NEW YORK CITY TEACHERS' RETIREMENT SYSTEM
INVESTMENT MEETING

Held on Thursday, January 5, 2023
Via Videoconference
10:12 a.m.

ATTENDEES:
DEBRA PENNY, Chairperson, Trustee
DAVID KAZANSKY, Trustee
THOMAS BROWN, Trustee
BRYAN BERGE, Trustee, Mayor's Office
ALISON HIRSH, Trustee, Comptroller's Office
RUSSELL BUCKLEY, Trustee
PATRICIA REILLY, Teachers' Retirement System
SUSAN STANG, Teachers' Retirement System
DEVON ALEXANDER, Rocaton
MICHAEL FULVIO, Rocaton
VALERIE BUDZIK, Teachers' Retirement System

REPORTED BY:
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ATTENDEES (Continued):
LIZ SANCHEZ, Teachers' Retirement System
THAD McTIGUE, Teachers' Retirement System
DAVID LEVINE, Groom Law Group
JOHN DORSA, Comptroller's Office
KOMIL ATAEV, Teachers' Retirement System
RON SWINGLE, Teachers' Retirement System
KATE VISCONTI, Bureau of Asset Management
KIM BOSTON, Bureau of Asset Management
JENNIFER GAO, Bureau of Asset Management
JOHN GLUSZAK, Bureau of Asset Management
MINJOO NA, Bureau of Asset Management
DAN HAAS, Bureau of Asset Management
VICTORIA LEE, Bureau of Asset Management
JANET LONDONO-VALLE, Bureau of Asset Management
ED BERMAN, Bureau of Asset Management
SANYA COWAN, Bureau of Asset Management
WILFREDO SUAREZ, Bureau of Asset Management
ENEASZ KADZIELA, Bureau of Asset Management
MAREK TSYZKIEWICZ, Office of the Actuary
KEVIN LIU, Mayor's Office
SANDY XU, Bureau of Asset Management
JACKIE YE, Bureau of Asset Management

JOHN ADLER, Mayor's Office

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ATTENDEES:
AMANDA JANUSZ, Rocaton
DEV SUBHASH, StepStone
MARC RIVITZ, StepStone
JUSTIN THIBAULT, StepStone
ISAAC GLOVINSKY, TRS
ARISTA AFTOOMIS, TRS
SEAN BARBER, Hamilton Lane

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Proceedings

MS. REILLY: Good morning. Welcome to the Board meeting of the Teachers' Retirement Board for January 5, 2023. I will start by calling the roll. Bryan Berge.

MR. BERGE: Bryan Berge for Mayor Eric Adams present.

MS. REILLY: Thomas Brown?

MR. BROWN: Here. Good morning, Patricia.

MS. REILLY: Good morning. Russell Buckley?

MR. BUCKLEY: Here on behalf of Panel For Educational Policy Chair, Dr. Angela Green.

MS. REILLY: Alison Hirsh?

MS. HIRSH: Alison Hirsh here representing Comptroller Brad Lander. I will have to step out at noon at which point John Dorsa, my alternate, will take over for me.

MS. REILLY: Thank you. David Kazansky?

MR. KAZANSKY: Present.

MS. REILLY: Debra Penny.

MS. PENNY: Good morning. I am here.

MS. REILLY: Good morning. So we have a

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quorum, and I will turn it over to the chair.

MS. PENNY: Okay, thank you. Happy New Year everyone. Wishing a happy and a healthy one for sure. I apologize for the last-minute notice of this meeting being virtual, but as I was hearing of more and more people getting ill, I just thought it was safer for everyone to remain where they were and we will meet again next month at this time but thank you. So we are ready -- we are going to start with -- we are in public agenda with the Passport Funds, so we will start with Michael Fulvio.

MR. FULVIO: Thanks, Madam Chairperson. Good morning, everyone. Happy New Year and wishing a happy and healthy 2023. I am going to share my screen and then turn it over to my colleague Amanda Janusz to review November's performance.

MS. JANUSZ: Thanks, Mike. So good news is that the month of November was another positive month after following a pretty positive result for the month of October as well. For the month of November there were really two things that drove that result. One

being weaker-than-expected inflation CPI numbers. And the second being some signaling from the Fed of slowing the pace of rate hikes, both of which were met with positive reaction from the market, and so really those two announcements correlate to the two strongest trading days of the month of November and resulted here in positive results for the month. In particular, the strongest results came from your non-US equity investments which were up double digits for the month of November. But really across the board positive results.

The one fund that outperformed its benchmark for the month was the Balanced Fund. And really even looking out over the trailing three months, after having both a positive October and November, we are looking at positive absolute returns for the trailing three-month period as of the end of November. So overall, encouraging numbers.

Your Diversified Equity Fund, you can see at the top of the page there, up about 6 and a half percent for the month. In

particular, the international component of that fund being the key driver of results there. And down the bottom of the page, best performer being the International Equity Index, which was up over 13 percent for the month. Any particular questions in terms of November results?

MS. PENNY: Any questions for Amanda? Okay. I guess we are good. Happy to see all those positive results there for the month so thank you. Great, so I guess we are on to the December 2022.

MR. ALEXANDER: Yes, we are. I would like to continue the theme -- I would like to continue the theme of positive results. However, December kind of ended --

MS. PENNY: Devon, Devon, Devon. Come on.

MR. ALEXANDER: December's performance was actually consistent with the entire year's performance, which was quite negative coupled with Central Banks' battle against inflation. We had COVID restrictions in China and also the war on Ukraine that sort of led to

not-so-good performance for the end of the year. However, on the bright side, we can say we did have positive results as of fiscal year to date, December, but for the month of December, we saw the global market composite benchmark was down 18 and a half percent for the year and 4.6 percent for the month.

On the Balanced Fund Benchmark, we saw that it was down by 9.06 percent for the year and down by just over 1 percent for the month as well. The weakest performer across there was the Sustainable Equity Fund Benchmark, which was down about 30 percent for both strategies for the year and down by roughly 6 percent and 7.6 percent for the month. And perhaps the strongest performer, no surprise there, was the actual Balanced Benchmark -- actually the strongest performer there for the year was actually International Composite Benchmark, which was down 16.67 percent for the year and down .26 percent for the month but up 3.7 percent fiscal year to date. But yes, as I was saying before, the performance for the month was consistent with the year's

performance which is down across the board. Any questions there?

MS. PENNY: Thank you, Devon. Any

questions for Devon? No? Okay. Is there -- Liz is inviting us -- why is that? Executive session up --
MS. SANCHEZ: I took care of it.
MS. PENNY: Does anyone have anything else for the Passport Funds' public agenda? Okay. Then we are off to the public agenda for the pension fund. We start with the third-quarter risk presentation. And we have --
MR. BERMAN: Hi. Good morning.
MS. PENNY: -- Ed Berman from the Bureau of Asset Management.
MR. BERMAN: Good morning. We are still talking about September month-end, quarter-end. So a little belated. A lot of things happened in the market but let's just jump straight into it. Can we have the presentation on the screen, please?
MS. VISCONTI: Just one second.
MR. BERMAN: Can we have the next page,

please? Thank you. So this quarter will follow the same structure of the previous presentation. There will be three parts all together. Page 1 will give you a top-level view of the portfolio risks and the relationship between the portfolio and strategic benchmark. Page 2 will provide a granular breakdown of risks to give you a sense of risk concentrations at individual asset class level and page 3 will focus on the forward-looking projections and that's where we will show you some of the new analyses that we developed at BAM as we extend our risk framework. So let's start with the plan level overview, and you can see on the page that the total risk at the end of the quarter stood at 12 percent. It's an increase of about .5 percent from the previous quarter. It's the number in the low right corner of the table. Highlighted in bold font. Just to remind you that this number represents the expected return of the portfolio over the next 12 months meaning they project the gains or losses of your portfolio should be within 12

percent, and it also means that it's about 15 percent probability that the gains will be larger than 12 percent and also 15 percent probability that the losses may exceed minus 12 percent. But what does this number mean?

What is the intuition behind this number? Is it something we should worry about? Is it a good outcome? Is it consistent with the investment process?

Broadly speaking, the level of risk is determined by two main factors, by markets and by the portfolio construction process. So the main risk decision in the portfolio construction process is to establish the stock/bond split. Historically equities deliver the best returns but also comes at the cost of high level of risk. We captured this first step of the process by the market portfolio in the table, column 1 on the left. It's a simple 60/40 blend of the MSCI All Countries and Barclays US Ag, which is a broad measure of the NASDAQ fixed income market.

The next step of the process is to determine asset allocation within each

category where we establish the ranges for US equities, core fixed income, and other asset classes. These decisions are reflected in the strategic benchmark where the market portfolio is further split into 11 components as reflected in the bottom of the page. The exposures for the policy benchmarks are captured in column 2 in the middle of the table.

And the final step of the portfolio construction process is to fill out the manager selection process and ongoing portfolio balancing, any cash flows, so these processes are captured in column 3, which is your actual portfolio. So by applying this framework, we can get a better sense of the overall risk levels and what drove the changes.

So let's start with the market portfolio. That is the 60/40 blend. This portfolio will be the baseline for our analysis. There are three main dimensions of risk that we take in this portfolio: Equities, interest rate, and credit. These

three dimensions are shown at the top of the table on the portfolio construction, so equity exposure is captured by equity allocation. It's the first row of the table. It's obviously 60 percent by construction. The next dimension of risk is interest rate or time value of money. The best way to measure exposure to interest rates is through duration of the portfolio.

What does this number mean? Simply put, it's a scaling factor that translates interest rate moves into the portfolio's market value. The magnitude of the interest rate exposure is shown in the next line which is the rate duration equals to 2.5 years. It simply means 1 percent drop in the interest rate translates to a 2.5 percent gain for the portfolio. You will notice that the duration for the portfolio came down during this quarter. This is a direct result of an increase in the interest rate as driven by Federal Reserve policy. The final dimension of risk is credit spread which is a measure of the default risk. Only the bonds issued by private borrowers

have exposure to credit risk, so for this reason only about 40 percent of the Barclays Ag has exposure to credit risk since 60 percent of index are treasuries and agency securities. Much like the above, the exposure to credit spread is measured by spread duration which is just multiplied to translate spread changes into market portfolio value. So the credit spread duration of 1.5 means a 1 percent decline in credit spreads translates to a 1.5 percent gain for the portfolio.

So how did this portfolio construction translate into risk measures? You can see on the bottom of the table on portfolio risks, we represent two measures of risk here. Let's start with the total risk which stands at 11.6 percent at the end of Q3. So it's basically just an expected 12-month return for the portfolio with the usual disclaimer 15 percent probability more, 15 percent probability less. You can notice that the total risk for the market portfolio increased this quarter by .5 percent. This is a direct result of volatility in the market as we go through this

historical extraordinary period.

At the end of September, the VIX Index, a measure of equity volatility closed at a level over 30 points versus the pre-COVID average of 18. The actual fixed income market at the end of the September, the MOVE Index, which is a measure of fixed income vol, closed about 160, close to the highest historical level outside of the Global Financial Crisis as compared to the pre-COVID average of around 60.

So the total risk will give you a measure of the portfolio's future expected performance over the next year. The other risk measure we show here is more short-term measure, and that's the beta to S & P 500. It's a measure of how the portfolio will move on average when the overall stock market increases or decreases. So the beta of the market portfolio shown at the bottom of the table stands at .57. It's almost unchanged from the previous quarter. It's interesting to note that the beta is actually smaller than the asset allocation of .6. The reason for

that is the allocation to fixed income and international equity. The decline of beta versus asset allocation is a result of diversification in the portfolio.

So now let's move from the market portfolio, which is a baseline analysis to the policy benchmark which captures the asset allocation decisions. You can see in column 2 of the table. You will notice that the strategic is slightly higher asset allocation but comparable rates of credit exposure. A drop in the rates duration versus the market portfolio comes mostly from allocation to high yield which tends to be oversure of maturity. A small decline in spread duration comes from allocation to TIPS as they have no credit risk being government bonds.

So how did the risk levels of policy benchmark compare to the market portfolio? It held quite well. As you can see at the bottom of column 2, the total risk level remains almost unchanged despite a higher allocation to equity. This is a good outcome. We expect varied returns from asset allocation, not an

increase in risk, so I take it as a positive.

So finally, let us consider the portfolio itself which is shown in the column 3. You can see that the portfolio is closely aligned with its benchmark but let's go over the small differences. There is a small change in asset allocation for this quarter which I don't really see as material. We will see more details on the next page. You will also realize there is a small duration overweight versus strategic benchmark. While the portfolio is managed flat to benchmark on the rates exposure, the small overweight comes from the ETI allocation which means the exposure to mortgages, therefore increase in duration.

So how does this translate into risk measures? You can see them at the bottom of the table on the right. Again, the risk measures are broadly in line with the policy benchmark, but we should go over some differences. Let's start with the total risk which is only about 6 percent higher than the benchmark. A trend similar to the previous

quarter. This increase in risk is driven primarily by allocation to private markets, mostly to private asset allocation, which is mapped against the Russell 3000. So it's not surprising that the beta to S & P is also slightly higher than the strategic benchmark, and related to this is the third measure we haven't talked about so far, active risk. Similar to total risk measure, active risk is a forward-looking assessment of the expected excess returns of the benchmark.

So the active risk of 2.1 percent means that we expect the excess returns of the portfolio over the next 12 months to be within a 2.1 percent range with the usual disclaimer, 15 percent probability more and 15 percent probability of bigger losses. Almost all of active risk is driven by the allocation to private equity. Out of the total 2.1 percent of active risk, about 1.5 percent comes straight from the US buyout strategies. Active risk increased this quarter by about 23 percent, mostly driven by market factors but about three-quarters of it was due to the

impact of markets on the private equity strategies.

And finally, I want to draw your attention to the chart on the right-hand side of the page. Here you can see the evolution of risk over the past 12 months for the portfolio. Chart 1 shows the time as of total risk, and you can see that the relationships we have been discussing today have been stable over time. You can also notice how the overall risk level declined slightly by the end of the year and the previous year 2021 and then started to trend higher from January of

21. This is driven entirely by the market volatility, and the similar trend is noticeable for the active risk chart at the bottom of the page. It trends slightly higher from the low of 1.5 percent in December. Again, it's the impact of market fall. I will pause here if there are any questions for the total portfolio level. Otherwise we will move to the next page.
MR. BUCKLEY: Chair, if I may?
MS. PENNY: Go ahead, Russell.

MR. BUCKLEY: Hi, Ed. This is Russell. I want to ask a couple of clarifying questions just to make sure I am understanding all the information correctly. When you say there is a 15 percent chance above and below relative to the 2.1 percent active risk, I think it was also for the total risk as well, you are talking about one standard deviation away from the mean essentially?
MR. BERMAN: Correct. That's exactly what it is.
MR. BUCKLEY: So excluding the second and third standard deviation outside of what we would expect or rather measuring the median saying it's going to fall within that 68 percent, give or take of a normal standard deviation graph?
MR. BERMAN: Well, this is -- we use the measure of volatility to assess risk and the volatility is one standard deviation move. Assuming normal distribution obviously, two standard deviations is just a multiplier from the risk level. It gets more complicated from there. There are more dimensions to risk

management, and I will be more than happy to discuss them. It may be a little too dense for this meeting. It will take more than a half hour but more than happy to discuss.
MR. BUCKLEY: Understood. I am trying to see if I could capture the high-level points, make sure I am understanding the content correctly.
MR. BERMAN: This is just a one standard deviation move. This is what you would expect in like normal day-to-day markets. One standard deviation move happens several times a month. Most of the losses actually happened in the winds of the distribution. So normally we are more concerned with the tail risk.

MR. BUCKLEY: Got it. Do we ever talk about tail risk?
MR. BERMAN: I will be more than interested to have a broad conversation about what the Teachers would like to see in this presentation and actually am very much open to your suggestions and would welcome a chance to have a discussion, but I think that's definitely something I would like to pursue.

MR. BUCKLEY: Before you move on, when I look at these two line graphs, I appreciate the detailed look at the last year or so. I would be curious maybe during the next presentation to see them over a longer period of time maybe, you know, 60 months or maybe 120 months. I think I am just trying to understand the historical context of these numbers. That might help me better understand. I don't know if other trustees feel the same.
MR. BERMAN: Sure. We can definitely show this information. One would caution the portfolio trended significantly over this period of time.
MR. BUCKLEY: Yes. Please use your discretion in determining what an appropriate time period would be. I think I need more than a year to fully grasp the context, to put the year in context without 2022, which was an extraordinary year in some respects.
MR. BERMAN: Yes. We can definitely provide more information, but I would also love to have a chance to have a broader

discussion of the information you would like to see in this presentation. There is a lot of different risk measures, and assessing the risk exposure to such a complex portfolio is obviously a monumental task.
MR. BUCKLEY: Agreed. Thank you.
MR. BERMAN: So move to the next page?
MS. PENNY: I think so. Great. Thank you.
MR. BERMAN: So here we take a look at what's happening inside the portfolio. So we will review the exposure in more detail at the asset class level and also try to see how the allocations contribute to the performance. First of all, let's focus on column 1 where we show the asset class allocation and the tilts against the strategic benchmark. We show here

the allocations without parking place adjustment, so it's the actual allocations shown against the strategic benchmark.

You can see that the public allocations are closely aligned with the benchmark but there are slight differences in the private markets. Notably private equity allocation

exhibits a slight overweight, about 1.8 percent, whereas the other private allocations are slightly below target. Hope there are no surprises here.

Next focus on column 2 where we show the total risk level at each asset class level and the contribution to the portfolio in total. The same information is actually shown in the chart at the bottom of the page which may be a little bit easier to follow, and here we show allocations in blue and risk contributions in orange.

Several observations to be made about this chart. First of all, you may notice that equity makes a disproportionately high contribution to the total risk level. The allocations that punch well above their weight are US equity and private equity, both of them heavily domestic. You will also notice that fixed income provides a useful balance to the portfolio to compensate for the high risk level of equities. Core fixed income and TIPS have almost negligible contribution risk despite having material market value exposure.

This type of risk contribution is typical for a multi-asset portfolio and is completely in line with the investment process.

I also want to draw your attention to column 3 which is active risk at the asset class level. Here we assess the active risk for each asset class against its own benchmark. Several observations stand out. First of all, active risk of public markets is well-contained, about 1 percent for equities and very small for fixed income. The slightly higher levels of active risk for developed ex-US which is consistent with allocation to active managers, and I was told not to mention specific managers in public session but some of your managers are running active risk up to 8 percent. Active risk for US public equities is much smaller, which affects a large use of passive managers. There was no material change this quarter for active risk for public managers. If anything, active risk came down slightly but it's not that material; it's about a 10-basis-point decline. Active risk for fixed income public active managers

remains almost unchanged from the previous quarter.

Finally, we see a large level of active risk on alternatives, which is not surprising given the idiosyncratic nature for this asset class. Specifically for private equity against the Russell 3000, active risk stands a 18.3 percent which is an interest of 15 percent from the previous quarter. This high level of active risk is intuitively correct as we saw significant decoupling in performance between the private and public markets. Most of active risk for private equity comes from allocation to US buyout strategies, both large and small. At the system level, the active risk of 2.1 percent -- you can see this number at the top of the table -- is driven almost entirely by private allocation. Specifically the private equities strategies contribute 3 quarters of the total risk level primarily driven by US buyout managers.

So what does it all mean for performance? Remember that we define risk in terms of the ability of the portfolio to

generate returns, be it positive or negative. So let's turn to column 3 where we show the 12-month returns for each asset class.

The first observation is that every single note on the public markets is colored red. This reflects the historically difficult markets that we have been experiencing. Both equity and fixed income markets sold off, which delivered the worst performance for the 60/40 portfolio going back almost 100 years and the losses for some asset classes exceed our risk forecast, especially where we rely on active managers. I would like to point out developed ex-US where the loss of minus 31 percent significantly exceeded the risk forecast of 20 percent. The same is true about the excess return of minus 4.56 percent being far more than the active risk of 2.7.

The returns for most of the passive US equity strategies are comparable to the risk forecast. The fixed income markets specifically went through a highly unusual period as the rates increased at a very historically fast paced. The first half of

this year delivered the worse rate of returns since the 18th century and were clearly seen in the returns on the public side.

The absolute returns exceeded the risk forecast by a wide margin, but more importantly the excess returns are reasonably close to the active risk forecast. The alternatives on this account delivered performance that provide a couple of diversifiers to the public markets. Private equity and private credit returns are both in line with the risk forecast. A real standout is the historic performance of private real estate which exceeded the risk forecast by a factor of almost 2.

I will pause here for any questions at the asset class level. If not, can we have the next page please?

MS. PENNY: I think you can go on.

MR. BERMAN: So you will notice this page looks different from the previous quarter. Here we represent our forward-looking projections for your portfolio. We obviously do not know what the

future will bring. So instead we are focusing on the major economical factors that impact the performance of your portfolio, and we are trying to identify which factors we need to watch out to understand the future performance. Fundamentally there are three groups of macro factors that impact the economy markets and by extension the performance of your portfolio. Let's start with the equity markets which are always the most important component of risk and returns as we just discussed.

Equities have traded in almost every country in the world, but the three most important markets are the United States, the European Union and China, or more broadly emerging markets. Together these three centers capture about two-thirds of the global equity consolidation with the USA being 41 percent. These three markets are identified in the first three lines of this table by the indices the S & P 500, the Euro STOXX and MSCI EM, which is in the first three lines of the table.

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The second bucket is rates. That is the cost of capital. We highlight three rates here that are most important for the portfolio lines 4 to 6. The 2-year treasury note is the best proxy for the Federal Reserve policy rate since it captures both the rate hikes and the market expectation for the future policy. The 10-year treasury note is representative of the broad economy as it's used as a benchmark for mortgages and investment grade debt. Finally, the euro/dollar exchange rate stands for the dollar in the international markets since the dollar has been the global standard of currencies.

Finally, the third bucket, commodities, captures the dimensions of the real economy which produces goods and services. Copper in line 7 stands for global manufacturing since copper prices correlate highly with industrial output. Oil, line 8, stands for the demand for energy which is the critical component of any economical activity or transportation, and finally, inflation on line 9, which is the macro factor that doesn't need introduction.

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It dominated our lives in the past year.

The next step in our analysis is to identify how much the prices of these factors may change in the future. So there is obviously no way for us to forecast these levels, but we use risk models to estimate market in flight move. In this case we are asking the question what would be the worst monthly market move to happen over the last year. You can see the results of this calculation on the next column on the table under "Market Move". These monthly market moves are estimated to have an 8 percent probability of occurring which corresponds to roughly once a year. I tell people all the time these are not market forecasts. All these market moves have the same likelihood. They are corresponding to a monthly move for the next year.

I want to pause here for a moment to appreciate the magnitude of these market shifts. These are truly big numbers across all three buckets. Notice we are not forecasting the direction of the move. It

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could be either up and/or down. For example, our models are the material likelihood that the equity markets may experience a 30 percent move up or down in the next year. Also notice among the three equity indices, the EM has the lowest volatility and therefore the lowest risk. Somewhat unusually, the risk of European markets exceeded those of the US, which reflected a difficult macro economic environment for the European economies. The numbers in the rates bucket are also unusually large. A market move of 100 basis points for a 2-year treasury note would have been unthinkable just a couple of years ago. Similarly, a 10 percent move for the euro/dollar rate is shockingly big in the context of the past 20 years.

Finally, the commodities bucket. A 57 percent move for oil means that the oil prices can move from the current level of 77 dollars within the range of 34 to 120. In truth, this feels consistent with the market over the past couple of years when the prices moved from being negative to 140 I think was the high.

Similarly, the monthly change for inflation, almost 3 percent, indicates how uncertain the current macro environment is.

So what does it mean for your portfolio? The results are captured in the next two columns. Both the portfolio and strategic benchmark which puts the results into two categories, risk-on, which is colored green, represents a rally in the market and risk-off, colored red, represents a selloff. So all together we show you 18 possible outcomes for your portfolio and 18 outcomes for the benchmark. I am not going to read the numbers, instead focusing on the main takeaway with the goal of identifying on the factors which have an outsized impact on your portfolio.

Let's start with equities, lines 1 through 3 in the table. I will be focusing on the risk-on column, but the conclusions will be similar to the risk-off column. You can see that the -- among the three markets, the US equities have by far the largest impact on the portfolio. I found this to be a positive

result. Whereas the global economy is facing multiple headwinds and likely heading toward a recession, the United States stands as a strong economy with a better potential to deliver stronger performance. China and Europe face their own set of challenges, different in each case, but on a relative basis your portfolio is somewhat insulated from the effects of these risks.

Next, let us look at the rates bucket. I find the results to be most interesting. The portfolio is not actually that much sensitive to the federal fund policy. For 160-basis-point decline in the 2-year rate, a mild projection of about a 1 percent increase in the portfolio now. The move is slightly larger for the 10-year, close to 2 percent, but still not that much significant.

But look at the move for the dollar exchange rate. Clearly the US dollar has an outsized impact on the performance. A decline in the dollar exchange rate of 10 percent will increase the value of your portfolio by 5.5 percent. And finally, the commodities bucket.

In this case the price of copper has a strong impact on the portfolio. Just to remind you that we use copper prices as a proxy for the overall economic activity since the demand for copper is highly correlated with GDP growth, and the impact of copper prices is quite high, even larger than the dollar. A rally in copper prices of 35 percent will be hugely positive as the portfolio gains 6.5 percent. Oil price will have a similarly large impact on the portfolio, but copper clearly is the dominant contributor.

Related to that is an impact of inflation. It's probably not surprising that inflation is one of the most important factors for the performance of your portfolio. Maybe somewhat counterintuitive but the portfolio turns positive in an environment of rising inflation. The same thing applies to commodities as the portfolio benefits from a rise in commodity pricing. You can notice that your portfolio gains almost twice the rate of inflation increase.

So let me summarize the main takeaways

from the forward-looking projections. First, the main economic factors in your portfolio are the domestic equities. Then the European and Chinese stock markets. The trend of US dollar exchange rate, weakening of the dollar will have a beneficial impact on performance and inflation. The rise in level of inflation will have a positive return. I find this useful to understand the main risks and exposure in your portfolio and to connect the expected performance with the headline news that we read every day. Basically diversification of the portfolio across the asset classes. You can see it in the chart on the bottom of the page where we show the performance of the individual asset classes for the highlighted scenarios.

Almost all asset classes perform in the same direction. The largest risk concentration in the portfolio comes from US public and private equity allocation. Interestingly, the core fixed income allocation don't have any material impact on the performance under either stress test and

3, the portfolio outperforms the benchmark under every single stress test. This is true for the risk-on scenario where the outperformance is desirable but unfortunately also for the risk-off scenario where the portfolio performs the same or worse than the benchmark. And this conclusion is consistent with the observations we made in the first two pages. So I will stop here and open for any questions.

MS. PENNY: Thank you. Any questions for Ed?

MR. BUCKLEY: If I can ask one more.

MS. PENNY: Sure, Russell.

MR. BUCKLEY: Thank you. I am looking at the risk-on and risk-off columns here. Almost every single one at TRS is outside the policy benchmark, so for the risk-on, TRS is above the policy benchmark and everything except for the European stock market and then same thing for the risk-off. TRS is always below the policy benchmark. Is that internal leverage? What's causing that?

MR. BERMAN: I wouldn't call it

leverage. It's the risk level of the portfolio is slightly above the benchmark. We saw it on the previous page. On page 1 we saw there is an active risk component. Right? So ideally what we would like to see the risk-on outperformance and the risk-off to cushion the blow, right? So ideally. It's not that easy to achieve for such a well-diversified huge portfolio, but I think the purpose of this table is to show that given the assumption put into this stress test, we did not actually see the desired outcome. That's actually the point of the stress test.

MR. BUCKLEY: Thank you.

MR. BERMAN: I think you need a good gateway. As we are moving forward the strategic asset allocation in the next few months might be a good point discussion, which is exactly the point why we show the results here.

MS. PENNY: Any other questions for Ed? Okay. No? Thank you very much, Ed. That was a very interesting presentation.

MS. HIRSH: Just want to jump in here

and reiterate something Ed mentioned on behalf of BAM, which is he has been eager since coming on board in July to have a meeting with trustees to get a better sense what would be helpful and effective in a risk presentation and that is something that is on the table that we are going to move forward on in the next month or so. So just wanted to flag that.

MS. PENNY: Thank you. Does anyone else have anything for public agenda? Hearing none, do I have a motion to go into executive session?

MR. BROWN: So moved.

MS. PENNY: Thank you, Mr. Brown. Do I hear a second?

MR. KAZANSKY: Second.

MS. PENNY: Thank you, Mr. Kazansky. Any questions? All those in favor of moving into executive session, please say aye.

Aye.

MS. HIRSH: Aye.

MR. BUCKLEY: Aye.

MR. BERGE: Aye.

MR. KAZANSKY: Aye.

MR. BROWN: Aye.

MS. PENNY: Any opposed? Any abstentions? Okay. We are moving to executive session.

MS. HIRSH: One thing. I think Thad wanted me to mention, we have asked John Adler to join the executive session for the discussion of excluded company list, so he will be joining us.

MS. PENNY: Great. Any questions on that? And I have asked Victoria Lee to join us as well. As you know, I will be retiring February 1st, and Victoria has been instrumental in my transition.

(Discussion off the record.)

MS. PENNY: Okay. We are all back. All right. We are back in public session. Susan

Stang, would you please report out?

MS. STANG: Certainly. In executive session we received a preliminary performance review for the pension fund, we discussed the excluded company list, we received a presentation from MSCI, we received annual implementation plans for private equity and real estate. Consensus was reached on both.

MS. PENNY: Okay. Thank you very much. Does anyone have anything else? Okay. Hearing none, do I hear a motion to adjourn?

MR. KAZANSKY: So moved.

MS. PENNY: Thank you, Mr. Kazansky. Do I hear a second?

MR. BROWN: Second.

MS. PENNY: Thank you, Mr. Brown. Any discussion? All those in favor, please say aye.

Aye.

MS. HIRSH: Aye.

MR. BUCKLEY: Aye.

MR. BERGE: Aye.

MR. KAZANSKY: Aye.

MR. BROWN: Aye.

MS. PENNY: Any opposed? Any abstentions? Okay. We stand adjourned. Happy and healthy new year.

(Time noted: 1:31 p.m.)

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Proceedings

C E R T I F I C A T E

STATE OF NEW YORK)
: ss.
COUNTY OF QUEENS)

I, YAFFA KAPLAN, a Notary Public within and for the State of New York, do hereby certify that the foregoing record of proceedings is a full and correct transcript of the stenographic notes taken by me therein.

IN WITNESS WHEREOF, I have hereunto set my hand this 17th day of January, 2023.

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YAFFA KAPLAN