be doing different strategies. Expected rate of return is more of a long-term assessment to see how your returns compare to what's needed for funding reasons. And in the index, that may be for looking at how the risk premium of your portfolio is if you have a T-bill as the index.

So when we were assessing plans meeting their benchmark, we utilized a weighted average of all asset classes. So we took -- we have benchmarks for each plan, reported by them. For each asset class, we take a weighted average of that based on their own allocation to those asset classes and compare that to their actual performance. So this question really -- the benchmark we're using answers the question, "How does a plan do relative to its own strategy?" So we don't worry about the fact that some plans have very different benchmarks for very different reasons. We kind of use the same benchmark for everybody.

What we find is about a third of plans meet that weighted average -- do not meet that weighted average benchmark. So about a third don't execute their plan to their expectations over the long haul.

And plans that fell short of their benchmark were also more likely to be in the bottom quartile relative to other plans. So it may be that plans that fell short of their benchmark actually just had high benchmarks. So they have actually performed better relative to others, but worse relevant to their own standards. But this chart (indicating) suggests that that really may not be the case. Thirty-eight percent of plans that underperformed their benchmark were bottom quartile plans, so they were, just bad performance relatively, as well as compared to their benchmark.

For overperformers, you only see about 22 percent being in the bottom quartile. So it suggests there's kind of less shenanigans going on with the benchmark than you might think.

So about fees?

Our data show that most plans report between 30 and 50 basis points in terms of annual fees. So what we did is we calculated the long-term return from 2001 to 2016, assuming the plan paid no fees, and then using a net of fee return, and compared that long-term return to get kind of an average fee over the whole period. And that came to 30 to 50 basis points. Our estimates for Pennsylvania was closer to 70 to 80 basis points, so they were at the very high, very high end of the average fee paid over the whole period.

I guess you can go back one. Sorry.

So what was interesting was that we found that fees played a somewhat limited role in the relative performance of plans, so that if you look at gross returns and net of fee returns, plans basically stay in the same quartiles. That's not to say there's not some movement within plans, but there's not big jumps due to fees being paid. So it's not that if a plan did not pay fees, it would be top quartile and is paying fees, so now it's bottom quartile. It just didn't seem that dramatic.

So what we see here (indicating) is that 70 percent of plans don't change their relevant position to other plans if you look at their gross return versus net return. And then there's about 15 percent that move up a little bit, 15 percent that move down a little bit.

Now, the plans that fell short of their benchmark, they did have higher fees across all asset classes. So they did pay more and they did fall short of their benchmark, but that doesn't mean exactly that the fees are the reason for that. And we show this in our next slide where we look at where they would have been relative to their benchmark if they paid no fees.

For most plans, it would take a cut in their fees of almost 50 percent for them to have achieved their benchmark. So presuming that that kind of fee cut is exorbitant, you would think that maybe fees aren't the reason that they didn't hit their benchmark. You know, most plans, you know, almost, yeah, 60 percent-plus of plans either needed more than 50 percent or couldn't even hit their benchmark if you removed their fee totally. So it really speaks to how fees are not the whole reason why plans are underperforming. It's part of it, not all of it.

So what do I take away from these figures, these summaries? One is that the observed differences in long-term investment performance among plans is meaning that there actually is a wide range of performance from 2001 to 2016, and it matters in terms of how we explain differences in today's funded ratio. For most plans, the difference is due to asset class returns. Most had very similar allocations. But for the worst performing plans, the allocation to hedge funds and commodities after the crisis definitely played a role.

Now, while most plans outperform their benchmark, the third of plans that did not were also more likely to be in the bottom quartile relative to others. So these plans underperformed relative to their peers and relative to their own standards.

But these plans that underperform their benchmark, they paid higher fees, but in many cases, even if they paid lower fees, they wouldn't have hit their benchmarks. That's not the other story for these plans. They're underperforming for other reasons.

So here (indicating) I have an appendix of just kind of disconnected items, but I think are relative and interesting about Pennsylvania and I wanted to get a sense of how different it is relative to the universe of public plans in the database.

So first thing I look at is a simpler allocation. What happens if you just go 60-40? And here we define that as Wilshire 5000 versus 40 percent of the

Barclays U.S. Aggregate Index. Then I'm going to look a little bit at what other public pension plans use leverage explicitly in their investment strategy, then looking at how plans value their investments, and finally looking at unfunded commitments, so plans that commit to put money into private equity funds or real estate funds, how those unfunded commitments may play a role in their future liquidity.

So the benefits of a simpler investment approach really depend on the period in question, right? From 2001 to 2017, the majority of plans in our PPD sample outperformed a simple 60-40 stock bond portfolio. And this is not that sensitive to what indices you use, whether you're using S&P 500, Russell 3000, this narrative holds true, that over the whole period, they've outperformed, but since the financial crisis, a lot of plans have underperformed.

And for SERS and PSERS, the story is similar. Again, you know, you may quibble about exactly what the levels are depended on what index you use, but the narrative is that, over the whole period, plans that outperform these simple alternatives -- but really, since the crisis, we've had a kind of a different investment environment where indices are really outperforming other kinds of allocations.

So one characteristic that stands out about

Pennsylvania's school system is the explicit use of leverage. I didn't see that as a common feature in a public plan's database, so I spent the last couple of weeks kind of combing through some of the CAFRs of our public plans in our database to see what other plans explicitly said they use leverage. Many plans talk about the fact that their private equity portfolio managers are able to use leverage or that their real estate managers are able to use leverage, but only a few really talk explicitly about the plan leveraging.

And so here (indicating), you know, I think it's a total of maybe 10 systems across the 180 that we have in our sample that actually specifically use leverage. And those that do, it's usually a pretty small amount under 10 percent. There are three plans that stand out: Pennsylvania schools, Missouri State, and Ohio Police and Fire that use significant amounts of leverage to achieve their returns.

I also reviewed the classification of plan assets. So starting, I think, as of 2015, plans were asked to report the valuation methods for their investments. So there are three levels. Level one is really liquid assets that can be market to market very easily. Level two are those that have observable characteristics, but maybe not traded frequently through something like a municipal bond or a corporate bond. And then finally, level three, where there are significant variables that are not observable when you're doing your valuation. And these generally involve models for things like real estate valuations.

And then there's net asset value. And so that captures a lot of the net asset value. That generally tends to be what would otherwise, I think, be classified as level three assets, right? These are private equity funds, real estate funds, where the system is given a share of the net asset value of that fund and that is reported to them from the fund manager. In many cases, these are what we would consider level three assets.

So you may want -- you know, when thinking about the liquidity and the ability to value, fair value, of a plan's assets, it may be prudent to combine the two, NAV and level three.

Finally, as the growth in alternative space, as the alternative allocation has grown among public plans -- you know, part of that is the commitments you make to alternative investment funds, private equity funds, real estate funds. And you know, commitments are -- I think we've had other speakers discuss this -- that commitments are lumpy, distributions are lumpy, that you have capital calls that are made to the fund over time as the fund needs money to invest.

And so what I show here (indicating) is

unfunded commitments. So amounts that the plan has promised to give, but has not been called yet to these funds as a percent of assets.

As you can see, PA SERS and PA schools are at the upper end of the distribution. The majority of plans, their unfunded commitments fall below 10 percent of their assets, but for SERS and schools, we're at a 12 and 16, respectively. So that is a significant level of unfunded commitments that could cause, could limit the flexibility in terms of -- for the planning going forward, in terms of its investments. Basically, 10 percent of his assets are potentially callable at any given point from the private equity or other alternative investment fund.

So that concludes my summary of our two briefs, as well as some high level data from the Public Plans Database. I welcome any questions on our data or the research I have shown here.

CHAIRMAN TOBASH: I appreciate your testimony. And your testimony comes to the conclusion that fees are not the reason for underperformance. Your data shows that the fees are not high enough to cause them to move to another quartile or really change their performance in their peer group. But it also tells us that higher fees aren't necessarily correlated to top quartile performance, as well. Is that what you're saying?

MR. AUBRY: Right. Right. And so I think that the takeaway here is that -- I mean, to be clear, right, less fees are always better. More bang for buck, generally. If for any given reason, if you're paying less fees for that, that's more take home for the plan.

But our data doesn't show any real relationship between fees and underperformance or overperformance. So we have not been able to track that from our data as of yet.

CHAIRMAN TOBASH: It's an interesting thing that we're all seeking value, right? It's the value proposition.

Other questions from the Vice-Chair?

VICE-CHAIRMAN TORSELLA: Thank you very much. And thank you for your organization's work, which I think is hugely important to, not just to us, but folks around the country.

A couple of questions. On the fee thing, understanding the nuances of this, if you're performing here in gross of fee, it's not going to change dramatically as you go.

You did say that you thought Pennsylvania's fees were very high relative to your 30 to 50 percent that you typically see. I'm having trouble understanding the correlation. I thought your report said -- well, your report says, "Data shows a correlation in higher fees in worse relative performance." I think, I thought we were saying today that the magnitude of impact that can come from fees depends on how dramatically you can cut it and where you're levels are, but are you saying there's no correlation or there is that correlation?

MR. AUBRY: No. What we found is that plans that underperformed paid higher fees, right? So there is a correlation, I guess, right? Causal is hard. And as shown by the fact that if we add back in fees for plans that underperformed, it doesn't cause them to overperform --

VICE-CHAIRMAN TORSELLA: Right.

MR. AUBRY: -- right, or meet their benchmark. So there is definitely a correlation between the fee that plans pay and their underperformance, but it is not clear that fees are the reason that they underperform.

VICE-CHAIRMAN TORSELLA: Correct. Okay.

And the other takeaway I have from your testimony is that we really are outliers when it comes to the amount of potential unfunded commitments that are out there, 68 percent of funds have as much or less than we do. And we're a real outlier when it comes to the use of leverage at the portfolio level.

MR. AUBRY: Yeah, that's absolutely correct. I mean --

VICE-CHAIRMAN TORSELLA: Not that we didn't have enough to worry about. We're underfunded.

MR. AUBRY: All right. Yeah. You can consider the unfunded, that's another liability that the plan faces, right? And it's just -- unlike the benefits paid through pension funds, that's somewhat predictable. The liability for unfunded commitments is much less predictable. And my sense is that opportunities arise when markets depress and that's also when a plan is otherwise liquidity constrained. So there may be kind of correlations there that could be troubling in terms of the unfunded commitments and when those are called.

VICE-CHAIRMAN TORSELLA: At the time, we'd most want to take advantage of the opportunities that might be really stable, too.

MR. AUBRY: Yeah.

VICE-CHAIRMAN TORSELLA: Thank you.

CHAIRMAN TOBASH: Mr. Gallagher?

COMMISSIONER GALLAGHER: Thank you, Mr. Chair.

Mr. Aubry, thank you from being here. I've benefited from your research over the years, trying to help better educate the caucus that I serve. And so thank you for that. I do have a couple of questions for you.

At the center of all this, you're deriving conclusions from your database. Is your database solely sourced by CRR staff, completely from soup to nuts?

MR. AUBRY: Yes. So the data is extracted directly from CAFRs by the center. So we don't -- the data is from reports leased by plans. And to the extent possible, we have plans vet our data, as well. So there's a process which we send the data to the plans and there's a review period in which they can look that over. And so that's our process.

But we try to do as little massaging of the data in the reports as possible. And so it comes directly from plans. For that reason it can be limited. There can be variation in how plans report within a plan over time and across plans. But we find that on the whole it provides some clarity as to kind of broader trends in the public pension universe.

COMMISSIONER GALLAGHER: Our system, or one of our systems, our State Employees' Retirement System, had done some research of another entity, the Pew Charitable Trust, and identified inconsistencies in the data that they captured for comparing plans. And so I just want to extend the invitation to maybe reach out to our systems and see if your data is aligned with what our systems have for reporting fees. So if I can make that request.

And then a second part to it is, is any of the research that we heard today funded by the Laura and John Arnold Foundation or from Pew Charitable Trusts?

MR. AUBRY: So our investment data is funded by the Arnold Foundation. We're currently pursuing a three-year project with their support to collect data on investments specifically. So that's the only portion.

The rest out of the PPD and the rest of our database and analysis is funded through other bodies, such as the state and local -- sorry -- Center for State and Local Government Excellence.

The PPD is done in partnership with Nazra. And they vet anything that goes on the PPD. So all the data that we've collected, it's from -- it's funded by the Arnold Foundation for it to get on the PPD. It has to pass with Nazra and Center for State and Local Government Excellence.

COMMISSIONER GALLAGHER: Thank you.

CHAIRMAN TOBASH: Okay. We appreciate your testimony. And as Commissioner Gallagher said, we may very well be back in touch with you to extract more of the information that you're compiling.

Thank you very much.

MR. AUBRY: Look forward to it. Thanks.

CHAIRMAN TOBASH: Okay. We've got two testifiers left. And our next testifier is Ms. Kristen Doyle, CFA, partner, retirement and investment for the Aon

Hewitt organization.

So we appreciate you being here. We apologize that we are a little bit behind schedule. And it's getting towards the end of the day, however, we are anxious to hear your testimony. Thank you.

MS. DOYLE: Great. Thank you.

Commissioners, thank so much for having me today.

So as you just mentioned, my name is Kristen Doyle. I lead our public fund business at Aon Hewitt Investment Consulting.

We at Aon Hewitt Investment Consulting in the U.S. have about one and a half trillion dollars in assets under advertisement that are in the public sector. And we work with probably about a third of the top 50 largest state plans in the U.S. We have about a 30-plus year history of working with public sector pension plans and I personally work with three of our largest relationships.

I work with the Florida State Board, which is a $160 billion plan. You heard from Ash today, who is the executive director for that plan. I also work for the New Jersey Division of Investment in the State Investment Council there, and I also work with the Minnesota State Board of Investments. Both of those plans are about 75 billion in assets, so very similar in size to some of the plans here in Pennsylvania.

So I have two main sections to my presentation today. One is to provide an overview of asset allocation for institutional investors, talk about the best practices, and how to set asset allocation, and then the importance of diversification. And then the second part of my presentation is related to best practice on benchmarking.

Next slide, thanks.

So before I dive into asset allocation, I did want to just remind the commission of how asset allocation fits into the overall pension accounting formula. So this depiction that you see here (indicating) illustrates -- it's a complicated way of showing a very simple formula, which is that investment return on assets, or an asset return, plus the contributions is what funds the overall liabilities and what defines liability is primarily obviously the benefit levels. So said even more simply, contributions plus investment return equals benefit payments.

And this has come up a few times today, but I did want to mention that there are a number of states -- and I believe here in Pennsylvania this has happened -- where there's been a study of where the underfunding has come from over time. The state of Kentucky has recently done this, Colorado has done one, I believe New Jersey has done one. There's a number of other states that have. And typically, what is found is that the primary contributor to significant underperformance over time has been the underfunding.

So we're going to talk about asset allocation.

Asset return today is obviously extremely important. I was actually just at the Florida State Board meeting this past Monday, and they've earned net of benefit payments over the last year, $9 billion. So if those assets had been sitting in cash, they wouldn't have an additional $9 billion to contribute. So I don't want to diminish the importance of the assets and the asset allocation and the investment return, but note that there is a another key component to the pension formula here.

So what is asset allocation? So when I talk about asset allocation today, what I'm referencing and referring to is the actual implementation of an investment strategy that more than anything is seeking to balance the need to earn investment return, but also taking into account the risk of earning that particular return.

And you can define risk in a million different ways. At Aon, the way we think about risk and the most important is permanent loss. So that's the permanent loss of not having the assets that you need or having to sell assets at a permanent loss to make benefit payments.

So certainly risk can also be defined as the volatility of returns. So it's hard to ride out volatility of returns, so we want to reduce volatility as much as we can with asset allocation. And that's certainly an important piece and that goes along with the risk of permanent loss.

We'll also talk about diversification, as I mentioned, but if all of your assets are falling at the same time, that risk of permanent loss is greater. And so to the extent that you have some assets that are performing well while you have other assets that aren't performing well, then you limit that risk of permanent loss.

I also wanted to mention that when setting asset allocation, it should be done by looking forward, not by looking backward. So we'll talk about benchmarking in a minute, which is definitely a look backward on how the plan has performed over time. And that has certainly a very important place in evaluating pension plans, but again, when we evaluate and assess asset allocation, what we want to make sure that we're doing is that we're looking forward and positioning ourselves for what we and what our experts think will be the market environment, let's say, over the next 10, 15, 20 years.

So there's been a number of different studies over the past couple of decades that have shown that asset allocation is the most important decision that an institutional investor makes and that it is the number one determinant of investment return and investment return variation over long periods of time. And that's why it really is best practice for boards to set and vet asset allocation.

And you heard Ash today from Florida indicate that his board is a policy board. And so what they do is they pay the most attention to the asset allocation investment policy, which again, is a key determinant of the overall success of the program.

So this (indicating) is a lot of words on a slide. Let me try to summarize.

So really, the point is that every investor has different circumstances, characteristics, liquidity requirements, liability profiles, and risk tolerances. And all of those factors are what should form the asset allocation.

So the spectrum of allocations and the way we define it, we define it from, on the left side of the spectrum, an efficiency investor, which is an investor that is going to look for a higher reliance of market risk, so taking the market return that it gives them, the need for more liquidity and less active management, less active risk. And then on the far right is what we call opportunity investors. And on the far right of that spectrum is where you're going to allow for more private market investments, more active strategies as opposed to the passive, and generally, but not always, being able to take more liquidity.

I've also listed a few key determinants that help you determine where you might fall on that spectrum. So those are things like governance structure. So there are governance structures that allow the investment team to be more nimble or less nimble. There are time horizons.

So most public pension systems are going to fall on the long-term time horizon spectrum with the exception of maybe like Puerto Rico. And actually, I used to consult on the teachers plan down there. And so as they were running out of money, we made drastic changes to their asset allocation. So that was a very different experience for public pension, where they ended up on the far end of the efficiency side of the spectrum. But most public pensions are going to have a longer time horizon and so that should form the way we invest.

And then thirdly is portfolio size. So the larger the plan, typically the larger and more sophisticated the internal investment staff. And also, that goes hand in hand with the ability to sort of prudently invest in private markets due to investment knowledge and capability and expertise to select the best managers to understand the complexities. And also the size needed to access the best strategies and to maintain diversification.

And the one thing I didn't put on this slide, but I wanted to make sure I mentioned is that we also want to think about and identify a plan's competitive advantages. So that's one thing we've been talking a lot more to our clients about, is sit down and think about what your competitive advantages are and maximize them.

So Ash and David both talked about a lot of internal management. That's a competitive advantage for them, mostly a competitive advantage here because of size and because of resources. So that's something that you want to make sure that you maximize because it can have huge benefits to the way you manage your program. That's just one example.

So asset allocation certainly has changed for institutional investors over the past 50 years, probably most dramatically over the last 20. Most of this has been driven by quality structure and the sophistication of different asset types, but also, the emergence of new capabilities, the increase in skill, both for institutional investors and also investment managers, and importantly, the terms that are now more favorable for investors than they have been in the past and better aligned interests between investors and managers.

So diversification is extremely important. The Uniform Prudent Investor Act, which defines the responsibility of a fiduciary, was adopted in 1992 and has since been adopted by all states either in its entirety or in part, and basically requires an explicitly -- explicitly requires that diversification as a duty for prudent fiduciary investing. So it's something we definitely want to make sure that we pay attention to.

And I have a very simple illustration here that basically shows that if we're just talking about stocks and bonds very simply, a lot of times when stocks are up, bonds are down. And when bonds are up, stocks are down. And so if you're investing in both asset classes, you're getting the benefit of that. So you're not up a lot when stocks are up and then down a lot when stocks are down. You have a buffer that allows you to manage through difficult periods of time for stocks or for bonds.

I have an example of what that looks like in practicality. So this again is a very simple example.

But if we have investment A that in year one was up 20 percent and down 10 percent in year two, you would end up with a cumulative return of 8 percent. So I did sort of the dollar math on the bottom for you there. (Indicating.) So you'd end up with $108. If you were in investment B, which behaved exactly the opposite, in year one down 10 percent, year two, up 20 percent, you would end up in the same place. You would end up at an eight percent cumulative return. But if you allocated 50-50 to each of those assets that are performing very differently in year one and very differently than each other in year two, you actually end up with a five percent return in year one. So a lower return than you would have had with investment A, but a much higher return than you would have had with investment B. Vice verse for year two, but another five percent return, so you would have compounded five percent over a two-year period and you would end up at $110.25. So just a simple example of how diversification actually can benefit an investment program in terms of cumulative return.

And of course, there's a spectrum of risk and return profiles. So this picture just illustrates that cash and bonds fall in the lower end of the return and risk spectrum, and equities, as you would expect, in private equity, carry a higher expectation for returns and then, therefore, a higher level of risk.

So let me move on to benchmarking. So once you've set the asset allocation and are implementing it, then you need to measure its performance, but it can't be a binary approach, so meaning that you don't want to just look at one type of measure of performance. There are many different ways to measure and monitor performance over various time periods. And I'm just going to describe a few of those quickly.

But before I do that, I just want to make sure that we're all clear that benchmark is essential to good governance. This is a really important piece of fulfilling a fiduciary duty to a pension system.

So there's a couple different types of benchmarks that I've listed here. (Indicating.) The first is typically used in the public markets to represent the broad opportunities set for a particular asset class. So this (indicating) is a broad benchmark like the Russell 3000 that represents the entire universe or opportunities set of U.S. equity stocks. The MSCI All Country World Index is what I list here as an example. It represents the entire global opportunities set for publicly traded stocks.

Those broad benchmarks can also be sliced and diced by style and by market capitalization, so that you can have benchmarks for more focused investment strategies, if that makes sense. So that would be like a value-based index or a growth-based index or a small-cap index.

I said that measuring can't be binary, so there's also other types of benchmarks like a risk-adjusted benchmark. That's a good example of a different way to look at performance.

We really recommend that you look at return in the context of how much risk you have to take to get that return. So you could have a really, really good return -- so if you look at U.S. equity stocks over the last 12 months, and at the end of August, they're up 20 percent. So that's a really, really good return. If you look at that return in isolation, you don't understand how much risk you had to take to get there. So that's why we advocate using a risk-adjusted benchmark, as well.

Over longer periods of time, there's other more absolute return-like benchmarks that are useful. Seven percent return target might be -- so your actuarial assumed rate of return, for example, might be an important thing to look at over longer periods of time. We definitely don't advocate using those in shorter periods of time. There's too much noise and it can cause bad behavior and bad decision-making.

There's also real return targets. So if your plan has an objective of beating inflation plus a premium over a long, long period of time, and that's an important objective for you to measure -- a number of public pension plans do use that type of long-term benchmark -- that's appropriate, as well.

And then peer universes, of course, are interesting to look at and we provide that to a lot of our clients, too.

So just to reiterate, a really important function of a board and also of third-party consultants like ourselves, we want to ensure that those that are without conflict are setting reasonable and appropriate benchmarks. So we spend a lot of time with our clients helping them set benchmarks.

So what you don't want is your manager, your third-party manager, telling you which benchmark you should be using. They can help inform what benchmark you should be using, but you really want to take an objective, conflict-free approach to setting these benchmarks so that your constituents and other key stakeholders are comfortable that you're actually measuring your performance in a very objective way.

So I've listed a few characteristics of a good benchmark here. (Indicating.) They spell out "samurai." Not sure if that's just a coincidence or why that is, but anyways -- so let me just list them quickly.

So specified advance, we want the benchmark to be specified prior to the evaluation period because we know hindsight is always 20-20. We want it to be appropriate, so we want it to be consistent with the investment style or the area of expertise or the opportunities that we're trying to use.

It should be measurable, so it should be able to be calculated. That seems very obvious, but that's an important characteristic.

It should be unambiguous. So we should all always know what's going to be in the benchmark or what's in the benchmark. We should be able to peel back the hood and see what's in there.

It should be reflective of current investment opinions, so that the manager should have knowledge of the securities and the factor exposures that are within the benchmarks.

So a really silly example, but one that I think maybe explains this is, if your manager is only investing in small-cap stocks and isn't considering mid-cap stocks as a place that they are looking, they don't know anything about mid-cap stocks, you wouldn't want to benchmark them against a small- and a mid-cap index. You'd want to stay with the small-cap index.

It should be accountable, so the manager is aware of and accepts accountability for the benchmarks. So that's more at the manager level. That wouldn't apply necessarily to the total fund level.

And then it should be investable. So these are all really important characteristics of a good benchmark.

Now, I will make the comment that these are pretty easy to fulfill across the board when it comes to public market benchmarks. It's a bit more difficult in the private markets, although there are really good private market benchmarks and they've improved dramatically over the past 10 years.

So before I talk about private market benchmarking, which is my next slide, I just wanted to quickly -- I don't have a slide on this -- touch on total fund policy benchmarks and asset class benchmarks.

So we believe that the best total fund policy benchmark should be a passive representation of the broad asset classes included in the established asset allocation policy. And this was mentioned by the testifier before me. So this, what this does is it does two things. It measures the deviation of actual investments relative to the investment policy. So if there's an overweight to equities, for example, it's going to measure what impact that had on the performance. And it also measures the implementation of the asset classes. So how are the asset classes -- the implementation of the asset classes performing relative to the benchmarks selected?

Changes -- this is important, too. Changes to the total fund policy benchmark should always be applied going forward. It should never be applied going backwards. And as there's changes to the asset allocation, this should always be reflected in the total fund policy benchmark.

There's a couple other total fund benchmarks that can be used as secondary benchmarks, which I've already mentioned, which is the actual assumed rate of return, a real return target, and maybe even an opportunity cost benchmark, where you're looking at a mix of stocks and bonds to measure how your additional diversification is benefiting the program.

So lastly, on private market benchmarking -- so this has definitely has its challenges. We did include a list here of those benchmarks that represent best practices and are the most commonly used across public pension systems.

So in private equity, we used to only have one commonly used benchmark here, which was the broad public market index plus a premium. And that really works much better over longer periods of time because when you have big swings in public markets, the private markets don't keep up because the way that the companies are valued in the private markets is just so lagged compared to what's happened in the public markets. But what we've seen over the last, I would say five or ten years, is a massive improvement in the depth and the quality of peer universes. So we've started to see peer universes used much more frequently to benchmark private equity and this can be used over shorter periods of time and provide good information.

Core real estate uses a universe of other core real estate managers. That's what that NCREIF, NCREIF Odyssey Index is and represents. For noncore real estate, we could either use a noncore peer universe, which also, again, has become much more robust over the last five years or so, or the NCREIF Odyssey, which is the core, representative of the core real estate market plus a premium.

And then for hedge funds, hedge fund research is a peer-based benchmark that they have by strategy. And there's an entire suit of those that allows you to get pretty specific with how you benchmark your individual hedge fund managers.

So that concludes my prepared comments. I'm happy to take questions.

CHAIRMAN TOBASH: Thank you.

So to develop and be disciplined about an asset allocation model, you see that that's successful in the plans that you compare. And you do a lot of peer analysis; is that right? Aon does a considerable amount of peer analysis. Do you?

MS. DOYLE: We do have a decent amount of peer analysis. Yes.

CHAIRMAN TOBASH: Have you taken a look at

Pennsylvania?

So the other thing I heard was that benchmarking and fiduciary responsibility -- and not all benchmarks are created equal and you've got some best practices in that regard. So our first testifier, our consultant, talked about Pennsylvania and their benchmarks, at least in one of the systems, being set low compared to their peers. Do you have any information on Pennsylvania and its benchmarking strategies?

MS. DOYLE: So I don't work personally with any of the Pennsylvania plans and I didn't do, I haven't done any benchmarking studies for Pennsylvania, so I don't know that I would be able to give you a good, educated response to that question at this point.

CHAIRMAN TOBASH: Sure. Is that data in that peer analysis, do you know, available through Aon, through your organization? Is that something that if we wanted to look at it further, we might seek help and support from you?

MS. DOYLE: Yeah, of course. And we actually recommend that our clients do a benchmark review every three years or so, just to make sure that all the benchmarks still make sense because it is such an important component. And sometimes we'll tweak them. Sometimes new benchmarks come available, sometimes strategies change, and so that is something that we do on a frequent basis.

CHAIRMAN TOBASH: Great. Okay. Thank you.

Mr. Vice-Chairman, question?

VICE-CHAIRMAN TORSELLA: Thank you.

Thank you for your testimony and for being here.

When you talk about diversification, your chart on page 8 had the rebalancing as kind of a crucial tool to achieving the benefit of diversification, which is, we've heard two different versions over lunch today, one was fees, the other was diversification. But if -- does that influence how we ought to think about levels of illiquidity? In other words, is the ability to, in fact, rebalance in the event of the earthquakes or the metaphors we've heard about today crucial to achieving that diversification benefit?

MS. DOYLE: It is. So, yeah. I don't know what else I would say other than just to agree with you that when you look at your liquidity profile, being able to rebalance in a stressful period is really important. Being able to rebalance and also to pay benefit payments and to pay benefit payments out of an asset that is performing well or isn't down 20 or 30 percent. So certainly, that's something that you'd want to take a look at.

VICE-CHAIRMAN TORSELLA: And on the peer, on the benchmark -- we could spend a whole other day, we won't, on benchmarking, but on the peer analysis, what's the right governance response if an institution is consistently, not this month, this year, but consistently low in a peer ranking analysis of performance?

MS. DOYLE: I'm sorry. If they're lagging --

VICE-CHAIRMAN TORSELLA: What would be the right governance response if you're, over a long period, low in a peer group?

MS. DOYLE: So I believe the right governance response would be, especially if it's persistent, is to study it and learn about why it's happening and understand what might be different about the asset allocation or the way the performance of the asset classes is. And then determine if you think that there's something there that needs to be changed or tweaked or enhanced or improved.

But what I would say is, so I would use it -- the way we like to use peer universes is as a source of information. But I don't think it should be a source of decision-making, if that makes sense?

VICE-CHAIRMAN TORSELLA: Great. Thanks.

CHAIRMAN TOBASH: Okay. I think that's it.

We appreciate you hanging out with us here till the end of the day and look forward to further communication as we work towards wrapping up our project.

MS. DOYLE: Thanks for having me.

CHAIRMAN TOBASH: And last, but not least, as we approach the end of the day, we have Dr. Gregory W. Brown, professor of finance at the -- Sarah Graham Kenan Distinguished Scholar, and director of the Frank Hawkins Kenan Institute of Private Enterprise.

We appreciate you joining us for lunch and then sticking around here to wrap up our testimony for the day. So thank you very much, Greg.

DR. BROWN: It's my pleasure. So I'm really just a professor of finance, and those are my administrative duties that are also other parts of my title.

But thanks for the opportunity to speak to you.

What I'm going to do in this talk is actually zoom out a little bit and think about things from a little bit more of a macro perspective and a long-term trend perspective.

I think you all have heard a tremendous amount of very granular data. It's actually been, I think, excellent information that you all have gotten from the set of folks you've heard from today and different viewpoints, I think really valuable. I've actually learned a lot from listening to the presenters today. So I think the exercise you're going through is a really worthwhile one and one that's rich with information.

And I think what I hope to do today is maybe provide a broader context for a lot of these more granular issues that you've been hearing about. And what I've spent a lot of career studying is just how financial markets have evolved over the last 50 years or so. And so I'm going to kind of walk you through what that evolution has been and why it's important to the investment decisions that are being made in institutional portfolios today. And I hope that provides useful information as you're sorting through, you know, whether it's fees or asset allocation or other issues.

So the way I think about what's happened in the post-war period is really, there's been three eras in terms of capital markets. The first one is what I call the public markets era from about 1950 to 1974.

There was this period after the financial collapse in the late 20s, during the Great Depression through World War II, where the attitudes towards investing in stocks and corporate bonds really changed and people thought things were much too speculative investments for typical types of investors. Most institutional portfolios held just high quality bonds and real estate.

And I think people started to realize in the post-war period as the track record started to improve for stocks, we started to see more academic work in terms of trying to understand what the potential benefits of, risk and return benefits were for equities and there was a resurgence in terms of public markets. And we saw, especially during the 60s and 70s, large growth in the number of stocks. We saw innovations like the NASDAQ and electronic trading. We saw the regulatory changes in terms of regulation of commissions and things that led, you know, on through the 80s and 90s to significant growth and changes of attitudes about public markets.

But I think really the, kind of the heyday of that growth, that kind of Renaissance period, happened during the 50s and 60s.

An interesting thing happened in the 70s, in the era that I characterize as essentially 1975 to 1995. I call it the financial engineering era. There were very important advances, two important advances in the 1970s. One was theoretical. There was an academic framework that -- probably many of you have heard of the Black-Scholes option pricing formula, but that's sort of the most famous outcome of a set of theoretical technologies that were developed that let you price a very wide class of financial instruments that previously people either hadn't known how to price or hadn't thought of creating yet and wanted to price. So we saw advances in derivative markets and the growth of derivative markets.

So we saw the advent of exchange traded

options, you know, things like financial futures, contracts, swaps. And you know, another logical extension of this was structured debt programs, so mortgage max securities and other more structured debt projects. And there was a huge explosion in activity in those markets during the latter half of the 70s and the 80s and the 90s.

And then that sort of plateaued, that innovation plateaued. I think people kind of invented everything that was useful and then started inventing things that maybe weren't so useful, you know, leading up to the financial crisis. And there's been a little bit of a retracement in -- and I'll show you a graph in a minute -- a retracement in terms of activity in this kind of financial engineering space.

But then what's happened the last 20 years, what I call the private markets era, since the mid 90s, is we've seen the institutionalization of investments that have been around for a long time. People had sort of done private types of investments, but they weren't things that were structured in a way that made them attractive to institutional investors. And you know, finance folks sort of figured out how they could do this type of packaging of assets and partnerships in order to encourage additional investment in this space.

So I want to walk you through a couple things that sort of show these trends pretty graphically.

This first slide shows the number of publicly listed stocks, and we heard reference to this earlier today, that the number of stocks kind of worldwide really grew very significantly. This graph starts in 1980 and shows that the number of stocks went from less than 20,000 to about 45,000 up until about 2000 or so, and then started to plateau.

If we look at just the OECD countries, the rich countries, there was growth over that same period, plateauing at about the same time period. But the growth was not as extreme, not nearly as extreme. When we look at the G7 countries, it's much flatter. And then the right graph shows what's happened in the United States, that actually the number of public listings peaked prior to the tech bubble bursting, it was during the midst of the tech bubble, at above 8,000 stocks in the U.S., and has since fallen by about 50 percent to 4,000. So the universe of investable securities has contracted quite a bit.

The wealth that's in the stock market has continued to increase because, as we also heard earlier today, the typical company has gotten much larger. So we have a smaller number of much larger companies. But the kind of characterization of the typical stock, the average stock, has changed quite a bit.

This next graph shows what has happened to the over-the-counter derivatives market, which is an enormous market. And it just grew exponentially through the 90s and aughts. And then peaked during the financial crisis and has been in something of a decline since then.

But if we compare what's happened with those markets to what's happened with the private fund industry, this next graph shows the number of active private funds for three categories, equity, real estate, and credit.

And you go back to the 80s, and there was really just a few hundred active funds that are in the databases that we have access to. And we think of these databases as sort of tracking institutional quality funds in some sense. And that number of equity funds grew very dramatically, and especially during the aughts and over the last decade has grown substantially. We've also seen an increase in real estate, another real asset fund -- that's the green area there (indicating) -- so that they've grown to be kind of more than a thousand funds in that space. And most recently, we've seen a big increase in private credit, private debt funds.

The next slide shows the values of those funds. And it's grown even more rapidly in recent years because not only has the number of funds increased, but the average size of those funds increased. So if we look at the actual value of assets, it's really exploded over the last

15 years or so.

If we think about some other things that people typically put into alternative investments space, hedge funds are certainly in there. There's been a very rapid increase in the number of hedge funds, as well, from around just a few hundred in the 90s to, you know, thousands of them today. Likewise, the value of assets held by hedge funds has grown from just a few hundred billion dollars to more than three trillion.

There's some -- this is data that comes from HFR, which Kristen mentioned is a very popular source of data there. But if you -- the Office for Financial Risk, it's part of the U.S. Treasury, has access to proprietary, regulatory filing data for hedge funds. They think the number may be as much as five or six trillion dollars. It's not always clear exactly what a hedge fund is.

And at the next slide, if we look at what's happened to real estate -- you know, obviously, the amount of dirt that's out there hasn't change, but certainly the structures that have been built on it have increased substantially and the value of that dirt has increased. So the size of a commercial real estate market has also grown by about almost fourfold over the last 30 years.

So all these things sort of suggest that there's been very significant changes in the types of financial intermediation and the way capital formation has been happening in the U.S. And the way that I've been thinking about it is, in some ways, there's an arc to the types of securities that have been available to the public market investors. And during -- and I think this is a pattern we're starting to see play out in other countries, as well.

So the U.S. has sort of gone through this arc. Other developed countries are a little bit behind us, emerging markets are on the front end of it.

But what happens is, as capital markets start to develop, there's a burst in activity in public markets. That's a good way to go out and raise money, but it's not always the most efficient way to manage risky assets for reasons having to do with governance, with fees, with how capital is allocated, research and development. And there's just certain types of companies that maybe they could be public companies, but they're even better served as being private companies. So for example, they either never go public in the first place -- and I'll show you some data on that in a minute -- or they get acquired by another company that can manage the assets and activities of that company more efficiently.

So what we track, and sort of -- if you think about the average risk of a public company, you know, it starts out low as an economy is developing. It starts to increase as public markets get more important, and then as private markets start to develop. Some of the riskier companies either don't ever go public or end up being acquired.

So the next graph I have here actually shows this using data. So it's time on the X axis and risk on the Y axis. And it's kind of a complicated graph, but I think it will make sense in a second here.

What we've done is plot the risk of an average company by when it went public. So the black line, it's typically along the bottom there (indicating), shows companies that were public before 1967. And you can see that those are relatively low risk companies and have stayed low-risk companies. And if anything, they sort of drift down a little bit over time. And that's typical. Companies risk tends to drift down over time.

If you look at the gray line there (indicating), that's companies that went public from 1968 to 1977. They tended to be a little bit risker. If you look at the yellow line, they're companies that went public 1978 to 1987, they're riskier still.

So each decade goes by, there's riskier and riskier companies that are going public. And in fact, it's even the case today, that the companies that went public in

2008 to 2017 are really the riskiest that we've ever seen. But the caveat here is that we just don't have nearly as many companies going public and that the long-term trend for all the existing public companies is down.

So there's actually been a decline in overall risk, overall riskiness of a public company in the last 20 years, which is very interesting from an investor perspective. Because if we believe -- like let's forget about, you know, whether there's excess returns or alpha in markets, if we just believe there's a risk return in trade-off in financial markets, then the risk of public markets has gone down, which means we would expect that the return associated with public markets would also be declined, just from a pure equilibrium perspective, nothing to do with picking the right stocks or anything, just what's available to investors.

So why has this been happening? This next graph is copied from an academic paper that circulated recently that shows that really the biggest effect has come from the decline in IPOs. There's really been a dearth of IPOs and the probability of a company that gets venture funding ultimately doing an IPO has declined to, you know, almost zero for practical purposes, where it used to be above 20 percent.

Another interesting shift on the next slide is that if you think about the industry composition of public companies, it's also gone through a big shift. We all know that the U.S. economy has shifted from being very much a goods-oriented economy, you know, in the early post-war period, to being more service based. We see that reflected also in the types of companies that are publicly listed.

So this graph, the bottom three colors there (indicating), the blue, green, and purple, are basically goods industries. They're basic goods, consumer goods, and business goods which you can think of as machine tools and computers and things like that. So they used to be 80 percent of market cap in the U.S. and now they're down to about 50 percent. And of course, what makes up that decrease? The gap is filled by service companies, and those in three broad categories are finance, health care, and other services. So at the same time that the profile of risk and which companies are public has been changing, the composition, industry composition of companies has been changing, as well.

So what does this mean for investors? I think it raises some important questions about how you want to think about asset allocation.

We live in a dynamic world, not a static world. So we need to be careful when we look back to, you know, 20 or 30 or 40 years of data, that we're not drawing inferences about the way things used to be versus the way that they're going to be in the future. That makes the problem harder because we can't rely on historical statistics as much. But I think we can still try to understand things that will inform the investment process. So I just want to walk through a few of those.

So I guess the first, most obvious one is, where are we in the evolution of alternatives? We've seen this huge growth over the last 20 years. Is this a bubble? Is it going to keep going? Have we leveled off?

You know, I don't think anybody knows for sure. My personal opinion on this is that, that things are probably going to level off at about where they are. I think we're reaching near the saturation point on things like private equity and venture capital.

I have a joke that I tell my kids every time I see the bike share things. I'm like, "It's a sign of the venture capital apocalypse." Right? We don't need like 14 bike share companies. I don't know how many you have around here, but it feels to me like, you know, there's things that we've gotten to a saturation point in some markets. And it's always a cyclical business.

But I think there's plenty of opportunity for the amount of assets that we currently have under management to persistent. But whether we are going to see another doubling or tripling of private equity and venture-type investments in the U.S., I would personally doubt it.

There is a lot of growth internationally. Europe and developed Asia is a bit behind us in those markets, and emerging markets are very far behind us. So I think to the extent there's going to be new opportunities in private investment land, those will be disproportionally international.

What does it mean for the value of investments and for risk and return in particular?

I think there are good reasons to invest in private markets. Just because, say, diversification -- and I already said, like, let's take alpha off the table and just think, well, if, you know, now we have companies that are risky, high-growth companies. It can only be accessed through private investment vehicles and you want your portfolio to be exposed to those. Then you have to be invested in private vehicles to some extent. That doesn't mean that you need to be 80 percent in alternatives, the way that some endowments are. But I think, you know, when you believe, like, you know, maybe 10 or 20 percent of what would have been in terms of market value, what would have been public is now private, that that's a meaningful allocation that you're going to want to have towards mid and small companies.

I think I'll talk a little bit more -- this next slide -- on what does this mean for investors? One issue when we talk about asset allocation and portfolio construction is that the problem is much harder when we want to incorporate private investments and alternative investments broadly in the portfolio. And the reason it's harder is because you don't even really observe the full universe of investments. Like, we're not even exactly sure what qualifies as institutional quality investment and how to measure that universe. So you can't do the things that we typically, you know, teach our students, our MBA students, about portfolio optimization and portfolio construction. You know, like Kristen was saying, it's difficult to even meet some of the basic criteria for benchmarks in terms of investability, because you can't go buy the same office building somebody else owns. So if you're trying to benchmark yourself, it can be difficult to know what's really, truly investable and what is, you know, sort of ethereal or a remnant of past investment decisions.

So the first one is just trying to define what you mean by the investment universe. Once you do that, you really have to think about, what are the characteristics of that that you think are most important for investment?

We know that -- a previous testifier had talked about the risk factors, like the Fama French risk factors. We know that things like size and the value growth characteristics, these are things that are important. Profitability, volatility of assets are things that are important for characterizing portfolios broadly. So to think about how you're going to get exposure to those types of factors with private investments, it's a bit more complicated decision, because you can't just do a regression model on stock market data the way you can with public equities or bonds.

And the last one I think is that, an interesting thing about a lot of private investment vehicles is you're delegating much of the investment decision to other people. So when you commit to a private equity fund, you're really telling somebody else, "Okay, you make these investment decisions for me sometime over the next five years," right? So you don't know whether they're going to draw half your money next year or in three years or four years. And they have -- there's an agency issue here, as well, like their incentives are somewhat different than the incentives of the investor.

So how do you try to manage that additional layer of complexity and is it worth it, right? I think these are important questions that we're just really starting to struggle with from an academic understanding with these newer markets.

So I'm going to, I think I'm just going to conclude with going through some recent research that we've done on endowments to try to make these a little bit more concrete issues.

Endowments are interesting, at least to study. They were early to adopt alternative investments. They tend to be heavily invested. We heard about the Yale model today and endowment-style investing generally. There are investments like UNC management. The UNC endowment is about 80 percent invested in alternatives. So there's large, well-run programs that are very heavily invested. The typical large endowment has more than half of its assets in alternatives, and even small endowments through outsourced CIO models are getting into alternatives.

So there are great things to study because they are a good lab. They have lots of exposure to alternatives. They also have really good data. So the trade association, the CUBO for University of Business Officers, has done a great job collecting annual data, fairly comprehensive data, on endowment portfolios. And so we know what their asset allocations are and returns are and lots of things about who runs them and what their staff looks like. So we've been able to go back and look at what their performance has been historically.

And it's a great place to understand what are the risks and what are the returns associated with alternative investments. And what we found is that there tends to be a fairly robust and large benefit associated with investing in alternatives, at least for endowments. The endowments that are heavily invested in alternatives earn about one to two percent per year more on average than the endowments that are less invested in alternatives. And this is controlling for lots of other things that would matter. So it seems to be some real tangible benefit there. And interestingly, they also have lower risk. So they've been able to figure out more diversified portfolios and earn a higher return by incorporating alternatives into the investment process.

And, you know, risk is harder to measure with private investments because you don't get, you know, clean market price on things. But even using what we think are high-tech, high-quality adjustments for, you know, reporting lags, we're still able to show that, it looks like there's a higher return, punitive risk, higher sharp ratio for endowments.

So there's -- I could go on for hours on this, but I doubt anybody here wants that to happen. So I'll just wrap it up there, and if y'all have any questions, I'm happy to answer them.

CHAIRMAN TOBASH: Thank you. Some of your testimony is consistent with Dr. Jenkinson who's spent the day with us. We really appreciate that. And I may be back in touch with him because he's heard all the testimony today and that's really great.

Have you collaborated with Dr. Jenkinson?

DR. BROWN: Yeah. We've worked on a few projects together.

CHAIRMAN TOBASH: Yeah. That's terrific.

One of the things we talked about was transparency in questioning him after the testimony. You know, the idea that there's a growing sector of our economy and investments and that businesses will continue to need capital and thinking that with that need-for-capital growing sector, that cost will be driven down in the private equity space. Do you know anything to comment on that? What do you see in the horizon?

DR. BROWN: Yeah, I think they will come down. It sounded like Tim was fairly optimistic that they were going to come down in the next five to ten years. I think it might be a longer period than that, especially how hot those markets are right now. There was a lot of movement right after the financial crisis. And it looked like we were starting to see some cracks on both the transparency side and the funding side. But as the fundraising environment has improved so much the last few years, I've heard, what I characterize as backpedaling on, you know, the lower fees and opportunities. I mean, they're always reluctant to lower fees, but they were providing more generous opportunities for coinvestment and things that effectively produced fees.

I've heard -- maybe some of the investment staff here knows firsthand -- that there's been an increasing reluctance for some companies to take money from public pension funds that are insisting on lower fees. I think that's indicative of the current fundraising environment, not what's going to happen long run. So I think fees will come down. As it gets to be a more competitive space, we're still seeing a lot of new firm creation and some of the more talented people come out of the larger firms and set up their own firms. So I think it's inevitable that there's going to be more competition and that's going to compress fees.

And Ludo is absolutely right that the theory says, you know, "why would you give away your profits?" If you're generating all these excess profits, you know, finance theory says you should try to keep those. And that's what they're doing. And that's kind of what's happening. They give people enough to induce them to come into the space and then keep as much as they can. As the markets get more competitive, I think those pressures will come down on fees.

And on the transparency side, I think ILPA has been effective in helping provide more transparency on fees, but I think they're just a fraction of the way there.

CHAIRMAN TOBASH: From the perspective of an endowment, maybe having a little bit more flexibility investing heavily in alternatives -- and I don't want to oversimplify this -- but if you're the, you know, holder of an IRA or 401(k) and you had a time horizon that you're approaching, you have to be more conservative with your investments. Is that in the institutional space where you've got pension funds and you've got endowments that seem to be a little bit more flexible? Is some of the reason maybe flexibility with endowments and time horizons?

DR. BROWN: Absolutely. And I don't think that public pension funds or, you know, other types -- to the extent we're able to structure things here so that defined contribution plans have access, the allocations will need to be smaller. I don't think anybody can go out as far as endowments and foundations and, you know, some family offices that have very long horizons may be able to do. It's just not prudent to take on that much illiquidity risk. Yeah.

CHAIRMAN TOBASH: Great. Thank you again for your testimony.

Mr. Vice-Chair.

VICE-CHAIRMAN TORSELLA: Thank you.

I do think the endowment model is interesting, but also important to remember what the guru of the endowment model says -- the institutions that have different constraints than he does. I think the David Swensen quote was interesting. One of our funds paid out nearly six percent in its beginning net asset value and benefits last year, which endowments have to spend, but it's a different kind of spend than the requirement we have to our pensioners.

DR. BROWN: Absolutely.

VICE-CHAIRMAN TORSELLA: But I wondered, do you have a sense, when you talk about sort of -- what percentage of private equity do public pension funds fund, in a ballpark?

DR. BROWN: The percentage of the market is now made up?

VICE-CHAIRMAN TORSELLA: Yeah.

DR. BROWN: That is a great question. I don't know the answer to that. I'm guessing it's, you know, it's probably around a third to half now.

VICE-CHAIRMAN TORSELLA: Right.

DR. BROWN: But it's certainly increased in the last five or six years, yeah.

VICE-CHAIRMAN TORSELLA: It strikes me that, I mean, taking Dr. Jenkinson's point -- who is still here, hats off for that -- that individually, we might not amount to much -- although sitting around the pension boards, I noticed the CEOs are usually the ones who show up looking for the contribution -- collectively, we are an extraordinary percent of the market.

And you wrote an interesting paper, which I read, on the quality of data out there, in which you talk about the need for more transparency and standardization. I take it, from what you just said to the Chairman, you support the ILPA effort as a step in the right direction.

DR. BROWN: Yeah. I think ILPA has a cat herding problem, in that they have lots of different people with lots of different objectives. I think that they probably have as much ability and incentive to effect change as anyone. So I'd definitely support their efforts. Yeah.

VICE-CHAIRMAN TORSELLA: Great. Thank you.

CHAIRMAN TOBASH: Great.

Commissioner Gallagher?

COMMISSIONER GALLAGHER: Thank you, Mr. Chair.

And again, thank you for being here, especially in light of Hurricane Florence hitting your state so hard and I imagine Chapel Hill got hit pretty hard? I understand there's some flooding.

DR. BROWN: We got a lot of rain, but fortunately missed the wind, so...

COMMISSIONER GALLAGHER: Okay. All right. Well, thank you for being here despite those headwinds. Is it too soon? Probably, I'm sorry.

Question about, you know -- we've heard a lot about alternatives today. And when I was in high school, I thought Nirvana was the only alternative thing out there. But is there an alternative to alternatives? I mean, I've heard conceptually that there's an ability to reflect the value that alternatives provide you, perhaps, in an all ETF platform. Is that a realistic return perspectively? Is that a real tool that investors, institutional investors, should consider something -- or are there other concepts for alternatives to alternatives?

DR. BROWN: Yeah. So this kind of goes back to the discussion about factor risks, that you can try to isolate what are the unique factor characteristics of alternative investments, and then find public assets that have those same characteristics and create, you know, these smart beta-type portfolios around them.

I think those have been a little disappointing, to be honest. It seems like there may be some sort of additional premium that comes along with the assets that are in private markets, either because the managers are adding value or they're able to pick off those things that are going to perform better, you know, some sort of other special aspect. So it doesn't seem like you get that same premium that Tim showed when you look at the synthetic products. That's at least in the private equity venture land.

For hedge funds, you're probably going to do better, historically, over recent history. Because hedge funds have been very disappointing as an asset class. If you do careful risk adjustment of hedge funds in the post-crisis period, the performance has been, you know, negative alpha. It's been below what you would have gotten if you had taken the same in public markets. Yeah.

CHAIRMAN TOBASH: Commissioner Bloom?

COMMISSIONER BLOOM: This is a bit of an off-the-wall question, which I wanted to ask all day.

Since the Great Recession, many minority and other diverse asset managers have left the business, gone to work for other people. Can you speak at all to the diversity component in the public market compared to the private market today?

DR. BROWN: Well, I think we can safely say that the diversity challenges in public and private markets are immense, right? Those are both women and underrepresented ethnic minorities. It's a very difficult challenge for the industry.

In terms of specific numbers in public versus private markets, in terms of portfolios managers or senior people, I don't know those numbers. I'm not aware of any recent research. I know there's been a study out of Harvard, it's a few years old now, there's some folks at Caltech and Stanford that have done work in the venture space. But I think the conclusions of all of those is that the numbers are bad.

COMMISSIONER BLOOM: Thank you.

CHAIRMAN TOBASH: Okay. Ladies and gentlemen, I thank everyone for sticking with us for the day, I thank the commissioners for their work.

And I thank you for your testimony. And again, I'm certain that we'll be back in touch with you. We appreciate your expertise.

We've collected a tremendous amount of information here today. I thought that maybe after our third hearing that we would convene again, but, you know, after giving it some thought, I may be reaching out to the commissioners to have another meeting. We'll see what is convenient. And if we can't get to Harrisburg, maybe we can do it via some other method with people that may not be able to get here, but maybe as early as next week. I think it's time to discuss some of the information that we've compiled so far as we go into the last hearing, because things are going to happen relatively quickly. So we'll be in touch.

I thank everyone again. And I thank the Joint State Government Commission for continuing to keep us on track.

And with that, we will conclude today's hearing.

Thank you.

(The hearing concluded at 4:51 p.m.)

C E R T I F I C A T I O N

I hereby certify that the proceedings are contained fully and accurately in the notes taken by me on the within proceedings, and that this copy is a correct transcript of the same.

Summer A Miller

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Summer A. Miller, Court Reporter
Notary Public