STRS
OHIO

Fiscal 2022
Investment Plan

June 17, 2021

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1. Purpose

The Investment Plan provides the fiscal 2022 outlook and strategy for the asset classes and total fund based on the State Teachers Retirement Board's long-term objectives and the forecasted capital market environment. Because the staff forecast is based on estimates of future economic conditions and returns, updates or modifications to the plan may be necessary. This will be communicated to the Retirement Board during the upcoming fiscal year as appropriate.

2. Fiscal 2022 Investment Plan Overview

FORECAST IN BRIEF		
	Fiscal 2022 Projected Ranges	**FY 2021 Forecast**
Real Gross Domestic Product	5.0%–6.5%	13.0%
Real Personal Consumption	4.5%–6.0%	15.0%
Real Business Fixed Investment	2.5%–12.5%	13.7%
Housing Starts (millions)	1.55–1.75	1.582
Real Net Exports (billions)	($1300)–($1240)	($1137.1)
Consumer Price Index Ex Food & Energy	1.75%–3.25%	2.3%
S&P 500 Earnings	$200 16.3%	$172 37.6%
	Fiscal 2022 Projected Ranges	**End of April 2021**
Federal Funds Target Rate	0.00%–0.50%	0.125%
10-Year Treasury Note Yield	1.00%–2.75%	1.630%

ECONOMIC OVERVIEW

Across much of the globe, economic recoveries have been much stronger than expected after the lockdowns and mitigation efforts that were imposed to slow the coronavirus pandemic at the end of fiscal 2020. Fiscal and monetary policymakers around the world have introduced extremely stimulative actions to overcome the deep recessions from the economic shutdowns. Those actions, to a large extent, will remain in place through fiscal 2022 and support economic growth well above long-term trends. In the United States, real gross domestic product (GDP) grew a robust 6.4% annualized in fiscal 2021's third quarter after 4.3% and 33.4% annualized growth in the fiscal year's first two quarters, respectively. For comparison, the long-term potential growth rate for the United States is likely in a range of 2.25%–2.5%. With that 14% annualized increase in real GDP through the first three quarters of fiscal 2021, returning to the peak level for real GDP before the pandemic is roughly an annualized 3.5% away. That level will be surpassed in the final quarter of fiscal 2021. Compared to the global financial crisis that led to the Great Recession, the current one-and-a-half-year recovery to the prior peak in GDP will come two years sooner than that prior severe recession experience. As vaccination efforts gain speed across the world, more economic sectors will join into the already robust recovery and propel economic growth into fiscal 2023.

For the United States and elsewhere, here are some of the key points to the STRS Ohio economic forecast:

- U.S. real GDP should grow around 5.7% in fiscal 2022 following a 13% increase in fiscal 2021 and a 9% plunge in fiscal 2020. Private domestic final sales growth (GDP less volatile inventory changes, government spending and foreign trade) should grow a similar 5.6% after an impressive 15.4% surge in fiscal 2021. Consumer spending and business fixed investment should lead the way as more and more businesses reopen amid continuing pent-up demand and strong fiscal and monetary policies support. Employment trends will improve further with the unemployment rate approaching the pre-pandemic low late in fiscal 2022, even as the labor force participation rate improves. Interest rates should move higher in the fiscal year due to the ongoing strong growth and higher inflation trends. That would slow residential investment from the extraordinary growth it displayed in fiscal 2021, but housing activity should remain solid with the shortage of available homes across the country. Fiscal policy should grow even more supportive for economic activity as the agenda shifts from addressing pandemic shortfalls to infrastructure spending and broader social spending in fiscal 2022, while monetary policy could change in calendar 2022 to tapering quantitative easing even as the Federal Reserve's main policy tool of changing short-term interest rates remains untouched.

- More broadly, in developed countries the delay in recovery due to prolonged lockdowns and slower vaccination rollouts has meant that strong economic activity has been pushed into fiscal 2022. Where vaccinations have progressed rapidly (e.g. United Kingdom, Australia), fiscal 2022 growth will likely remain well above their long-term trend rates. Meanwhile, inflation forecasts for fiscal 2022 remain above consensus estimates, reflecting the already strong economic recoveries that will be followed by above-trend economic activity through fiscal 2022. Emerging countries should grow strongly as well through the end of fiscal 2022. There is more uncertainty about growth in emerging countries than in developed countries because of their diverse COVID-19 trends. Underlying inflation will climb steadily through fiscal 2022 in all countries, but for some emerging countries it is a further sticking point because they have badly mismanaged their COVID-19 containment strategies. Restrictions on economic activity may generate quirky sectoral price trends that muddy the overall inflation picture. Nonetheless, monetary and fiscal policies should remain expansionary in all countries.
- U.S. fiscal 2022 growth in the 5%–6.5% baseline range after the surge in activity during fiscal 2021 has about a 50% chance of occurring. More moderate economic growth below that range, but not including a recession, carries about a 30% chance of occurring while more robust growth carries about a 20% chance. The baseline U.S. forecast of 5.7% real GDP growth and 2.3% GDP price index growth is notably stronger than the Bloomberg weighted average consensus real GDP growth of 4.6% and the *Blue Chip Economic Indicators* GDP price index growth of 2.1%.

TOTAL FUND OUTLOOK

STRS Ohio investment assets are currently estimated at $91.8 billion as of the end of April 2021. Investment staff projects a base case scenario with a positive total fund return at the Retirement Board's policy return of 6.84%. The positive return and market environment we forecast should roughly offset approximately $4 billion of net benefit payments (benefits and operating expenses less contributions) anticipated for fiscal 2022, resulting in a minimal change for the total investment assets.

The table below illustrates the expected annual market forecast for each asset class for fiscal 2022 relative to the Retirement Board's policy for expected average annual returns. The current fiscal 2021 total fund return will likely end the year with a return that is significantly above the policy return, following a below-average return for the COVID-19 impacted fiscal 2020. More importantly, the total fund return will likely finish with an above-average five-year return ending fiscal 2021. The total fund has earned a positive return in each year following fiscal 2009, this trend will likely continue in fiscal 2021, depending upon the final two months of the year.

ANTICIPATED MARKET RETURNS

	Board Policy Expected Average Annual Benchmark Returns	Benchmark Annualized Return Expectation for Fiscal 2022
Liquidity Reserves	2.25%	Below Normal
Fixed Income	3.00%	Below Normal
Domestic Equities	7.35%	Normal
International	7.55%	Normal
Real Estate	6.00%	At-to-Above Normal
Alternative Investments	7.09%	Normal
Total Fund	**6.84%**	**Normal**

Based upon market levels during mid-May 2021. Should market levels change significantly by late June 2021, an updated projection will be issued.

INVESTMENT PLAN THEMES

- *One year ago, the coronavirus was spreading globally, leading to widespread lockdowns and a historic collapse in economic conditions. The global response to this health and economic crisis was and remains significant. Continuation of monetary and fiscal policy support and increasing global vaccination rates support a global economic recovery and above-trend growth. The STRS Ohio economic forecast for fiscal 2022 expects the U.S. economy to grow at a real rate of about 6%, and inflation averaging above 2%, representing an above-consensus forecast for nominal GDP growth near 8%. As a result, this forecast expects the U.S. economy to transition from recovery to expansion supported by consumer spending and business investment. The baseline forecast for real GDP growth reflects a range of 5%–6.50% and carries a 50% probability of occurrence with a 30% probability for more moderate economic growth without a recession and a 20% probability of more robust growth above this range.*

- *Asset prices reflect the robust economic forecast, while incorporating the risk of potential coronavirus setbacks albeit mitigated by the actions of monetary and fiscal policymakers and health officials. The efficacious vaccines accompanied by significant monetary and fiscal policy actions combined to not only support the recovery of financial markets but also set the stage for expansion. Fundamentals have recovered dramatically over the year and are expected to further improve throughout the course of fiscal 2022. The underlying and improving fundamentals support the fair-to-high valuations in each asset class. Although the health trends are positive, we expect to experience sporadic volatility as virus flare-ups occur. Furthermore, we expect inflation to remain within a tolerable range and decline over the fiscal year. However, inflation concerns may spawn volatility during the fiscal year. Overall, we expect normal volatility punctuated by coronavirus and inflation concerns leading to buying opportunities in the upcoming fiscal year. With economic growth supported by monetary and fiscal policy as the effects of the coronavirus wane, and fair valuations, we expect a fiscal 2022 return that is at the board's long-term policy return of 6.84%.*

- *There is a change in one risk factor for the investment ERM matrix on Page 8 to recognize the robust economic recovery. We have reclassified "Recession" as a low probability scenario but retained it in the medium financial impact. While we are forecasting the continuation of the economic recovery during fiscal 2022 and assign a low probability of recession, if a recession were to occur during the fiscal year and returns become negative, then this would have a more negative impact on the funded status of the plan and require moving this risk factor to the high financial impact category. Another risk factor, "Long-term sovereign deficit and debt issues" is deserving of increased scrutiny, but we are not moving it in the matrix at this time. Policymakers responded quickly and aggressively to combat a deep recession and potential market collapse, but these actions may have a lasting impact on the fiscal profile of many countries, including the United States, potentially requiring future austerity measures that could inhibit long-term growth and productivity. In the near-term, these fiscal issues should be manageable because governments are able to finance deficit spending and higher debt levels with historically low government bond rates.*

- *The board's investment consultant, Callan, worked in coordination with staff and the board to complete a comprehensive asset-liability study in fiscal 2017. The target asset mix improved total fund liquidity and increased diversification, which proved valuable during the significant volatility that coincided with the pandemic. Another study will begin in August 2021 and conclude in March 2022. The asset-liability study will include a comprehensive review of capital market expectations, risk and liquidity — ultimately resulting in a target asset mix. Staff will present longer-term economic and asset classes reviews in September and October. The board's investment consultant, Callan, will present initial results in December.*

- *The alternative investment team is continuing its efforts to pursue direct and co-investments, consistent with the board's strategic initiative. Staff has made meaningful progress on this initiative and deal flow remained consistent in fiscal 2021 despite COVID-19-related market disruptions. We increased our internal capabilities in the asset class in fiscal 2021 with the hiring of two new members to the alternative investments team to focus on direct and co-investments. Staff will continue to move ahead on the initiative in fiscal 2022 as opportunities develop.*

- *There has been meaningful progress on the strategic initiative to improve domestic equity performance. The asset class is on target to have value-added performance on a one-, three- and five-year basis at the end of fiscal 2021. This continues an improving trend for the asset class. We will continue efforts to enhance the structure and performance of the asset class to sustain these positive results over future moving five-year periods. Staff will provide an update to the board in early fiscal 2022 to discuss trends in performance and provide an update on ongoing efforts within the asset class.*

- *Investment staff from all asset classes will continue to conduct ongoing research on various new potential strategies and refine and improve existing strategies as outlined in some of the following asset class sections of this plan. This is consistent with the board's strategic goal initiative for the investment program to develop strategies and tools that can increase returns, diversification or the flexibility to manage the assets.*

3. Asset Allocation/Risk/ERM Matrix

AVERAGE LONG-TERM POLICY WEIGHT, CURRENT ASSET WEIGHT AND STRATEGY FOR FISCAL 2022

(as a percentage of total assets at market)

	July 1, 2021 Neutral Weight	Preliminary April 30, 2021 Weight	General Strategy for Fiscal 2022*
Liquidity Reserves	1%	1.7%	We expect short-term interest rates to remain stable in fiscal 2022. We expect the current Federal Reserve policy rate may remain in place throughout fiscal 2022 as the economy recovers and inflation remains near the Federal Reserve's flexible average inflation target of 2%. With short-term market rates currently trading near zero, we expect to earn a return below the policy return of 2.25%.
Fixed Income	21%	19.6%	Staff expects relatively low volatility of U.S. Treasuries and gradually rising rates if economic and market conditions continue to recover. With a beginning yield on the benchmark near 2%, we project the asset class to generate returns below the policy return of 3%. The asset class received large contributions during the fiscal year driven by rebalancing activity due to strong total fund returns. We begin fiscal 2022 with an underweight and low expectations for competitive returns compared to other assets classes, leaving an underweight to the asset class likely for all of fiscal 2022.
Equities *Domestic* *International* Total Equities	 28% <u>23%</u> 51%	 28.9% <u>23.1%</u> 52.0%	The continuation of the economic recovery is driving earnings growth and multiple expansion. The markets are reflecting the vaccine success and the concurrent reopening, further supported by significant fiscal and monetary policy support. Although the risk of virus flare-ups remain and are likely to occur sporadically, the efficacy of vaccines are mitigating and curtailing the impact of this risk. As the economy recovers, inflation and the subsequent modifications to monetary policy are emerging. Earnings forecasts for many companies, especially forward guidance from company management, may be conservative at this phase of the recovery. We expect earnings may continue to grow at a brisk pace, justifying high current multiples in fiscal 2022. The market recovery that has occurred during fiscal 2021 has reduced some of the upside potential from the public equity markets and consequently, we see current valuations in relation to our earnings expectations as unlikely to repeat the returns of fiscal 2021, and we expect average returns. Given our economic outlook, we are modestly overweight to combined public equities, but our strategy will be altered tactically as our outlook and valuations evolve during the fiscal year.
Real Estate	10%	8.3%	The real estate asset class is projected to have returns at or slightly above the long-term policy return of 6% with valuations adjusting higher as the fundamental backdrop for real estate improves with the real economy. We begin with an allocation below the neutral target weight. Staff will continue to pursue potentially attractive acquisitions that may develop from the current environment, but we expect the asset class will likely remain moderately below the neutral target weight during fiscal 2022.
Alternative Investments *Private Equity* *Opportunistic/Diversified* Total Alternatives	 7% <u>10%</u> 17%	 10.6% <u>7.8%</u> 18.4%	We project returns for the alternative asset class to be at the long-term policy return in fiscal 2022. We will begin fiscal 2022 above the alternative investment target weight of 17%, with private equity above target and opportunistic/diversified below target. Staff will maintain a lower private equity commitment pace to manage the asset class weighting closer to target and will continue to reallocate exposure from the diversified portion of opportunistic/diversified into more opportunistic areas.
Total	**100%**	**100.0%**	

*More detailed asset weightings and projections are provided to the Retirement Board at its monthly meetings, which provides the Retirement Board more current updates to the overall strategy.

RISK BUDGET

Investment Portfolio Risk

Introduction

There are three primary types of investment risk that the Retirement Board and staff need to manage: capital market risk, active management risk and liquidity risk. The first type describes the volatility of the policy returns and is a result of the plan assets being invested in the selected asset classes. The fiscal 2017 asset-liability study determined an acceptable amount of capital market risk (14.46%) and established appropriate allocations.

STRS Ohio actively manages most of its investments; therefore, the fund will have active management risk. This risk refers to the return fluctuations around the benchmark return that result from active management decisions. The amount of active management risk indicates how closely the portfolio returns will match the benchmark returns. The policy range of active management risk for the total fund is 20–160 basis points. Staff uses the risk budget to manage this risk. Although active management is a source of volatility, it is much lower than and uncorrelated with the capital market risk. This means that adding active management risk to the fund will not cause a large increase in total fund volatility. Thus, over the long run, the actions of the staff are not expected to change the total volatility of the fund materially.

Liquidity risk refers to the ability to meet short-term funding requirements without incurring a loss of capital in the process. For STRS Ohio, the most important consideration is the payment of the monthly benefits in a timely manner. Examples of other important secondary needs for liquidity include rebalancing the asset allocation to the policy target weights and funding contractual capital commitments to alternative investment managers. STRS Ohio is a mature pension plan with more than $4 billion in net benefit payments per year (benefits and operating expenses less contributions). This can create challenges for managing the assets during extended periods of market volatility. Therefore, the asset allocation and its implementation are key to ensuring there is sufficient liquidity at the total fund to efficiently meet all short-term funding requirements. The target asset mix from the fiscal 2017 asset-liability study improved total fund liquidity by increasing the fixed income weighting and using the liquid treasury portfolio to better manage the liquidity needs of the total fund.

Asset Allocation and Capital Market Risk

The appropriate amount of capital market risk for the STRS Ohio portfolio is determined in an asset-liability study. The study establishes an optimal target weight for each asset class. This means there is no other combination of asset classes that has lower risk while achieving the same expected return. The fiscal 2017 asset-liability study updated expected returns, risk levels and the asset mix for the fund. Over a 10-year period, the board's investment consultant indicates that the accepted asset mix should generate a return of 6.84% (without value added). The following table contains the current and target allocations for each asset class and the expected return and capital market risk.

Asset Class	Expected Return	Capital Market Risk	Target Allocation	Rebalancing Range	Approximate April 30, 2021 Weight
Domestic Equities	7.35%	18.70%	28%	23%–33%	28.9%
International Equities	7.55%	21.30%	23%	18%–28%	23.1%
Fixed Income	3.00%	3.75%	21%	12%–28%	19.6%
Real Estate	6.00%	16.45%	10%	6%–13%	8.3%
Private Equity	8.15%	32.80%	7%	4%–10%[2]	10.6%
Opportunistic/Diversified	6.35%	12.34%	10%	6%–14%[2]	7.8%
Liquidity Reserves	2.25%	0.90%	1%	0%–5%	1.7%
Total Fund	**6.84%**[1]				

[1] Does not include active management returns.

[2] The Private Equity and Opportunistic/Diversified target weights and rebalancing ranges are only meant to be general guidelines; the official target weight and rebalancing range is at the total alternative investment asset class level. The board approved rebalancing range for the total alternative investments asset class is 10%–22%.

There are several ways to quantify and characterize capital market risk for an asset mix:

- The expected capital market risk for the total fund benchmark is 14.46%, which means there is a 95% probability that the investment portfolio returns will be in an annual range of –21% to 35%.
- Another risk concept we utilize is the "value-at-risk." According to this measure, there is on average a 5% chance under the target allocation that the fund could lose $15.6 billion or more in a single year.

Risk Budgeting and Active Management Risk

Active management risk refers to portfolio return fluctuations around the benchmark return that result from active management decisions. Risk budgeting is a tool used by staff to efficiently allocate active management risk among the asset classes by assigning active management risk ranges. The goal of a risk budget is to maximize the active management returns earned within a board-approved active management risk range for the total fund. Empirical evidence shows that less efficient markets such as real estate and emerging markets offer greater opportunities for active management returns compared to more efficient markets such as domestic equities and domestic fixed income.

Based upon quantitative work developed by staff, we estimate that the total fund level of active management risk is currently 122 basis points. The STRS Ohio total fund return should track within plus or minus two times the expected active management risk level relative to the total fund composite benchmark. Thus, if the total fund composite benchmark earns 8% for the year, the STRS Ohio return is expected to be within 2.44% (two times 1.22%) of this return 95% of the time (i.e., between 5.56% and 10.44%). Similarly, in a year when the benchmark return is –3%, the STRS Ohio return is expected to be between –5.44% and –0.56%.

The policy range of active management risk for the total fund is established to achieve the net active management return goal of 40 basis points as specified in the Statement of Investment Objectives & Policy. This policy range is the basis for the policy ranges of the individual asset classes. Expected operating ranges for the asset classes are created by staff each year to efficiently achieve the desired level of active management risk for the total fund. Operating ranges must fall within the policy ranges for each asset class and for the total fund.

The table below shows the April 30, 2021, active management risk, and the fiscal 2022 expected operating range of active management risk for each asset class. These measures are expected to fluctuate during the fiscal year; however, no material deviations from these measures are anticipated. The active management risk of the total fund is expected to fall in the range of 60–160 basis points during fiscal 2022. This range includes tactical risk (due to asset allocation decisions) that is not included within the individual asset class active management risk estimates. These asset allocation decisions are likely to vary throughout the year, so this will result in various amounts of tactical risk.

FISCAL 2022 ACTIVE MANAGEMENT RISK

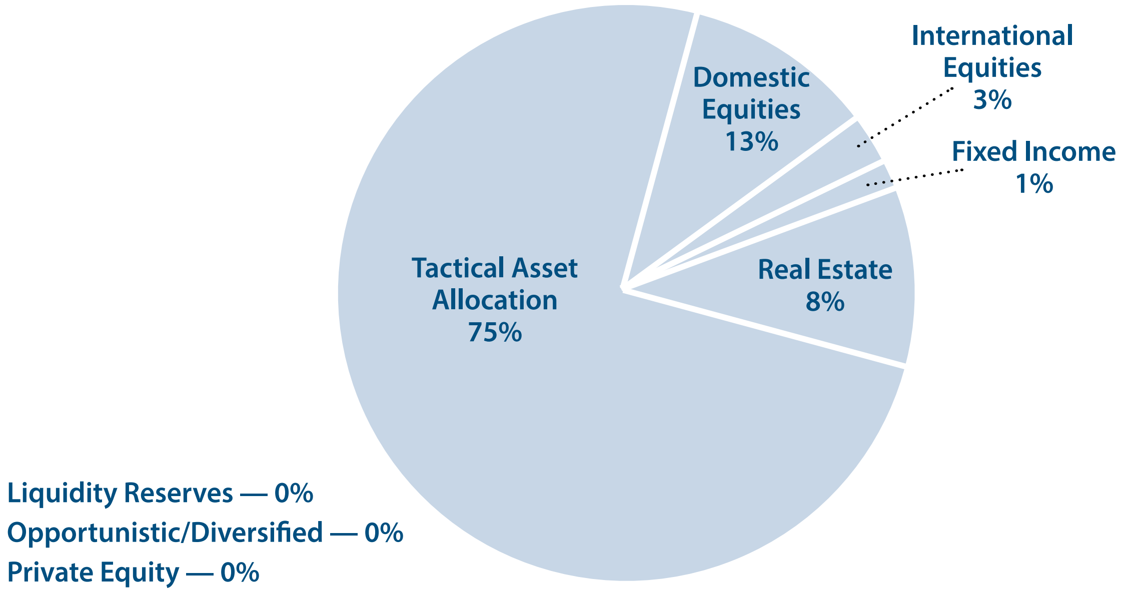
Asset Class	April 30, 2021 Active Management Risk (basis points)	Expected Fiscal 2022 Operating Range (basis points)	Policy Range (basis points)
Liquidity Reserves	N/A	N/A	N/A
Core Fixed Income	36	20–120	10–150
Domestic Equities	122	50–150	20–150
International Equities	91	70–125	60–250
Real Estate	350	350*	200–700
Alternative Investments	N/A	N/A	N/A
Tactical Asset Allocation	100	40–140	N/A
Total Fund	**122**	**60–160**	**20–160**

*As explained in the paragraph that follows, this estimate is static unless a significant portfolio adjustment occurs.

Unlike other asset classes, real estate does not have a model that can be used to accurately estimate active management risk. Instead the estimate is based on historical active management returns, the amount of leverage in the portfolio, and past real estate market volatility. These factors are unlikely to change much over time without a significant change to the portfolio; therefore, the estimated active management risk for real estate will be static most years.

The following chart explains where the active management risk for the total fund is generated.

CONTRIBUTION TO ACTIVE MANAGEMENT RISK



IMPACT AND PROBABILITY ANALYSIS FOR INVESTMENTS

PROBABILITY

FINANCIAL IMPACT

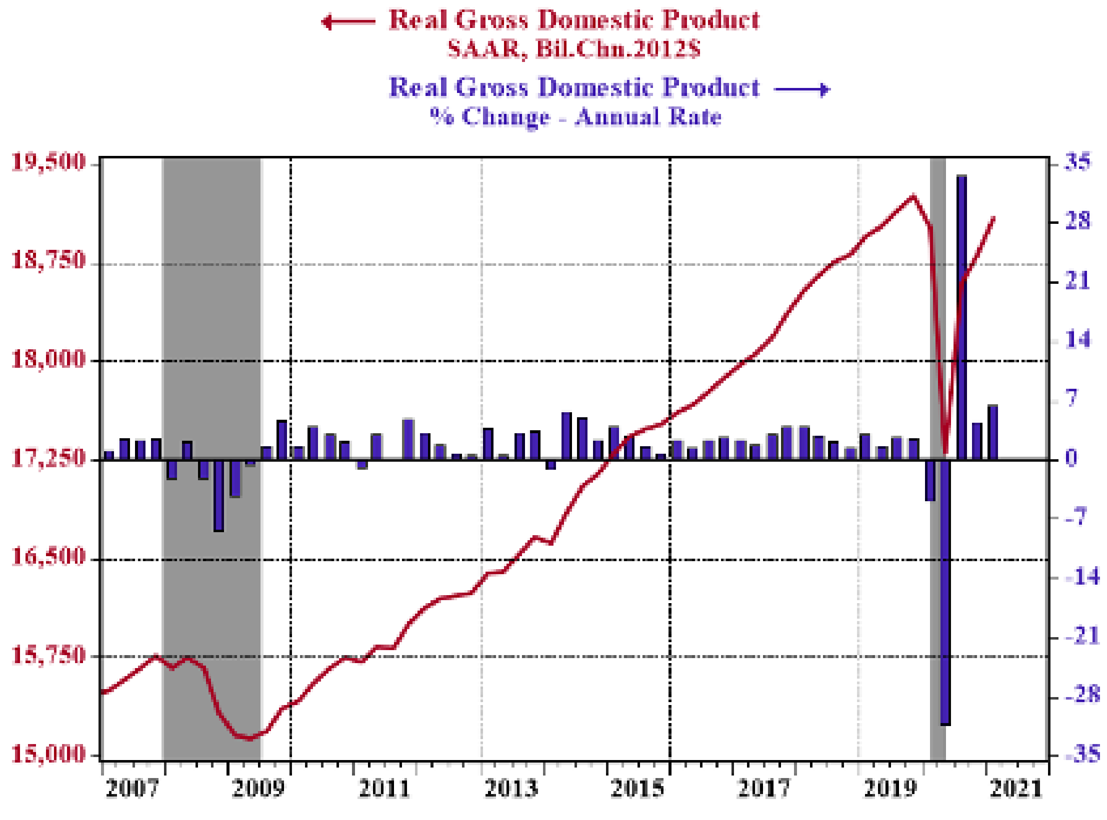
	HIGH	MEDIUM	LOW
HIGH	• Not earning the actuarial assumed rate of return over the 10-year period	• Long-term sovereign deficit and debt issues	• Diversification ineffective • Significant negative investment return in any one year
MEDIUM	~~• Recession~~	• Global financial stress related to low economic growth	• Recession • Deflation • Long-term inflation greater than 3.5%
LOW	• Not earning the actuarial assumed rate of return in a fiscal year	• Corporate fraud (securities litigation) • Buy Ohio	• Poor investment • Divestment • Investment operations failures

4. Fiscal 2022 Economic Outlook

U.S. ECONOMIC GROWTH AND INFLATION OUTLOOK

Following the country's 128-month record length for an economic expansion through fiscal 2020's first half, the economic turmoil resulting from COVID-19 pandemic mitigation efforts created a near-historic 31.4% annualized collapse in real gross domestic product (GDP) during fiscal 2020's final quarter. Many economists and financial market participants expected the pandemic would continue to weigh upon the economy through, at least, the early stages of fiscal 2021. However, with many of the lockdown restrictions removed during mid-May 2020, the U.S. economy skyrocketed in the first quarter of fiscal 2021 — growing an annualized 33.4% and recovering two-thirds of the lost output from the second half of fiscal 2020 (see the chart below). Above-trend economic activity during the following two quarters of fiscal 2021 largely closed the gap in the level of real GDP from its previous peak at the end of calendar 2019, requiring just 3.5% annualized growth during fiscal 2020's final quarter to jump past the prior economic peak. For that quarter, the STRS Ohio economic forecast expects about 10% annualized growth while the consensus forecast among economists calls for nearly 9.5% annualized growth. In other words, nearly all economists expect that a new peak level for real GDP in the U.S. economy will have occurred in the final quarter of fiscal 2021.

A V-SHAPED RECOVERY FROM THE SEVERE, BUT SHORT, RECESSION SHOULD LEAD TO ABOVE-TREND GROWTH



Source: Bureau of Economic Analysis

Note: Shaded areas denote recession.

As the above chart shows, the rapid recovery and strength shown in the current economic expansion follows a classic V-shaped pattern — unlike the more gradual, slower U-shaped recovery following the Great Recession of 2007–2009. While that economic expansion took three-and-a-half years to register a new peak level for real GDP, the current expansion will have done so in just one-and-a-half years. With extremely stimulative fiscal and monetary policy approaches in the United States and elsewhere in the world and the widening vaccinations for COVID-19 that will open up economies around the globe, economic activity is positioned for continued robust and above-trend growth in fiscal 2022. Inflation pressures will continue to build in this environment, but slack in important sectors of the economy should prevent actual inflation from soaring well beyond the range the Federal Reserve would find acceptable. However, the central bank in calendar 2022 will likely taper its quantitative easing policy that helps to keep long-term interest rates lower than normal, even as its main policy tool of controlling short-term interest rates will likely remain near the zero percent lower bound. Additional robust fiscal policy stimulus in the United States beyond the $5.3 trillion already appropriated since the beginning of the pandemic is also likely in the early part of fiscal 2022. Taken together, the United States economy should continue to grow well beyond its long-term trend of roughly 2.25%–2.5%.

U.S. real (inflation-adjusted) gross domestic product should grow by roughly 5.7% in fiscal 2022 after it exploded by 13% in fiscal 2021. Real private domestic final sales growth (a core measure of economic activity that consists of GDP less volatile inventory changes, government spending and foreign trade) should grow about 5.6% after a massive 15.4% surge in fiscal 2021. Nearly all economic sectors should contribute to the strong economic activity. Consumer spending (about 70% of the U.S. economy) growth should remain strong at 5.2% because of ongoing pent-up demand from the recession, solid income growth and improving employment patterns from more and more businesses returning to normal operations.

The jobs market could end fiscal 2022 close to the conditions that preceded the coronavirus pandemic, with the unemployment rate ending the fiscal year at or marginally below 4% from May's 5.8% rate. Surveys of hiring intentions and job openings remain extremely strong for upcoming quarters as more industries like travel and leisure reopen. The unemployment rate should average about 4.3% for the entire upcoming fiscal year after a 6.7% average in fiscal 2021 and a 6% average in fiscal 2020. Real disposable personal income growth could register a slight negative growth rate in fiscal 2022, but only because massive support payments have been made to people throughout the recovery stage of the pandemic. As that support is gradually withdrawn, the year-to-year comparisons skew downward. Both the personal saving rate and household net worth as share of disposable personal income remain near historic highs, leaving consumers with a great deal of resources to continue spending. Personal consumption growth is expected to advance by 5.2% in fiscal 2022 after a 15% recovery in fiscal 2021.

With continuing low mortgage rates and an improving jobs market, the housing sector should improve further in fiscal 2022 from having been a dramatic contributor to economic activity in fiscal 2021. However, there are constraints on this economic sector from a limited supply of homes and soaring materials costs that will slow the growth of housing. Nationwide through March, the Federal Housing Finance Agency's purchase-only home price index soared 13.9% over the prior year — the largest yearly gain in the 30-year history of the data. As a result, housing affordability will likely ease from the high levels recorded during fiscal 2021. Housing starts likely averaged nearly 1.6 million units in fiscal 2021 and that led to a phenomenal nearly 27% increase in residential investment. For fiscal 2022, housing starts could reach nearly 1.65 million units but contribute to economic growth at about a 3.4% rate that would remain above the sector's long-term trend.

Business fixed investment should remain strong after a vigorous 13.7% gain in fiscal 2021. The pandemic has pushed businesses to operate in new ways and to invest further in productivity-enhancing equipment and intellectual property products — a trend that should continue through fiscal 2022. In the first three quarters of the economic expansion, equipment investment has surged an annualized 35% and matched the country's strongest three-quarter growth rate dating back to 1950 when the United States was the world's economic leader following World War II. Similarly, investment in intellectual property products has returned to a strong 10% growth rate during the first three quarters of the current economic expansion. However, investment in structures fell an annualized 14% over the five quarters since the start of the pandemic recession and fell nearly an annualized 10% since the start of economic expansion.

Companies are finding new ways to conduct business and placing a strong emphasis on equipment investment and intellectual property products versus structures investment. For fiscal 2022, total non-residential investment is expected to grow by about 7.5%. That rate of growth is like prior growth patterns for that sector in the early stages of economic expansions and should provide the added benefit of solid productivity growth that, in turn, will help to contain inflation pressures.

THE FEDERAL RESERVE WILL ACCEPT INFLATION ABOVE ITS 2% AVERAGE INFLATION TO OFFSET WHEN IT WAS BELOW

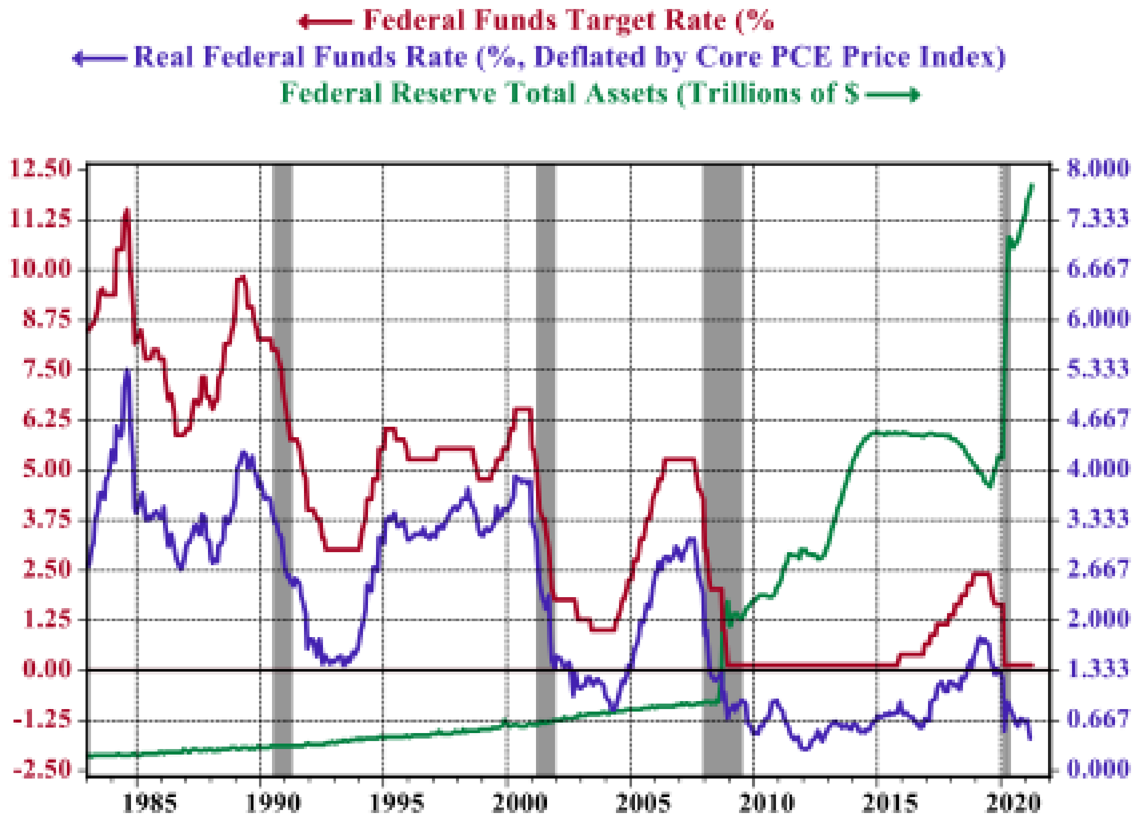
Sources: Bureau of Labor Statistics, Bureau of Economic Analysis

Note: Shaded areas denote recession.

After many years of inflation growth below the Federal Reserve's policy target of 2%, the central bank has adopted a policy of promoting average inflation over time of 2%. That means they are willing to accept price inflation above 2% for some time to offset the previous periods below the target. In the inflation chart shown above, both the commonly known consumer price index (CPI) and the broadest inflation measure, the GDP price index, are already hitting the 2% target on a quarterly basis. The monthly CPI measure through April is already soaring by 4.2% over the past year largely due to base effects when consumer prices fell during the recession. That exaggerates the year-to-year growth rates and the effect will not subside until the economy moves beyond the summer months. The Federal Reserve refers to this swing in inflation as transitory and is looking beyond the near-term to gauge inflation later this year. With the ongoing improvements in the economy, price pressures should continue to mount. However, economic slack remains large in specific areas like the labor market where about eight million fewer workers are employed relative to the end of the last economic expansion. In addition, businesses are focusing on attaining productivity gains that slow the growth in unit labor costs and help to keep prices in check. Consumer prices are expected to grow about 2.6% in the upcoming fiscal year with core consumer prices (CPI excluding volatile food and energy costs) advancing 2.4%. The Federal Reserve's preferred inflation measure, the personal consumption expenditures (PCE) price index, should grow about 2.2% while the GDP price index, advances by roughly 2.3%. Each of those expected growth rates for inflation would be within the acceptable range that the Federal Reserve would like to see for the upcoming fiscal year period.

Monetary policymakers are displaying a great deal of patience with their policy actions by continuing to purchase long-term securities and holding short-term interest rates basically at zero percent. Federal Reserve policy continues to be extraordinarily aggressive by providing unmatched liquidity and monetary stimulus since the recession began in fiscal 2020. In the chart below, the green line represents the amount of quantitative easing the Federal Reserve has conducted. It has nearly doubled from the level that existed prior to the pandemic recession to almost $8 trillion. It is useful to recall that, prior to the Great Recession from late 2007 through mid-2009 and the first usage by the Federal Reserve of quantitative easing actions, the assets on the Federal Reserve's balance sheet were roughly $900 billion — or just 11.5% of the assets it is carrying today. Suffice it to say, quantitative easing is now a regular part of the Federal Reserve’s toolkit in fighting off recessions and slow-growth periods by attempting to keep long-term interest rates lower than they would have been otherwise.

THE FEDERAL RESERVE WILL MAINTAIN AN EXPANSIONARY MONETARY POLICY THROUGH MUCH OF FISCAL 2022



Source: Federal Reserve Board

Note: Shaded areas denote recession.

Also shown in the chart are the nominal federal funds rate (in red) and the real federal funds rate in blue. The federal funds rate is the central bank’s primary policy tool, allowing it to control important short-term interest rates that affect the economy’s credit cycle. In the prior historically long economic expansion that followed the Great Recession, the Federal Reserve kept the nominal federal funds rate at basically zero percent for seven years. With positive inflation throughout, that drove the real federal funds rate into significantly negative territory and provided an enormous monetary stimulus to the economy. Since the pandemic recession began, negative real short-term interest rates have returned to the United States.

By some estimates, the combined economic stimulus from the Federal Reserve's normal policy options and the lending capability provided to it by the federal government have amounted to a $6 trillion boost for the U.S. economy. There are already indications from among members of the Federal Reserve that tapering of the quantitative easing programs could come in the latter part of fiscal 2022. That adjustment could lead to an end of assets being added to the Federal Reserve's balance sheet by the close of calendar 2022. Once the Federal Reserve puts that plan into action, it will likely pause after its completion before considering a change in its main policy tool — the nominal federal funds rate. That is likely to keep short-term interest rates pegged to roughly zero percent until late in fiscal 2023 or even beyond. Given these expectations, relevant ranges for the federal funds rate and 10-year Treasury yield for the upcoming fiscal year are listed in the table below.

Period	Federal Funds Rate	10-Year Treasury Yield
Fiscal 2022 Ranges	0%–0.5%	1%–2.75%

Note: The ranges listed anticipate capturing 90% of the daily closes during the period described. Brief excursions above or below these ranges that are quickly reversed should not be considered violations of the forecast.

In addition to ongoing aggressive moves by Federal Reserve monetary policymakers, the federal government continues to support overall economic activity with fiscal policy actions directed at easing the effects of the pandemic mitigation efforts and, in fiscal 2022, addressing infrastructure needs of the U.S. economy. Already, the federal government has appropriated about $5.3 trillion to address the economic repercussions of the COVID-19 pandemic. During the summer, it is likely that a physical infrastructure bill will pass that could inject anywhere from $1 trillion to $2.25 trillion over eight-to-10 years into the economy. Furthermore, the Biden administration would like to add another $1.75 trillion in spending on social programs in coming years. While the final packages have a long way to go before passage, economic forecasts must include the likelihood that something on the order of $2 trillion ultimately passes in fiscal 2022. If the result is roughly $2 trillion, then the combined spending by the federal government since the recession and over coming years would be about $7.25 trillion, or about a third of the current size of the nominal economy. Combined with the Federal Reserve's roughly $6 trillion impact on the economy, fiscal and monetary policymakers will have enacted unprecedented plans that compare to 60% of the U.S. economy's size. It is unclear how much and whether proposed tax increases to offset some of the spending will also be enacted in fiscal 2022. The added federal deficits and debt for the U.S. economy will matter again sometime in the future by potentially limiting economic growth with higher taxes and less spending to pay off the previous accumulated debt, but that is not the mission of policymakers today as they work to prevent another downturn from the coronavirus pandemic and address other spending needs across the economy. In the meantime, these issues should be manageable because the historically low financing costs of the rapidly growing debt is lower than the economy's potential nominal growth.

The baseline economic forecast during fiscal 2022 of continued solid economic activity with real GDP growth in a range of 5%–6.5% following the V-shaped recovery from a severe, but short, pandemic recession carries about a 50% chance of occurring. There remains a great deal of uncertainty how the coronavirus pandemic will play out and whether further setbacks will happen, but the actions by monetary and fiscal policymakers as well as public health officials appear to be appropriately dealing with the health and economic crises. More moderate economic growth below that range, but not including a recession, carries about a 30% chance of occurring while more robust growth carries about a 20% chance. The baseline U.S. forecast of 5.7% real GDP growth and 2.3% GDP price index growth is notably stronger than the Bloomberg weighted average consensus real GDP growth of 4.6% and the *Blue Chip Economic Indicators* GDP price index growth of 2.1%. The nominal GDP growth rate in the STRS Ohio forecast would be roughly 8%, while the consensus expectation would be for about 6.7% growth in fiscal 2022.

U.S. ECONOMIC FORECAST SUMMARY

Composition of Real GDP	Fiscal Year Ranges	FY 2022	FY 2022		FY 2021	FY 2021		FY 2020
			H1	H2		H1	H2	
Gross Domestic Product	5%–6.5%	5.7%	6.3%	5.0%	13.0%	18.0%	8.2%	(9.0%)
Personal Consumption	4.5%–6%	5.2%	6.5%	4.0%	15.0%	20.1%	10.1%	(10.2%)
Nonresidential Investment	2.5%–12.5%	7.5%	8.7%	6.2%	13.7%	17.9%	9.7%	(8.9%)
Residential Investment		3.4%	3.7%	3.0%	26.9%	49.2%	8.0%	(4.0%)
Exports of Goods & Services		7.4%	8.0%	6.7%	20.9%	39.8%	4.5%	(23.9%)
Imports of Goods & Services		6.0%	7.7%	4.2%	31.8%	58.3%	9.7%	(22.4%)
Federal Consumption & Investment		4.4%	2.6%	6.2%	3.4%	(3.6%)	10.9%	6.5%
State & Local Consumption & Investment		2.4%	2.0%	2.7%	0.4%	(2.4%)	3.3%	(0.6%)
Final Sales		5.5%	6.3%	4.6%	11.2%	13.8%	8.6%	(7.4%)
Domestic Final Sales		5.2%	6.1%	4.4%	12.8%	16.4%	9.4%	(7.7%)
Private Domestic Final Sales		5.6%	6.9%	4.3%	15.4%	21.1%	9.9%	(9.7%)
Incomes								
Real Disposable Personal Income		(0.1%)	(3.5%)	3.4%	(1.1%)	(13.8%)	13.6%	12.2%
Nominal GDP Corporate Profits, After Tax	2.5%–12.5%	4.9%	5.0%	4.7%	35.9%	50.7%	22.5%	(18.8%)
Prices								
Consumer Price Index		2.6%	2.8%	2.5%	3.3%	3.5%	3.1%	0.4%
Consumer Price Index Ex Food & Energy	1.75%–3.25%	2.4%	2.5%	2.2%	2.3%	2.9%	1.7%	1.3%
Personal Consumption Expenditures Price Index		2.2%	2.4%	2.1%	2.7%	2.6%	2.8%	0.6%
GDP Price Index		2.3%	2.4%	2.3%	3.0%	2.8%	3.2%	0.6%
Other Key Measures								
Real Net Exports ($B)	($1300)–($1240)	($1270.1)	($1267.6)	($1272.6)	($1137.1)	($1070.5)	($1203.8)	($843.7)
Real Change in Business Inventories ($B)		$18.8	$7.5	$30.0	($8.0)	$29.2	($45.3)	($81.3)
Light Vehicle Sales (M)		17.19	17.13	17.25	16.36	15.84	16.88	15.17
New Housing Starts (M)	1.55–1.75	1.644	1.650	1.638	1.582	1.508	1.656	1.321
Industrial Production		6.1%	7.0%	5.1%	14.8%	25.2%	5.2%	(14.1%)
Unemployment Rate		4.3%	4.5%	4.0%	6.7%	7.8%	5.7%	6.0%

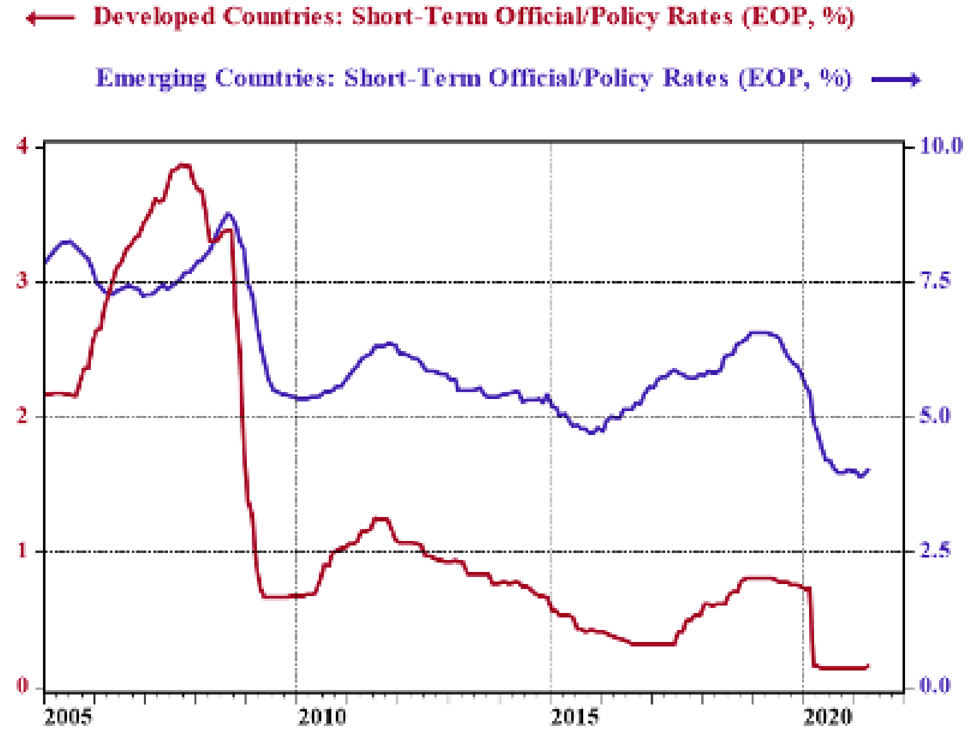
INTERNATIONAL ECONOMIC GROWTH AND INFLATION OUTLOOK

Most major developed and emerging countries have climbed back rapidly from deep recessions and are well on the way to recovering the vigor they had achieved before the COVID-19 pandemic struck. Underpinned by monetary and fiscal policy, pent-up consumer demand and private investment spending, they will progress further toward full potential growth through fiscal 2022. Until that potential is attained, monetary policies should remain highly accommodative and policy interest rates should stay very low. In all countries, policymakers stand ready to support economic growth if new surges of COVID-19 appear. However, they are also aware that a growing fraction of the population will be immunized against the disease through fiscal 2022 and that some types of policy support may have to be tapered gradually if the progress toward full potential growth continues unhindered.

During the recovery, investors and policymakers have realized that a resurgence of COVID-19 cases tends to be episodic, leading to short-lived setbacks that eventually leave the bulk of the prior economic recovery intact. While new restrictions on socioeconomic activity have been more lax than the ones that were imposed when the pandemic first struck, businesses and consumers have also since adapted to the restrictions in various ways and economic activity has suffered less extensively than it did the first time. In addition, fiscal policies have continued to support personal income growth and the floor it has placed on demand should stay through at least the first half of fiscal 2022 as an increasingly growing share of the population is vaccinated. Furthermore, pent-up demand has usually mushroomed during such episodes and economic growth revives strongly soon after the episodes subside. After the recent second wave of the pandemic, developed countries will be experiencing a flood of economic activity going into fiscal 2022 that will create momentum helping them to fully recover soon afterward.

During the first leg of the recovery in the eurozone, Germany's real GDP regained about 8.3 percentage points of its 11.5% initial loss, erasing about 72% of that loss. Similar strong recoveries in France, Italy and Spain have helped the eurozone erase about 81% of the initial loss in its real GDP. The pandemic's larger second wave that began toward the end of fiscal 2021's first half was unable to dent economic growth as much as the first wave and was able to reverse that recovery only by 1.8 percentage points, leaving just four percentage points to be recouped before full recovery is accomplished. Some of this remaining gap will be clawed back during the last quarter of fiscal 2021 when real economic growth of all member countries will post very strong annual growth rates. That will then set up the foundation for growth well above the long-term trend rates in fiscal 2022 as countries catch up further to reach closer to their full economic potentials by the end of that fiscal year.

EXPANSIONARY MONETARY POLICY AND LOW POLICY INTEREST RATES WORLDWIDE SHOULD CONTINUE



Source: Federal Reserve Bank of Dallas

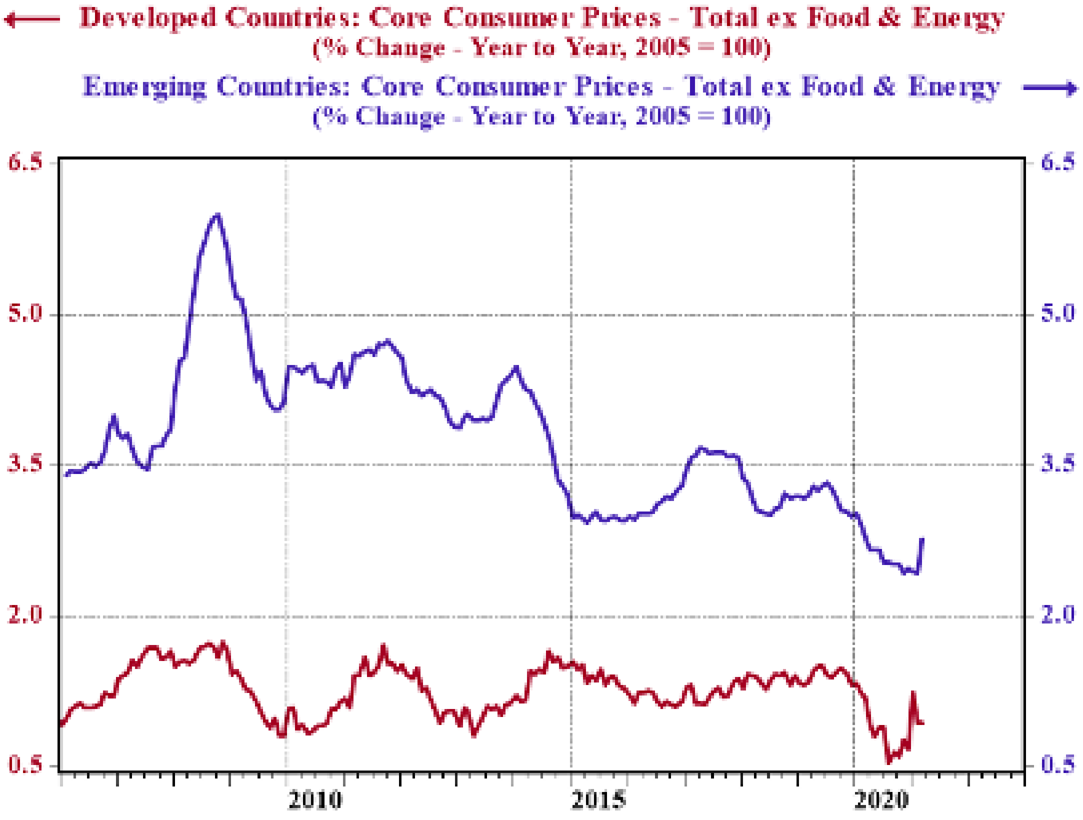
Observing the tone of the recovery, the European Central Bank (ECB) has upgraded its economic assessment. However, it will maintain a highly expansionary monetary policy until a large enough percentage of the population is immunized against COVID-19 to keep a future resurgence of the pandemic at bay. By mid-fiscal 2022, policymakers are likely to begin signaling that they may need to taper some of the quantitative easing over subsequent months considering the economic progress that will have been made by then. Meanwhile, the policy interest rates will remain zero and will be lifted well after that potential tapering has ended through fiscal 2023.

Similarly, in the United Kingdom (U.K.), the economy has recovered the bulk of its initial loss. After a setback during the pandemic's second wave, real GDP has likely been growing at a robust pace again now that the lockdown is being eased. The U.K.'s remaining recovery is expected to be stronger than that of the eurozone because its vaccination rate is well ahead of that of the eurozone's. That should also enable the U.K. to grow faster than the eurozone in the near term and then maintain a robust growth rate through fiscal 2022. Meanwhile, the Bank of England (BoE) is set to maintain its expansionary monetary policy through the first half of fiscal 2022. Over that time, as vaccinations become more widespread than in the eurozone, the BoE will likely signal the intent of tapering quantitative easing sooner than the ECB does.

Meanwhile, Japan's economic recovery has been lagging that of most developed countries and its recovery has been due more so to global economic trends than to domestic ones. Its vaccination rates have been woefully low and surges in COVID-19 have been frequent, leading to recurrent social restrictions. Nonetheless, strong global economic growth in fiscal 2022 is going to remain as a potent tailwind for steady economic progress. The Bank of Japan is expected to maintain its expansionary monetary policy as inflation is expected to remain well below the policy target rate of at least 2%.

The tailwind that has helped Japan recover has also led to rapid economic recoveries of major emerging countries, especially in Asia. The robust demand for goods in developed countries has boosted the manufacturing sector worldwide. Due to fiscal policy support of personal incomes, the demand for imports in developed countries has fully recovered. Consequently, world trade has surpassed its pre-pandemic peak level, brightening the prospects of export-oriented emerging countries that have been able to erase their losses faster than developed ones. For instance, China and South Korea surpassed their pre-pandemic peaks in the third quarter of fiscal 2021 and India had surpassed it through the second quarter, while Brazil was only 1.2 percentage points short of full recovery by then. Despite the recent surges of COVID-19 cases in key countries such as India and Brazil, most major emerging countries will likely have fully recovered by the end of fiscal 2021. During fiscal 2022, the tailwind of strong growth in developed countries will push major emerging economies further beyond their full economic recoveries.

UNDERLYING INFLATION TO RETURN TOWARD MONETARY POLICY TARGET RATES



Source: Federal Reserve Bank of Dallas

Consequently, inflation measures have picked up more in emerging countries than in developed ones. However, that can lead some central banks to raise policy interest rates too soon and that can be a potential policy mistake should those inflation increases prove to be transitory. Excepting Brazil, however, major central banks in emerging countries realize that a resurgence of COVID-19 remains more of risk than inflation as vaccination rates are still far from what are necessary to keep the pandemic at bay. Meanwhile central banks of developed countries, too, expect near-term inflation to increase, partly due to better demand but also due to demand outpacing supply in some sectors during the pandemic. Those sectoral demand-supply gaps will gradually narrow as production capacity expands to meet the demand and as global supply chains become unclogged once again. Nonetheless, policymakers also expect underlying inflation measures to strengthen toward their policy target rates as overall demand gradually changes into a strong sustained pattern in the wake of expanding vaccinations.

China has been one of the first countries to fully recover from the pandemic, but that recovery owes more to global demand for manufactured goods than to sustained improvements in domestic demand. Consumers have remained cautious as many COVID-19-related restrictions on social activity have remained and gauges of consumer activity such as retail trade have been slow to recover. However, robust growth in international trade and global economic growth will enable China to grow above the upper end of its 4%–5% long-term growth range during fiscal 2022. Meanwhile, policymakers have kept monetary conditions on a relatively tight leash to prevent unsustainable financial developments as well as to monitor the exchange rate more closely during the ongoing global transition out of the pandemic.

India is expected to grow strongly as well despite the recent setback to economic activity due to the resurgence of COVID-19 cases. Investors expect that the near-term threat of the ongoing second wave should subside and allow steadier growth to resurface as vaccination rates increase. However, the vaccination campaigns will likely take longer in emerging countries with large populations such as India where the public health infrastructure is much weaker than others such as Brazil that have made large strides in vaccinations since the pandemic's second wave. Similar improvements are expected in Mexico which will grow robustly at the heels of strong economic growth in the United States.

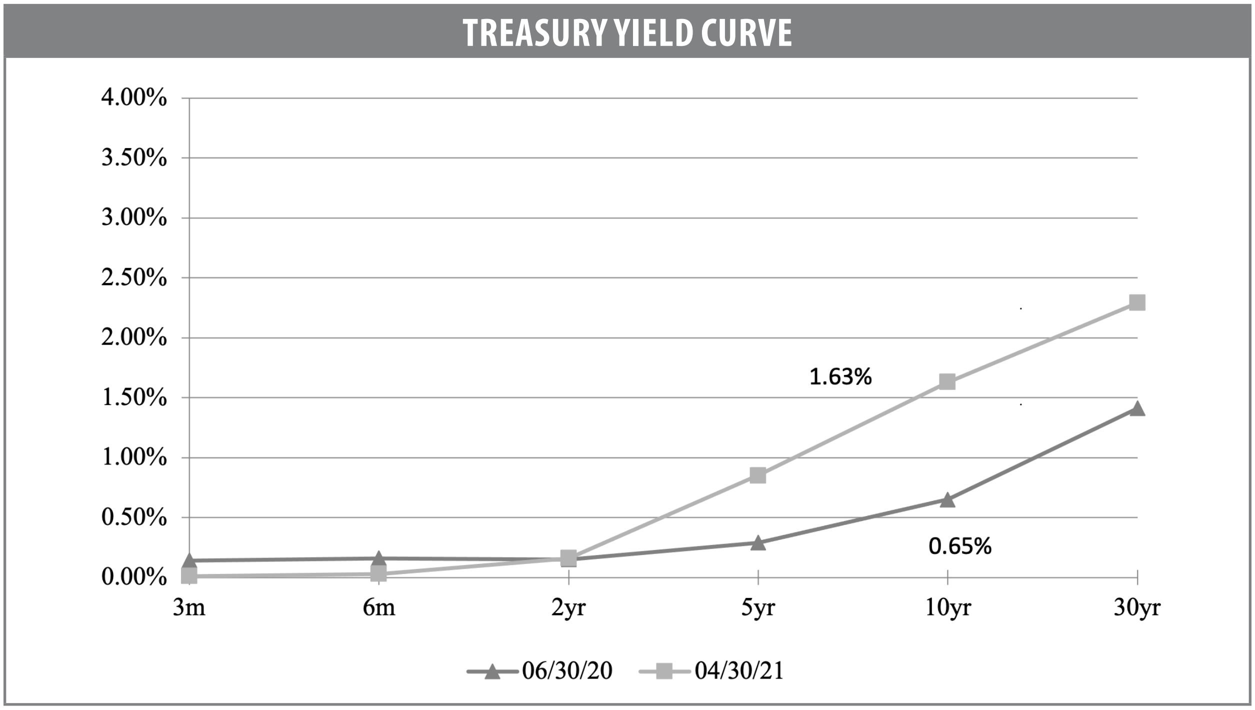
As emerging countries' economies grow in fiscal 2022, their tax revenues should improve as well. The large fiscal deficits that appeared because of the emergency aid during the pandemic should gradually wane. In the near term, investors have been more concerned about the management of the pandemic emergency than about the sustainability of fiscal affairs, expecting that it will improve once continuous growth returns without the surges of COVID-19 cases beyond fiscal 2022. Though the pandemic is still far from suppressed, global capital flows are likely to pay increasing attention to policy proposals aimed at addressing any future fiscal imbalances that may remain after the emergency spending has ended.

All told, the emergency monetary and fiscal aid that began when the pandemic first struck has been successful in containing the economic fallout and in spurring a strong global economic recovery in fiscal 2021. Aided crucially by public health policies aimed at suppressing COVID-19 cases around the world, the recovery is going to strengthen further in fiscal 2022 when the global economy will grow well above its long-term trend growth rate. As that occurs, monetary policies will stay highly accommodative, but at the same time will gradually start laying out the groundwork for the withdrawal of policy support beyond fiscal 2022.

INTERNATIONAL FORECASTS

	Real Gross Domestic Product		Inflation	
Country/Region	**FY 2022**	**FY 2021**	**FY 2022**	**FY 2021**
Canada	5.5%	15.0%	2.2%	2.8%
United Kingdom	6.1%	20.5%	2.0%	1.6%
Eurozone	5.6%	13.2%	1.7%	1.5%
Germany	5.5%	11.5%	1.8%	1.6%
France	5.2%	17.5%	1.6%	1.5%
Italy	5.0%	14.5%	1.3%	1.1%
Asia–Pacific				
Japan	3.5%	8.0%	0.8%	(0.2%)
China	5.5%	8.5%	2.5%	1.8%
India	7.0%	24.5%	4.8%	5.2%
Australia	4.3%	8.5%	2.2%	3.2%
South Korea	3.5%	7.0%	2.0%	1.6%
Latin America				
Brazil	4.2%	10.0%	4.0%	6.5%
Mexico	3.5%	16.4%	3.9%	3.8%

5. Fixed Income Investments



OUTLOOK

Bond Market Returns

We forecast the total return of the fixed income market to be below the STRS Ohio Policy return of 3.00% in fiscal 2022. The fixed income benchmark yield begins the fiscal year below the policy return at 1.84%. Since we forecast prices in the benchmark to slightly decline, we expect the benchmark to finish fiscal 2022 below the policy total return.

Federal Reserve

The Federal Reserve Board maintained the federal funds rate at the lower bound of 0% to 0.25% during fiscal 2021 after lowering the federal funds rate by 150 basis points in March of 2020 to restore confidence and support the economy. After unveiling an array of programs to support market function, liquidity and access to credit as a direct response to the coronavirus crisis, the Federal Reserve was able to allow many of these programs to expire as normal market function returned and the economy recovered. However, the Federal Reserve continued its asset purchase program known as quantitative easing and purchased a large quantity of U.S. Treasuries and agency mortgage-backed securities during the fiscal year to support the economic recovery.

We expect the Federal Reserve to maintain the federal funds rate at the lower bound during fiscal 2022 and are forecasting a range of 0%–0.50%. This forecast reflects our expectation that the Federal Reserve will maintain very accommodative monetary policy support even as the economy recovers strongly from the coronavirus pandemic. The Federal Reserve will only consider raising interest rates once the labor market has reached maximum employment and inflation has risen to 2% and is on track to moderately exceed 2% for some time. This new monetary policy approach, known as flexible average inflation targeting (FAIT), means the Federal Reserve targets a long-term average inflation rate of 2% and therefore, inflation will be allowed to remain modestly above the 2% target for a period of time after experiencing a period of below 2% inflation in the U.S. economy for the last several years. Importantly, even if the Federal Reserve forecasts inflation will exceed 2% for some time, it will not preempt that rise in inflation with an increase in interest rates. The Federal Reserve will only consider raising interest rates once the economic data has actually demonstrated that inflation has risen above 2%.

The Federal Reserve is continuing its quantitative easing program by increasing its holdings of U.S. Treasuries by at least $80 billion per month and agency mortgage-backed securities by at least $40 billion per month. We expect the Federal Reserve will consider reducing, or tapering, this monetary stimulus during fiscal 2022 as long as the strong economic recovery continues. While we do not expect the Federal Reserve to raise interest rates during fiscal 2022, a stronger than expected economic recovery coupled with inflation well above 2% could lead the Federal Reserve to raise interest rates sooner than we expect. Conversely, a slower or protracted economic recovery combined with discouraging coronavirus events, may cause the Fed to prolong the current pace of asset purchases.

Market Interest Rates

Our forecasted 10-year Treasury interest rate range is 1.00%–2.75%, with a baseline expectation that interest rates will rise from the current yield level of 1.63%. The expected 10-year Treasury interest rate range is based on the STRS Ohio economic forecast of a strong economic recovery, a slight pickup in inflation and the potential for tapering of the Federal Reserve's asset purchases.

A strong economic recovery, higher inflation, the Federal Reserve tapering asset purchases and continued successful mitigation of the coronavirus support the upper end of the interest rate range. On the other hand, a weaker economic growth environment combined with unsuccessful mitigation of the coronavirus support the lower end of our range. In a weaker economic growth scenario, we are unlikely to experience inflation pressures and the Federal Reserve would be more willing to maintain its asset purchase program, keeping interest rates closer to the lower end of our range.

Credit Quality

Corporate credit quality will improve as the economy continues to reopen from the pandemic and related restrictions ease. The recovery is aided by accommodative Federal Reserve policy and supportive fiscal policy which provide companies with uninterrupted capital market access and stable financing sources while the economy continues to recover from the effects of the pandemic. Industrial companies' revenue and profits will grow, profit margins will improve, and leverage will decline as a result of economic growth. We expect companies to respond to this environment by increasing capital expenditures and shareholder payments as corporate fundamentals improve.

Banks entered this downturn with high levels of capital and liquidity which allowed the sector to meet the challenges of the pandemic and maintain strong balance sheets. Asset quality decline did not occur as expected in fiscal 2021 and releasing of excess reserves should boost bank earnings in fiscal 2022. However, bank earnings will still be pressured by slow recovering loan demand and low net interest margins from near historically low interest rates.

High yield corporate credit fundamentals will improve as the economy experiences a strong recovery. Default rates are expected to decrease to the 1%–3% range in fiscal 2022. The level of defaults will depend upon the strength of economic recovery and reopening following the coronavirus pandemic. Corporate leverage will fall as cash flow increases and companies repair their balance sheets as the pandemic subsides.

Emerging market (EM) countries will experience a strong economic recovery as the coronavirus pandemic eases. EM countries entered the crisis with relatively low leverage, solid growth, and flexible exchange rates. As the crisis unfolded, EM countries implemented large fiscal and monetary stimulus to support the recovery. EM countries will also benefit from the rapid recovery of developed market countries which will boost world trade volumes and EM exports.

STRATEGY

Overview

The Core Fixed Income Portfolio will begin with an active management risk of 36 basis points and will operate in the range of 20 to 120 basis points. The Liquid Treasury Portfolio will have an active management risk operating range of 0 to 25 basis points. The following points summarize our outlook and portfolio strategy for fiscal 2022.

- The STRS Ohio economic forecast predicts a robust economic growth environment, a slight pickup in inflation, and the Federal Reserve considering tapering asset purchases. As a result, we expect interest rates will rise from current levels.
- We have positioned the core portfolio with a current relative duration of 98.00%. Our strategy reflects the STRS Ohio economic outlook, the strong economic recovery, and interest rates that appear low relative to economic fundamentals.
- Regarding sector allocation of the Core portfolio, we are maintaining an underweight position in U.S. Treasuries. We expect to maintain an overweight position in investment grade corporates, high yield corporates, and emerging market debt as the robust economic outlook supports both fundamentals and valuations of those sectors. We are positioned near neutral to agency mortgage-backed securities and expect to adjust our relative position as valuations evolve and the Federal Reserve's tapering of asset purchases of the sector provide potential opportunities to add to our position.
- We reserve an ample amount of active management risk capacity as we expect that as the economy experiences strong growth, inflation pressures build, and the Fed begins to taper asset purchases, the market may present opportunities that lead to significant valuation changes and would prompt us to increase or decrease active management risk.
- The Fixed Income asset class has received $3.2 billion in net contributions fiscal year-to-date through April, split roughly evenly between the Core Fixed Income and Liquid Treasury Portfolio. These contributions were driven by rebalancing activity due to strong total fund returns.
- The total Fixed Income allocation is 19.6%, versus a neutral target weight of 21%.

Strategic Initiatives

- We continue to implement and review tactical and strategic opportunities including non-agency mortgage-backed securities and collateralized loan obligations which are non-index sectors. We maintain a tactical position in non-index Treasury Inflation Protected Securities (TIPS) should inflation rise unexpectedly.
- The Liquid Treasury Portfolio is positioned to provide funds for portfolio rebalancing and monthly cash flow needs of the total fund, especially during extreme events such as the market volatility associated with the COVID-19 pandemic in March and April 2020.
- The Core Fixed Income Portfolio will continue to review less liquid sectors and opportunistically provide liquidity in risk-off markets to earn an additional return premium.

Sectors

Treasuries

- During fiscal 2021, we were underweight as we added to spread sectors that offered better relative value, and we expect to remain underweight in fiscal 2022.
- We have a tactical position in TIPS should inflation rise unexpectedly.

- The Liquid Treasury Portfolio (LTP) consists of high quality, liquid securities and has a market value of $5.0 billion, representing 5.4% of total fund assets.
  - The LTP neutral target allocation is 5% of total fund assets.
  - The marketability of the LTP portfolio will remain high to maintain substantial flexibility in meeting the liquidity needs of the total fund — including benefit payments, asset allocation rebalancing and diversification.
  - We will focus on U.S. Treasury security selection in the LTP portfolio, emphasizing relative value and efficient trade execution.

Government Related

- We continue to maintain a large underweight. We expect to remain underweight but will continue to monitor spreads and seek opportunities in both U.S. Agency securities and within other sectors of the Government Related portion of the Index.

CMBS (Commercial Mortgage-Backed Securities) and ABS (Asset-Backed Securities)

- We begin the fiscal year underweight CMBS as certain sectors of commercial real estate experienced deteriorating fundamentals. However, as the economy reopens after the pandemic, we expect fundamentals to recover. We will continue to monitor the sector for select opportunities. Multifamily fundamentals are favorable relative to other commercial real estate sectors, and we anticipate increasing exposure to Agency CMBS.
- We begin the fiscal year overweight ABS. Consumer credit fundamentals have deteriorated from pre-pandemic levels but are trending positively. We expect the roll-out of vaccines will continue to support job growth and the recovery of consumer financial health. We will continue to monitor the sector for opportunities with an emphasis on strong issuers, structural credit enhancements, and high-quality collateral.

Mortgages

- We begin the fiscal year with a neutral weight in Agency Mortgage-Backed Securities (MBS). We expect prepayments to slow down during the fiscal year as mortgage rates continue to rise in response to the steepening of the treasury yield curve and improving economic fundamentals.
- The Federal Reserve will continue to purchase and reinvest its Agency MBS principal payments into mortgages during the fiscal year with the likelihood of tapering MBS purchases in the second half of the fiscal year. The Federal Reserve will try to ensure mortgage market stability during this process and limit the degree of volatility. We think the Federal Reserve's experience with previous quantitative easing programs should help guide the execution of tapering purchases this time, but we will look to take advantage of opportunities if mortgage-backed securities offer more relative value as a result.
- Our selection will be focused on Agency MBS pools with lower expected prepayment rates that are likely to provide relatively stable cash flows at a reasonable valuation and a higher relative return. We plan to selectively add MBS on a relative value basis as the year progresses.

Investment Grade Corporates

- We begin the fiscal year overweight investment grade corporates. Yield spreads have returned to pre-pandemic levels and are at the low end of their historical range, reflecting an improving credit environment.
- We expect to maintain the overweight to investment grade corporates during fiscal 2022 as monetary and fiscal policies support the investment grade corporate credit market.
- Our credit selection will be focused on companies with strong credit characteristics that will be able to continue grow revenues and margins as the economic recovery continues.

High Yield Corporates

- We begin the fiscal year overweight high yield corporates. Yield spreads have decreased and reflect an improving credit environment with lower default rates.
- We expect to maintain the high yield overweight during fiscal 2022 as yield spreads are fair and provide adequate compensation for the credit risk in the current environment.

Emerging Market Debt

- We begin the fiscal year overweight emerging market debt. Yield spreads have decreased due to the rapid economic recovery from the coronavirus pandemic.
- We expect to maintain the emerging market overweight during fiscal 2022 as yield spreads are attractive given the improving outlook of the sector.

BOND STRUCTURE REPORT

(as of April 2021)

Portfolio	Market Value* ($ millions)	% of Asset Class	Portfolio Annualized Active Management Risk[1]	Portfolio Duration[2]	Targeted Relative Duration
Core Fixed Income	**$ 13,034**	**72%**	**36 bps**	**6.06 yrs**	**98.0%**
Liquid Treasury Portfolio	**$ 4,951**	**28%**	**2 bps**	**4.00 yrs**	**100.0%**
Total Fixed Income	**$ 17,985**	**100%**			

Core Fixed Income	Market Value* ($ millions)	Percent of Portfolio*	Yield	Relative to Index[3]
Treasuries	**$ 3,388**	26%	0.9%	0.86x
Government Related[4]	**$ 79**	1%	0.8%	0.08x
Mortgages[5]	**$ 2,766**	21%	1.6%	1.03x
CMBS & ABS[6]	**$ 252**	2%	0.6%	0.32x
Investment Grade Corporates[7]	**$ 4,536**	35%	1.8%	1.18x
High Yield Corporates[8]	**$ 848**	7%	4.1%	1.22x
Emerging Market Debt[9]	**$ 1,165**	9%	4.5%	1.14x
Total Core Fixed Income	**$ 13,034**	**100%**	**1.9%**	

Liquid Treasury Portfolio	Market Value* ($ millions)	Percent of Portfolio*	Yield
Treasuries	**$ 4,951**	100%	0.6%
Total Liquid Treasury	**$ 4,951**	**100%**	**0.6%**

***Market Values for April 30, 2020, are preliminary.**

***Market Value and Percent of Portfolio columns may not add due to rounding.**

[1] A statistical model is used to generate annualized active management risk, which is an estimate of the expected difference in annual performance between the portfolio and the index. The Core Fixed Income Portfolio currently has an annualized active management risk of 63 basis points, meaning the performance of the portfolio relative to the index is expected to be within 63 basis points for 68% (one standard deviation) of all market outcomes.

[2] A measure of the sensitivity of the price of the fixed income portfolio to a change in interest rates, expressed in years. The current Core Fixed Income Portfolio duration of 5.29 years implies the average price of the portfolio is expected to rise by 5.29% for a 1% (100 basis point) decline in interest rates and is expected to fall by 5.29% for a 1% (100 basis point) increase in interest rates. The portfolio duration relative to the index, currently at 95.0%, is the portfolio's duration divided by the duration of the index. A number less than 100% implies the portfolio has a duration less than that of the index and reflects an expectation of rising rates.

[3] The relative exposure to each sector versus the index, based upon market value and duration. A number greater than 1.00x indicates an overweight, and reflects a sector that we believe is undervalued. A number less than 1.00x indicates an underweight, and a sector we believe is overvalued.

[4] Consists of U.S. Government Sponsored Enterprise debt and other highly rated non-corporate debt.

[5] Mortgages are secured by a diversified pool of loans on residential properties.

[6] Commercial Mortgage-Backed Securities (CMBS) are secured by a diversified pool of loans on commercial property such as office buildings, industrial complexes, retail centers, hotels and multifamily developments. Asset-Backed Securities (ABS) are secured by diversified pools of consumer loans, including credit card receivables and auto loans.

[7] Consists of debt from industrial, utility and financial institution issuers that is rated investment grade, which is Baa and above.

[8] Consists of debt from industrial, utility and financial institution issuers that is rated non-investment grade, which is Ba and below.

[9] Consists of bonds issued by sovereign, quasi-sovereign, and corporate emerging market issuers. Country eligibility and classification as Emerging Markets is rules-based and reviewed annually using World Bank income group and International Monetary Fund (IMF) country classifications.

6. Domestic Equities Investments

OUTLOOK

Equity Market Return Expectations

For fiscal 2022 we forecast total returns to be in a range of –2% to +17%, with a central S&P 500 target of 4500 (+7.7%), in-line with the STRS Ohio policy return of 7.35%. Key factors behind this forecast are:

- Positive earnings per share growth
    - Continued strong economic growth as both the U.S. and global economies recover
    - Operating leverage from strong revenue growth and controlled costs
    - Benign levels of wage inflation
- Price to earnings (P/E) multiples are likely to be down slightly
    - P/E multiples are well above the normal trading range
    - A moderate rise in interest rates (1.50%–2.25%)
- Potential Risks
    - The evolution of the COVID-19 pandemic and any associated economic shutdowns
    - Higher inflation, both input costs as well as the effect on interest rates
    - Change to corporate regulations or increased corporate taxes
    - Stimulus slowdown both fiscal and monetary
    - Supply chain disruptions

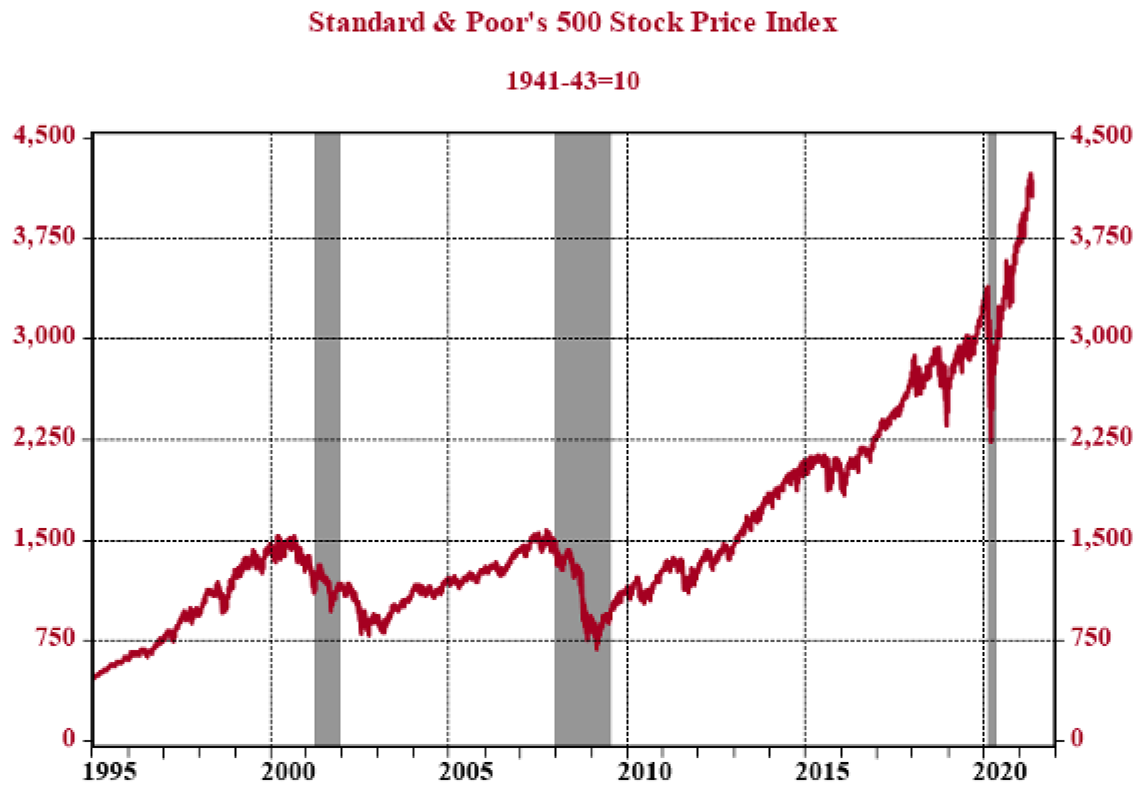
Summary of 2021

The U.S. equity market was very strong in fiscal 2021. The market was buoyed by multiple rounds of economic stimulus in the U.S. and rose further as vaccinations were introduced in mid-November 2020. The S&P 500 Index gained 36.6% through April of fiscal 2021 and is up 90.3% from the March 2020 lows. As of April 30, the S&P 500 stood at 4181.17.

Performance was strongest for stocks benefiting from the work-from-home theme in the early part of the fiscal year due to the unprecedented COVID lockdowns. However, the quick economic rebound and subsequent vaccine approvals were the turning point for sectors relying on economic recovery as they rallied from mid-November through the end of April. The economically sensitive Financials (+58.9%), Industrials (+50.1%), and Materials (+49.0%) have been the strongest sectors thus far in fiscal 2021. The defensive sectors have performed the worst, with Utilities (+21.3%), Consumer Staples (+21.4%), and Healthcare (+22.7%) lagging the market, but still up solidly for the period.

The mid-November vaccine roll-out also proved to be the turning point for market leadership. Since that time Small Cap stocks have outperformed Large Caps by nearly 20% and Value stocks have outperformed Growth by 7%.

S&P 500 PRICE INDEX



Source: Standard & Poor's

Note: Shaded areas denote recession.

Economic Drivers

Robust economic growth is expected during fiscal 2022. Companies will continue to be in expansionary mode driving capital expenditures and employment growth. Labor shortages and dislocations may become a concern due to the rapid reopening and could lead to pockets of wage inflation. Supply chain bottlenecks and shortages of certain components/materials may also lead to disruptions. International economies will likely start to reopen during the fiscal year which should also fuel U.S. stocks with international operations. The end of U.S. fiscal stimulus and the tapering of monetary stimulus may create a headwind for the market later in the fiscal year. Potential changes in U.S. government policies could lead to additional uncertainty this year, including higher corporate tax rates and increased regulation.

Earnings

Earnings uncertainty is high for fiscal 2022 and will be highly correlated to the trajectory of the economic rebound. Using our central economic forecast as a guide, earnings per share for the S&P 500 is expected to show strong growth in 2022, increasing a little over 16% to $200.

S&P Operating EPS	FY 2020	FY 2021 (est.)	FY 2022 (est.)
STRS Ohio Forecast	125	$172	$200
EPS Growth (YoY)		+37.6%	+16.3%
Consensus Forecast	$125 (actual)	$165	$193
EPS Growth (YoY)		+32.0%	+17.0%

Revenues for the S&P 500 are likely to grow substantially as global economies continue to reopen in fiscal 2022. Margins should improve from operating leverage gains due to strong revenue growth and continued cost control. Businesses may also see some expense relief and improved utilization as social distancing regulations are eased. Increased demand for labor and materials could lead to some cost inflation that could offset some of the margin improvements and, in some cases, may hinder revenue growth due to shortages.

Earnings for financial companies will improve as they reduce or reverse their loan loss provisioning expenses. Financial companies were very conservative during the pandemic and increased loan loss reserves aggressively. The losses have been much lower than expected and now the Financials Sector earnings will benefit as provisioning expenses ease. Bank earnings should also benefit from an expected rise in interest rates.

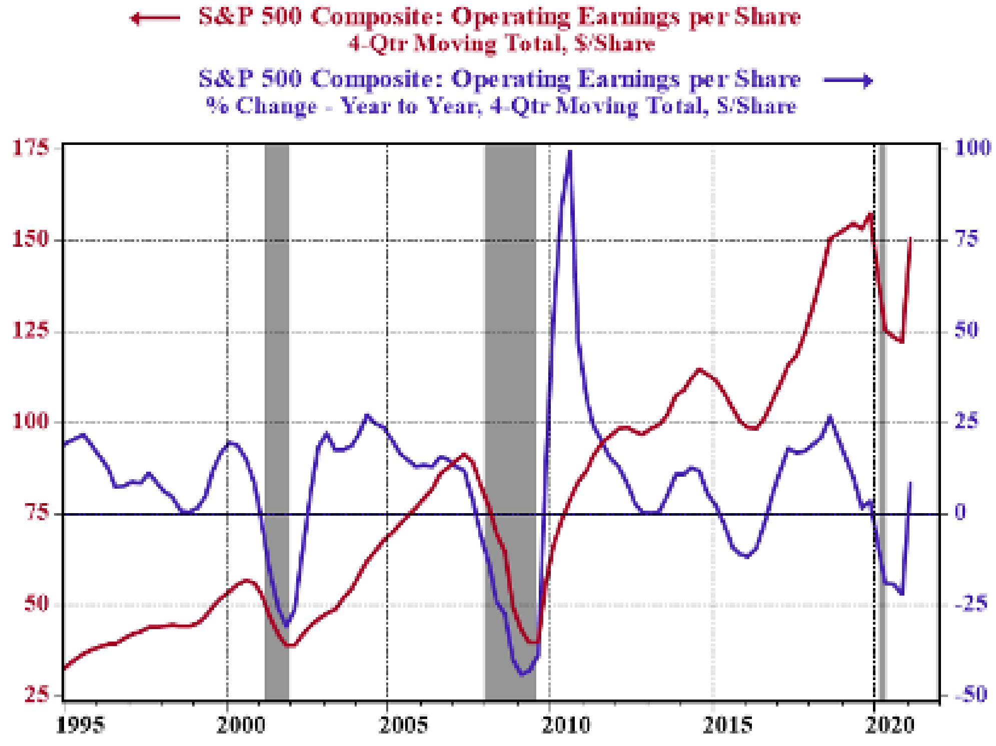
The technology sector saw a pull-forward in earnings during the economic slowdown. Many of these work-from-home applications gained a permanent foothold in workers lives as cloud-based software, computer hardware and remote connectivity companies saw a sharp rise in sales during the pandemic.

Some service-related industries such as airlines, restaurants, cruise lines and hotels should see a strong earnings recovery in fiscal 2022 as consumers have pent-up demand for travel and dining out. Other companies such as bricks-and-mortar retailers have been declining for several years, the pandemic has resulted in a sharp transition away from physical shopping and there has been a more rapid move to online business-to-consumer transactions.

The energy sector was hit particularly hard during the economic slowdown with demand for energy sharply curtailed by the stay at home orders. The sector has rebounded strongly in fiscal 2021 and we expect to see the demand for oil to increase as global economies reopen. Additionally, the energy sector has had a decade of underperformance, consolidation, and deferred capital expenditures, all of which could lead to a sharp rise in oil prices and earnings as demand increases and supply growth lags.

The following charts show a sharp drop and rapid recovery of operating earnings and operating margins through the third quarter of fiscal 2021. The fourth quarter data of the fiscal year will show much higher operating earnings and operating margins.

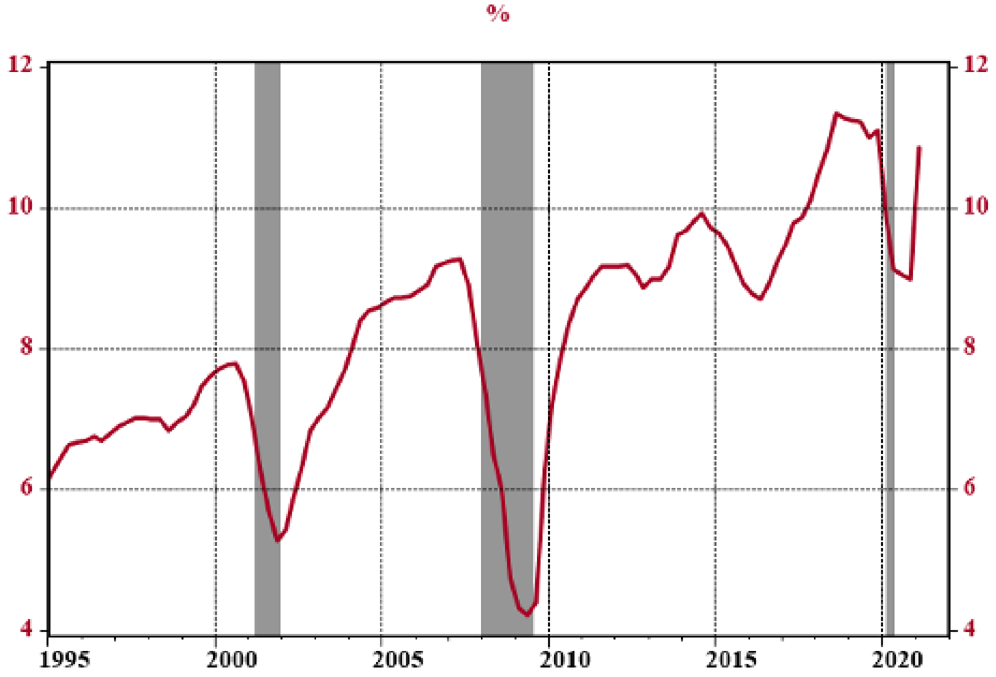
S&P 500 OPERATING EARNINGS



Source: Standard & Poor's/Haver Analytics

Note: Shaded areas denote recession.

S&P 500 COMPOSITE: OPERATING EARNINGS MARGIN



Source: Haver Analytics

Note: Shaded areas denote recession.

With respect to capital allocation, we expect companies to use free cash flow to grow their businesses and return capital to shareholders. Capital expenditures should rise as companies will need to add capacity in a rapidly rising economy. We expect the increase in technology investments to continue as they reduce costs and improve efficiency. Similarly, we anticipate business will continue to onshore manufacturing and supply chains from China. We expect that share buybacks and dividends will likely increase as companies strengthen their balance sheets and cash flow returns to pre-COVID levels or higher.

Valuations

The S&P 500 is currently trading at 28.1 times trailing 12-month operating earnings and 22.6 times forward earnings estimates. Valuations are full and well above the historical average of 16 times earnings. Investors will continue to watch the earnings recovery trajectory in 2022 and beyond as high expectations are priced into valuations. The P/E ratio is likely to decline in 2022 due to strong earnings growth and the likelihood of increasing interest rates. Other possible risks to valuations on the downside would be another wave of COVID-19 cases, less corporate-friendly policies from the U.S. government, or possible geopolitical uncertainty. Higher valuations could occur if the global economic activity grows at a more rapid rate than we are forecasting, and inflation and interest rates remain contained.

Forecast

Under the central economic forecast, we would expect an operating range for the S&P 500 to be 4100–4900 with a point estimate target of 4500. This estimate is based on a P/E multiple expectation of 22.5 times an earnings estimate of $200. Under alternative scenarios, an accelerating U.S. economy with benign inflation could drive earnings to $220 and the market to new highs above 5200. Should the U.S. economy experience another recession, earnings could fall to $175 or below — resulting in the S&P 500 at 3500 or lower. The following table illustrates these scenarios (all estimates are approximate and may be rounded for simplicity).

	Earnings	Multiple	Target	Total Return
Base Forecast	$200	22.5	4500	+7.7%
Operating Range			4100–4900	–2% to +17%
Upside Case	$220	24	5200	24%
Downside Case (recession)	$175	20	3500	–16%

STRATEGY

For fiscal 2022 we have a positive outlook on the equity markets resulting in returns that will be similar to policy return. Currently, domestic equities represents 28.8% of total assets, slightly above the neutral target weight. We would expect to remain close to the neutral target weight throughout the fiscal year as our expected returns are close to normal.

Our equity allocation is tilted toward value over growth factors. We anticipate that the cyclical outperformance will continue, and that Small Cap should continue to outperform Large Cap.

We expect volatility to remain low during this fiscal year, as the economic recovery continues.

Strategic Initiatives

We will continue to closely monitor the performance of all of our domestic portfolios — particularly those with weaker longer-term records. We will also continue to examine our external managers to determine if any changes need to be made to improve the Domestic Equities structure and performance.

We will once again look to evaluate option strategies that could also replace some passive exposure. We implemented an option swap in fiscal 2021 that took advantage of moderating volatility and a rebounding market. This strategy has been successful so far and we would look for other similar ideas to complement our domestic equity portfolio.

7. International Investments

OUTLOOK

In fiscal 2021, the international markets are recording strong returns due to an economic recovery supported by accommodative monetary and fiscal policies that should continue into the upcoming fiscal year. The MSCI World ex-US (50% Hedged) Index for developed markets has increased 27.2% through the end of April, while the MSCI EM Index for emerging markets has increased 37.5%. As a result, the International Blended Benchmark — consisting of 80% of the MSCI World ex-US (50% Hedged) Index return and 20% of the MSCI EM Index return — combined represents an increase of 29.3%. At this writing, staff anticipates total returns earning normal levels in fiscal 2022.

Developed Markets

The developed markets return in fiscal 2021 continued a robust rise from the March 2020 equity market bottom. However, there are still COVID-19 pandemic risks that create uncertainty for investors. International developed countries differ greatly with regard to the percentage of population either partially or fully vaccinated, and the timing of their unrestricted economic reopening varies accordingly. Many developed markets companies are reporting above-expectation earnings for the March 2021 quarter. Though most companies have yet to confidently boost guidance for the remainder of the year, markets believe that the earnings trajectory will remain positive, driven by the expansion of vaccination effects and associated strong pent-up demand. Consensus is expecting over 20% earnings growth for fiscal 2022. The strong earnings recovery may be more tilted toward the front-end, as a higher base effect takes hold in the second half and makes comparisons challenging. Moreover, cost pressures are percolating particularly within the commodity space, and companies are citing tightness in select components and labor. The markets' nervousness about inflation and interest rates may persist as the economic recovery proceeds. Low interest rates have supported valuation multiples that are already meaningfully higher than their 10-year averages, and their reversal remains one of the biggest sources of correction risk for equity markets. The +27.2% total return for the 50% hedged benchmark through the end of April was 3.3 percentage points lower than the unhedged benchmark due to the U.S. dollar weakening against the euro, pound and most of the other developed markets currencies. Staff expects the U.S. dollar to retain a modest weakening bias in fiscal 2022 while developed markets economic growth remains above trend, plus interest rate differentials are less supportive for the dollar unless the United States raises its policy rate before other major central banks. The total return forecast in developed markets for fiscal 2022 is for positive returns near normal with the primary drivers being earnings growth and dividend yield.

Shinzo Abe stepped down as Prime Minister of Japan in September 2020 due to health reasons, passing the last year of his third term to Yoshihide Suga, who is now facing re-election in October 2021. Despite having maintained one of the lowest per capita COVID-19 death rates among the developed world, Japan is experiencing worrisome flare-ups of COVID-19 while its vaccination efforts have been extremely disappointing. As of the end of May, Japan has vaccinated less than 3% of its population while it awaits shipments from overseas vaccine suppliers that, by some estimates, may only be sufficient to fully vaccinate 30% of the population by the end of summer. As a result, Suga has suffered significant popularity declines and urgently needs to see Japan's vaccination rate accelerate. Nevertheless, the lack of compelling competitors suggests that Suga's re-election bid is not yet at risk. In the meantime, Japan's tech-heavy market has benefited from strong global demand and seen significant positive earnings revisions. Valuation multiples of the Japanese market have expanded to levels that are noticeably above 10-year averages. Continued increases in earnings and returns are dependent on the recovery broadening to the service sectors, which could face bottlenecks if the vaccination efforts do not pick up pace soon.

The Boris Johnson-led United Kingdom government has implemented one of the most aggressive vaccination campaigns globally. As of the end of May, the United Kingdom has fully vaccinated more than a third of its population and is likely to cover 60% by the end of summer. Speedy vaccination along with accommodative monetary and fiscal policies have led economists to forecast above-trend growth for the United Kingdom economy for fiscal 2022. Whereas Brexit's long-term impact on the British economy remains unclear, and negative events such as shipping disputes in the English Channel and London's loss of trading volume to Amsterdam have grabbed headlines, the lifting of Brexit fatigue has been positive for the British pound which has recovered most of its losses from the 2016 Brexit referendum. For fiscal 2022, one should look north for potential dislocations in the United Kingdom. The pro-independence Scottish National Party and Scottish Greens Party have jointly won a majority in the Scottish Parliament and will likely push for another Scottish Independence Referendum before 2023, possibly during fiscal 2022. Although United Kingdom's equity market has rebounded sharply from its COVID-19 lows, it still trades below the pre-pandemic level with valuation multiples slightly below 10-year averages. Political uncertainty as well as the market's cyclical characteristics have likely contributed to this underperformance, and selective investment opportunities still exist in the United Kingdom.

Continental Europe suffered some of the worst COVID-19 casualties over the past year in the developed markets, starting when Italy became the first epicenter and many countries followed with repeated lockdowns. As the continent battled another wave of infections, its vaccination efforts were marred with supply disruptions and blood clotting concerns of the key AstraZeneca shots upon which the European Commission was heavily reliant. Countries have since pivoted to rely on the Pfizer BioNTech vaccine and dramatically improved the supply situation. As of the end of May, over 15% of the population have been fully inoculated across the European Union, a remarkable turnaround from the initial stall. If this rate of inoculation continues, it is possible for Europe to fully vaccinate up to 60% of its population by the end of summer. This will be extremely positive for the region's economy. The European Central Bank is expected to maintain an accommodative policy, with its 1.85 trillion euros Pandemic Emergency Purchase Program scheduled to extend through March 2022 at the minimum.

At this writing, local authorities in Germany have started to lift restrictions on restaurants, shops and cultural venues. Vaccination efforts in Germany experienced similar initial delays as the rest of Europe but the health ministry now is aiming for 70% of the population to be inoculated as soon as September. Poor execution with COVID-19 has cost the ruling CDU party popularity just as the country heads to the polls in September 2021. The Chancellorship is an important race as Angela Merkel is finally retiring after having served three terms as Germany's ultimate leader. On the other hand, the Green Party has gained momentum, led by a charismatic candidate, Annalena Baerbock. Barring significant changes in the parties' popularity, Germany likely will be led by a CDU/Green coalition with either party leader vying for the Chancellorship. The Green Party is considered a positive coalition partner with a constructive agenda that promotes investments in Germany's environmental and digital transformation, encourages reforms to ease Germany's constitutional debt limits, and supports the integration of Europe.

Whereas domestic economic recovery faced headwinds related to vaccination bottlenecks, many exports-oriented German companies benefited from strong pent-up demand globally. MSCI Germany trades above pre-pandemic levels at a valuation premium over its 10-year average. Further improvement in market returns hinges upon the ability of the economy to broaden its recovery to the service sectors. A large risk to the German market is potential regulatory overreach from a new government over issues such as the environment and labor, as well as restrictions on big businesses such as pharmaceutical and food companies.

The other important election to watch in Europe during fiscal 2022 will happen in France, as Emmanuel Macron faces re-election for President in April 2022. France's persistent struggle with COVID-19 and repeated lockdowns have cost him popularity in the opinion polls. In the meantime, the far-right led by Marine Le Pen is stepping up rhetoric threatening a "civil war" pointing to racial tensions involving the Islamic population. Macron is leading Le Pen in the polls currently. The election outcome is difficult to predict and the French market could be volatile as a result. Like Germany, France's vaccine roll-out was sluggish initially, though the speed has accelerated and the country has fully inoculated over 15% of its population as of the end of May. The French equity market is trading in line with its 10-year average valuation, although higher priced companies in the luxury and consumer sectors have led MSCI France to obtain a meaningful premium over its developed market peers.

In Italy, Giuseppe Conte was ousted as Prime Minister in February 2021 and the former European Central Bank President Mario Draghi replaced him. Draghi's government will focus on addressing the immediate issues including health care, vaccine distribution, and employment, as well as implementing a recovery plan aided by the Next Generation Europe stimulus from the European Union. The stimulus money and accelerating vaccination efforts should help Italy recover, though the tolls have already been significant with large budget deficits and mounting government debts. The Italian government's borrowing rate so far has been manageable, thanks to an unprecedented amount of loans and grants promised by the European Union, as well as the loose monetary policy of the European Central Bank. It is also dependent on the relative political stability of the new Draghi government to be maintained. While the Italian equity market appears cheap relative to its developed market peers, the more fragile state of the economy warrants it.

Spain's minority government is comprised of a fragile coalition between the far-left wing and center-left parties, aided by the abstention of Catalan separatists. Despite a deeply fragmented parliament, Spain approved its 2021 budget bill surprisingly quickly, a vast improvement compared to the prior years. Spain will need to implement a recovery plan aided by the Next Generation Europe stimulus from the European Union. Its economy, which is highly reliant on tourism, suffered the greatest contraction amongst major European countries during the pandemic. The tourism industry may need time to return to the pre-pandemic level, as uncertainties remain regarding the strength and length of vaccine protection, as well as the proliferation of viral variants. Reflecting a delayed tourism industry recovery, the earnings growth expectation of the Spanish market is lagging its developed market peers and the overall market valuation is just in line with its 10-year average.

Australia benefited from its remoteness during the pandemic, as its infection rate remains one of the lowest globally. Nevertheless, the government's swift actions to lock down international borders and restrict domestic movements pushed the economy into its first recession in nearly 30 years. Vaccination efforts in Australia have been highly disappointing, with the country having to switch course from AstraZeneca to Pfizer, and fewer than 30% of the population may be inoculated by the end of summer. Policymakers are warning that Australia's international borders could remain closed for all of calendar 2021, dampening the economic recovery. However, the rebound in commodities demand globally has helped Australia's resource-rich economy. The commodity and early cyclical companies have already been bid up to higher valuations with the rest of the market yet to catch up.

Having initially maintained better control of the COVID-19 outbreak than the United States, Canada has since lagged with its vaccination efforts. As of the end of May, Canada has fully vaccinated a little more than 5% of its population, and Justin Trudeau's promise of complete population coverage by September appears optimistic. Calendar year 2020 brought Canada its worst economic contraction in 50 years, though aid packages including wage, rent, and sector-specific subsidies eased the pain. Looking forward, increased vaccine coverage and strong global demand for commodities should help the Canadian economy to rebound strongly in fiscal 2022. Reflecting this optimism, MSCI Canada is trading meaningfully higher than its pre-pandemic level, driven by banks and resource companies. Valuation multiples look rich relative to their 10-year averages and opportunities are limited within Canadian equities.

Emerging Markets

The emerging markets return of +37.5% through April in fiscal 2021 was achieved primarily in the first half of the fiscal year while equity markets were boosted by improved economic and earnings growth outlooks and news of rapid development and approvals of COVID-19 vaccines. The emerging markets performance in the second half of fiscal 2021 has been more muted as growth stocks faced headwinds and several emerging countries experienced additional pandemic waves while vaccination rates lagged those in developed countries. Staff forecasts that the overall emerging markets in fiscal 2022 will earn a total return near normal primarily due to robust earnings growth and dividend yield.

The emerging markets valuation on both trailing and forward price/earnings multiples is higher than the historical average for the past ten years, while the current price/book value multiple is also higher than the

10-year average despite a lower than average return on equity. The earnings-based valuation multiples have contracted off 10-year peak levels reached near the end of calendar 2020 as earnings began to climb from the recession-induced bottom. Staff expects valuation multiples to continue to moderately contract in fiscal 2022 because consensus earnings for the emerging markets benchmark are currently projected to reach a new historical high by the end of fiscal 2022. There can be a more favorable outcome if investors remain attracted to equities in a low-rate environment and thus keep valuations elevated compared to historical averages. The emerging markets valuation multiples remain at significant discounts relative to the current levels in the developed markets. However, emerging markets are unlikely to outperform in any broad global selloff, particularly if the downturn is caused by an inflation scare or spread of a potent COVID-19 variant because these scenarios could disproportionally harm emerging market economies.

China remains a key factor for the emerging markets outlook as it is near a 37% benchmark weight. Although the country was the origin of the pandemic outbreak, China's real GDP grew more than 2% in calendar 2020 thanks to containment of the virus spread and stimulative government policies. China is now benefitting from better export markets due to a full recovery in global trade activity, so the policymakers have curtailed stimulative policies in calendar 2021 in order to attempt moderate deleveraging. The full impact of stimulus reduction on the domestic economy could occur in the first half of fiscal 2022. Although investors are concerned about an economic growth deceleration, the most likely outcome is that any overtightening would be quickly reversed with more stimulus to ensure favorable economic conditions in front of the 20th National Congress possibly to be held in October 2022 when senior leadership of the communist party is changed. Before any reintroduction of stimulus, commodity-exporting companies in the emerging markets could be negatively impacted by credit tightening within China.

The second- and third-largest countries in the emerging markets benchmark, Taiwan and South Korea, combine for another 27% of the benchmark. Both export-oriented economies have benefitted from the overall global trade improvement along with a surge in demand for technology-related hardware. The Taiwan outlook though does have identifiable risks. There is an acute water shortage and rising COVID-19 cases that both could result in a near-term curtailment in manufacturing production which could potentially exacerbate the global chip shortage and supply chain issues. Also, Taiwan faces the longer-term threat of conflict with China. South Korea will have a presidential election in March 2022 to replace the incumbent but the results might not be materially impactful to the market outlook. There will be elections and political developments in other countries though that will be impactful as political parties face pressure to maintain deficit spending from the electorate while at the same time the market is concerned about the sustainability of deficits and debt levels. For example, although Brazil's general elections won't be held until October 2022, the market is likely to be impacted by political news and polling in fiscal 2022.

STRATEGY

As fiscal 2021 draws to a close, the international portfolio at this writing is approximately $20.5 billion or 23.1% of total assets (includes 0.8% of total assets in Global Equities), slightly higher than the neutral target weight of 23%. The international asset class weighting did not deviate materially from the 23% neutral target throughout fiscal 2021. As markets climbed, rebalancing activity was initiated to withdraw capital to manage toward the neutral target weight and thus led to a net cumulative flow of funds out of the asset class of $1.9 billion through April 2021. Staff is projecting a normal total return for the International Blended Benchmark for the next 12 months, so the international asset class will likely be held near to a neutral position versus the target weight in fiscal 2022 unless the risk/reward outlook becomes more favorable.

Value stocks in fiscal 2021 reversed their multi-year underperformance trend versus growth stocks but the magnitude of value-style outperformance has not fully compensated for its historic underperformance recorded in fiscal 2020. The international portfolio will maintain a tilt to the value-style early in fiscal 2022 as staff believes that its outperformance can continue because it is still early in the recovery cycle for those international countries that have not fully reopened due to a slow pace of vaccinations and continued COVID-19 risks. The value tilt is likely to remain until either valuation spreads between growth and value stocks narrow to more normal levels or staff becomes concerned that the positive catalysts are eroding.

Fundamentals of the companies comprising the value and growth categories obviously will be a key driver of relative performance between the two styles. Financial stocks, an important component of the current value category, can benefit from normalized interest rates and a reduction in loan loss provisioning as economies continue to rebound. However, new fintech competitors are limiting the upside potential for some traditional financial institutions. Commodity stocks, another important component of the current value category, can also benefit from economic improvement if supply is restrained. The longer-term fundamentals for commodity stocks will likely diverge as the movement toward a lower-carbon economy will boost raw materials required for electric vehicles but in turn will constrain demand for oil. In the current growth category, internet-related stocks benefit from continued digitalization of economies but in certain areas, such as China ecommerce, face increased regulatory pressures.

The chart below shows the estimated allocations for assets internally managed, externally managed, developed and emerging markets investments at the end of fiscal 2021. We will be near a 78%/22% split between the developed and emerging markets within the asset class, which compares to the 80%/20% neutral points set for each. Staff anticipates that the developed/emerging split will move closer to the neutral points in fiscal 2022 as the slightly higher return expectation for emerging markets comes with an elevated risk profile. As shown below, the split between internally and externally managed funds is 55% internal and 45% external.

FISCAL YEAR-END 2021

(estimated)

	$ Invested (at Market)	Percent of International Assets
Internal Managers	$11,175 million	55%
External Managers	$ 9,295 million	45%
	$20,469 million	**100%**
Developed Markets	$15,990 million	78%
Emerging Markets	$ 4,479 million	22%
	$20,469 million	**100%**

As of April 30, 2021, $705 million is in a global portfolio. This portfolio is not included in the table above due to the fact that it includes developed, emerging, and domestic equity securities.

Strategic Initiatives

Staff previously communicated a strategic initiative to increase performance returns by creating additional exposure to international small-cap companies. As targeted in the Fiscal 2021 Investment Plan, staff issued a request for proposal (RFP) in the first quarter of fiscal 2021 to search for international small-cap managers. After extensive due diligence, staff selected three small-cap managers to hire and fund by the end of fiscal 2021. Small-cap performance in fiscal 2021 in the overall international markets has been better than the large and midcaps, and staff anticipates this outperformance can continue in fiscal 2022 as the pandemic risks recede. Therefore, staff will actively monitor for timely opportunities to allocate additional funding to the small-cap managers.

Staff will search for additional opportunities to increase returns in the international equity portfolio. One initiative under consideration is the hiring of an external manager dedicated solely to investing in Chinese equities. In fiscal 2022 staff will study the risk and return benefits to adding different categories of Chinese securities as a complement to the overall international equity portfolio.

Staff will continue to closely monitor the performance of all the international portfolios. The current internal/external manager platform will offer the flexibility to make allocation changes as necessary when market conditions change. The hiring of small-cap managers mentioned previously provides additional capacity. Looking at the portfolio from a risk budgeting standpoint, the highest amount of risk continues to come from the external managers. A lower amount of risk is coming from the internal managers, which is partly due to the passive core-EAFE component (i.e., Europe, Australasia, Far East). The other internal portfolios are being managed actively. Staff will continue to monitor and evaluate the proper allocation of risk across the international portfolio.

8. Real Estate Investments

OUTLOOK

Overview

At this time last year, staff indicated it expected the Blended Real Estate Benchmark to be well below the Board's long-term expected return for the asset class of 6.00%. Fiscal year, through March 31, 2021, the benchmark return stands at almost 6.5% and will likely finish the fiscal year above this point. This outperformance in relation to prediction was due to the abnormal stability of capitalization rates in the face of a severe recession and the strong rebound in the public REIT market. While private real estate is expected to start in earnest its recovery in the current quarter, the public markets (REIT) recovery is well entrenched and is expected to see modest improvement in the coming year, keeping the blended benchmark near its long-term target.

Public market real estate has returned 23% fiscal year to date through March; this was driven by an exceptionally sharp year-to-date recovery from its March 2020 drop of 34%, mirroring the overall equity market recovery. Staff anticipates public market returns will finish the fiscal year close to where they stand today. Including the recovery in the late spring of 2020, the index has almost attained its pre-pandemic high.

As of March 2021, the total return for private market real estate, as measured by NCREIF Property Index (NPI), is 3.6% fiscal year to date — about the same as last year at this time. Appreciation has been decelerating over the last three years and briefly turned negative for the first time in more than ten years. It has, as of fall 2020, reversed course and is slighlty positive for the fiscal year to date. Staff anticipates the NPI to end the fiscal year in the 5%–6% range.

Transaction volume for the January to March quarter was 28% behind on a year-over-year basis due to the effects of the pandemic. According to Real Capital Analytics (RCA), deal volume in the month of March had risen 11% off the year earlier period levels. Preliminary information on April and May indicates a more active market with buyers and sellers trying to reconcile opinions on post-pandemic valuations, thereby making deals slow to close.

Cross-border investment was down 31% in calendar 2020 vs. 2019. With $36 billion of activity, this compares to the recent peak of $100 billion in 2015. This represents only 9% of total investor activity compared to the recent high of 18% in 2015 according to RCA and is below the long-term average of 12%. The activity of Canadian players outpaced that of other cross-border investors over all four quarters of 2020. Investors from outside North America posted an average 74% annual decline in acquisitions in second and third calendar quarters of 2020 versus only an average 60% decline on the part of Canadian investors. Into the fourth quarter of 2020, Canadian investors rebounded, with the pace of acquisitions up 21% from a year prior.

Transaction activity is expected to recover in fiscal 2021, recovering most of the ground lost in the last year. With interest rates still near historic lows, even with the recent upturn in the treasury, overall cap rates have yet to move in a meaningful way. In fact, data compiled by Real Capital Analytics indicates that cap rates have actually declined as we moved through the brief, albeit deep, recession and corresponding recovery. This is unlike the preceding downturns where there was cap rate expansion to adjust for increased perceived risk in the recessionary environments. Spreads to 10-year U.S. Treasury yields had widened significantly due to the decline in interest rates. Although still higher than the long-term average, the spread to treasuries has come in somewhat due to recent increase in interest rates.

Through March, fiscal year-to-date total return for REITs stands at a positive 23% versus a negative 22% for the same period last year. According to Green Street Advisors, the retail strip centers value estimates are down about 12% from pre-pandemic levels. Retail strip centers are the most resistant to the pandemic effects due to the necessity-based retailers they house. Even with this as a strong backstop, retail was and is still expected to have limited incremental upside available in the public markets. Full recovery will take some time. Apartment REITs, on the other hand, are relatively cheap in Green Street's view. The office

REITs are still trying to determine if there are any lingering demand effects from the increase in work from home, leading Green Street to still think the sector is richly priced even if it is currently priced at a current "discount" to NAV of almost 30%. Even with a strong recovery, industrial REITs are considered fairly priced and expect a positive return going forward due to strong demand and increasing difficulty obtaining entitlements for new development in desired locations.

In fiscal 2021, staff anticipates the blended benchmark total return will be above the Retirement Board's long-term expected return for the asset class of 6.00%.

Property Markets

The effects of the global economic shock due to the pandemic response has continued to affect real estate fundamentals. The initial effect, that was mostly relegated to retail properties, has been slow rent collection and strained cash flow. The loss of income has not affected all property types equally. Retail is still recovering from the forced closure of stores, movie theaters and restaurants. Highly leveraged gyms, restaurants and theater tenants are on watch lists as they try to avoid bankruptcy. This is expected to continue throughout the next fiscal year until tenant sales can recover to near pre-pandemic levels. The immediate effects on other property types have been somewhat insulated in the near term due to the predominance of long lease terms and higher credit tenancy for office buildings, or in the case of industrial, definitive positive effects due to logistical changes brought on by the pandemic. Apartment markets are nearing recovery in most non-gateway markets. Gateway markets are recovering more slowly due to heightened and elongated pandemic restrictions.

After a weak start, the capital markets slowly started to recover in the latter half of the fiscal year. Debt became available for creditworthy buyers, unlike the global financial crisis when nearly all capital markets closed. Commercial mortgage-backed securities and debt funds have ramped up underwriting after experiencing low demand in the beginning of the fiscal year. Fannie Mae and Freddie Mac are still in business for financing the multifamily sector.

The good news for the retail property market is that there has been almost no new supply of retail space constructed, especially in the last 18 months. It has been the demand side that has suffered as described above. Many retailers had previously adjusted to e-commerce by developing an omni-channel approach to sales. E-commerce grew about 30% in 2020 versus a consistent 15% gain in the previous 10 years. With e-commerce now over 15% of total retail sales, brick and mortar retailers took solace in store traffic bouncing back to near pre-pandemic levels this spring as vaccinations started to make customers more comfortable with shopping in person.

The apartment sector has been a steady performer throughout the lengthy recent economic expansion. Demographic trends and shifts in lifestyle have buoyed rental growth and value creation. While some demographic trends may not be as supportive going forward, the lifestyle shift to renter-by-choice seems to still be in place. Nationally, supply and demand seem to be in balance. Urban core high rise apartments have lagged in the recovery in relation to suburban properties. This trend is turning as the urban areas have seen increased traffic at their properties with corresponding increases in occupancy.

Rent growth turned negative last year with the introduction of large rent concessions to entice would-be-renters, thus lowering effective rent and cash flow. Job and income growth drive rental growth and both have suffered in the current situation. Investor demand still remains strong with cap rates falling the most of all the main property types. The sector's health and subsequent value enhancement is directly dependent on the solidification of these drivers, primarily in the big cities.

The industrial sector continued its strong performance that began in earnest last year. New supply as a percentage of existing has ranged between 1.0% and 1.7% per year for the last seven years and is in line with net absorption, which, according to data collected by Cushman & Wakefield, has steadily dropped the national vacancy rate to 4.9% as obsolescence removes supply. They contend that newly developed space will begin to outpace demand in the near future. However, they also report that rental growth has well outpaced inflation at 7.8% over the same period last year. Investor demand for this product has been very strong as it is viewed as still being in the early part of a rent growth cycle, as described by Green

Street Advisors. This had driven national average of cap rates to the lowest point in more than 20 years. The pandemic will have lasting effects on how goods are distributed. E-commerce, re-shoring and the creation of industrial zones closer to the central city cores through redevelopment will all reshape the opportunities in this sector.

Office space under construction currently totals approximately 100 million square feet versus a four-year average of 115 million square foot according to Cushman & Wakefield statistics. With net absorption down in the first quarter as well as through last year, there have been very few new projects started. This, coupled with no overbuilding in the sector for many years, have given the office sector some rationale for rental growth in the future.

The major concern for the office sector is on the demand side. Work from home has impacted tenants', owners' and investors' views on the sector. With little clarity on how this will play out, the office transactional market has slowed 37% year over year through the first quarter of calendar 2021 according to Real Capital Analytics. Cap rates and other pricing parameters are not entirely clear at this point and will not be until the fundamentals have incorporated the impact of work from home. The knee jerk reaction that large numbers of jobs are leaving the big cities seems overreaching at best. Some analysts have produced estimates for up to 15% reduction in office demand. However, this is mitigated by the fact that these decisions will play out over several years as leases expire. Additionally, many big employers are determining that work from home does not work for their companies — especially those in the professional and sales categories of businesses. Those that hire new college graduates regularly also have concerns regarding onboarding and transference of corporate culture. It seems that tenants that have a highly independent employees, (i.e., programmers) or those with repetitive types of tasks will be better suited for a work from home situation. Some of the countries that have already opened their economies will be tell-tale indicators of how office demand will shape up stateside.

Returns

After six calendar years of double-digit returns through 2015 for the NPI, the longest on record, returns have been decelerating to single-digit total returns in a measured manner — with a fiscal 2020 return collapsing due to the effects of the pandemic. The negative NPI Price returns continued for three quarters, finally turning positive in second quarter of fiscal 2021. Last quarter, NPI Price return accelerated to 0.7%, the highest since the first quarter of fiscal 2019. We expect NPI Total returns in the current fiscal year to finish in the 5% to 6% range. Fiscal 2022 will likely continue the positive NPI Price return trend and staff expects Total NPI to be in the 5%–7% range. The table below demonstrates the changes in private real estate returns during the last three years as of March 31, 2021. The NPI represents 85% of the STRS Ohio Real Estate Blended Benchmark.

NCREIF PROPERTY INDEX (NPI)

One-Year Ending	Income	Price	Total
March 31, 2021	4.1%	(1.5)%	2.6%
March 31, 2020	4.5%	0.7%	5.3%
March 31, 2019	4.6%	2.2%	6.8%
Three-Year Annual Average	**4.4%**	**0.5%**	**4.9%**

Real estate returns are driven by both the underlying property fundamentals, through cash flow, and the capital market valuations that incorporate return expectations and assumptions regarding future cash flow growth. Since the inception of the NPI (1978) calendar year, the capital market component has represented just about 20% of the average total return, with the income component being the primary appeal of real estate.

Although the cash component has been the majority of NPI Total return, it has been on a very slow downward trend for more than 20 years as the value of real estate has appreciated. In the past 10 years, the

NPI Income component has been very consistent but also on a gradually decreasing trajectory — from 5% in 2002 to just above 4% in this fiscal year.

Dating back to the years just before the Great Recession, the capital market was the primary driver of returns, both positive and negative. In calendar 2005 price appreciation peaked at 63% of total return. On the negative side, in calendar 2009, capital markets pulled NPI down and were responsible for 78% of total NPI return that totaled a negative 16.9%. Although fiscal 2021 NPI Total Return is expected to be close to its long-term expected range, the components of how it was achieved were extremely volatile. With the capital markets now stabilizing and improvements in fundamental conditions for increasing cash flow, we will see a more traditional balance on the components that drive Total NPI return for the next couple years.

Specifically, the capital market assumptions regarding cash flow growth have been the largest component of total return since 2016, as the cap rate compression valuation gains had not been able to contribute as much due to narrowing spreads to the treasuries. This pattern reversed in fiscal 2021. Cash flow growth declined significantly and turned negative. The NCREIF NOI Index declined about 20%, with all but industrial properties seeing big declines. At the same time, there was a compression in cap rates that increased valuations to such a degree it overcame the negative influence of this substantial negative cash flow growth.

However, the recent drop in treasuries to historic lows, and thereby drawing cap rates with them, may be reversing. The cap rates response to the sub 1% treasuries environment was muted as spreads widened. Currently, with treasuries trading about 100bp above their lows, the spreads to cap rates have narrowed a bit, thereby stabilizing overall valuation parameters. Improving economic conditions will increase investor confidence in underwriting future cash flow assumptions, thus increasing values. In contrast to last year, more optimistic assumptions regarding cash flow growth in the short term are expected to be a contributor to increased valuations and thus total return. This, along with normalizations of cap rates to the historically low interest rate environment, both will add to returns for the near term.

Real estate is now widely accepted as an important component of a multi-asset class portfolio, which brings much more capital market influence than in the early years when it was maturing into an institutional asset class. In fact, over the past 15 years institutional allocation targets have doubled, and all categories of institutional investors are currently under-allocated to those targets. This pent-up demand for real estate investment will mute the potential depreciation that could be caused by increasing interest rates. It appears that cap rates will have some resistance to move up significantly, thereby reducing the impact of one component of potential depreciation. Real estate is now an integral part of institutional portfolios with long-term allocations that are not likely to be reduced. Relative returns versus other asset classes may become attractive again if the low interest rate environment continues. Staff expects total returns to go back to expected long-term ranges in the foreseeable future depending on the speed of the economic recovery and its effects on expected cash flow growth.

While the underlying fundamentals of the real estate held in REITs are the same as private market real estate, in the short-to-intermediate term, public market share prices are impacted by a wider range of factors compared to the private market. There is also additional volatility associated with the public market as seen by the extreme price fluctuations seen recently in March and April of 2020. REITs experience a more immediate pricing impact to changing interest rates or investor sentiment. REIT valuation relative to NAV is still in transition due to the pandemic-induced economic shock. Green Street Advisors projects that some sectors have not been as severely affected by the pandemic and look favorable versus NAV while others will suffer a while longer. Overall, according to Green Street Advisors, REITs are still considered to be reasonably priced due to improving fundamentals and spread to various debt measures. The key for the REIT investor will be sector selection and operator selection because of the divergent projected near-term outlooks.

Staff anticipates the blended benchmark total return for the asset class in fiscal 2022 to be at or slightly above the Retirement Board’s long-term expected return for the asset class of 6.00%.

The following table outlines the expected range of returns, based on property type, for transaction market pricing in fiscal 2022. There has been a lowering of the initial yield expectations especially with regard to industrial and apartment properties. This reflects the impact of the continued search for yield and the appeal of real estate in comparison to other investment alternatives. Increased allocation to the sector, even through the pandemic, has started to turn up pricing pressure — driving down yield expectations. Staff expects the investment market activity to continue to gain strength through the first half of the fiscal year before leveling as we enter fiscal 2023. There is still significant capital allocated for real estate, and the historically low interest rate environment has caused yield spreads to real estate to be attractive on a relative basis. Competition for high quality assets continues and will be most robust for industrial and apartments, which will remain high on an institutional investor's wish list. It is possible that there may be some transactions appropriately priced below these levels.

TRANSACTION MARKET PRICING EXPECTATIONS FOR FISCAL 2021

Property Type	Initial Yield*
Retail	4.00%–6.50%
Apartments	3.75%–5.50%
Industrial	3.50%–5.25%
Office	5.00%–6.50%

*Average annual 10-year holding period returns are expected to range from 1.00%–2.00% higher than the initial yield.

STRATEGY

Allocation

As of May 1, the real estate asset class is just under $7.6 billion. Including expected year-end loan pay off and potential acquisitions, the asset class will finish slightly higher at $7.8 billion — up from $7.4 billion at the beginning of the fiscal year. This translates into a projected weighting for the asset class of 8.4% by the end of this fiscal year, below its 10% neutral allocation. This is down from 9.7% at the start of the fiscal year and is primarily due to the large increase in the equity asset values.

Due to the slowed transaction market over the course of the past year, STRS Ohio's activity was less than normal. Staff evaluated the portfolio for disposition candidates, and by fiscal year end we expect to have sold about $74 million. New investment is expected to end the year near $100 million. Portfolio debt was only marginally changed throughout the year.

Staff expects to see write-downs diminish and appreciation to be positive in fiscal 2022. If the other asset classes remain stable or grow in value, even with expected net additions to the real estate portfolio, the asset class will remain under the targeted allocation in fiscal 2022.

Diversification

Public Investment (REITs)

The REIT portfolio is currently managed passively and is expected to be marginally above its 15% neutral weighting for the foreseeable future to assist on keeping overall real estate allocation closer to the 10% target. This portfolio will be transitioning in fiscal 2022 toward a more actively managed portfolio.

Private Investment

Geographic

As shown in the table below, the direct portfolio is diversified across the four regions, although concentrated in a few large cities in each region. There was limited transaction activity in fiscal 2021 thereby little change in diversification due to most markets being practically shut down for much of the year.

GEOGRAPHIC DIVERSIFICATION (CORE ONLY)
(As of March 31, 2021)

	STRS Ohio	STRS Ohio vs. NPI
East	36%	1.16X
Midwest	17%	2.11X
South	12%	.59X
West	35%	.87X

Staff will continue to focus portfolio holdings and acquisitions in major metropolitan markets across the country to provide for diversification — both geographic and economic. On the Core portfolio, major markets are emphasized, given the need to hold a mixed portfolio with critical mass to enable efficient asset management, as well as to benefit from the increased liquidity typically found in these markets. However, on a very select basis, additional markets may be considered for a particular property type.

Property Type

The table below details STRS Ohio's weightings in the four traditional property sectors, as well as the comparison to the benchmark. The decrease in apartment allocation is due to sales and loan allocation. The increase in industrial is due to acquisitions and increased valuations.

PROPERTY TYPE DIVERSIFICATION (CORE ONLY)
(As of March 31, 2021)

	STRS Ohio	STRS Ohio vs. NPI
Apartment	21%	.83X
Industrial	22%	1.01X
Office	44%	1.28X
Retail	13%	.71X

STRS Ohio has three apartment projects in the development process with operating partners. Construction was completed in 2020, but stabilization will not occur until early fiscal 2022 due to delayed lease up during the pandemic. Staff expects values to increase in these projects as the lease up progresses and this would correspondingly be a small increase in allocation to the sector. Although the pandemic delayed these projects' stabilization to a small degree, these apartment projects are examples of staff's strategy of focusing on urban infill or transit-oriented locations. These locations appeal to the younger population that is attracted to properties providing a live-work-play environment, as well as to empty nesters wanting easy access to an active social life. There is already a turn in the leasing markets, and we expect fundamental and valuation improvements in the near future. It is possible these secular trends may be modified by the pandemic and changes in social behavior; however, staff believes they will still be strong drivers going forward.

The industrial sector, essentially even to the benchmark weighting, is STRS Ohio's top performing property type for the sixth year in a row. This sector has been the most competitive over the last few years for new acquisitions. We were able to acquire one asset in a California joint venture and expect to close on another in a to-be-developed New York joint venture that already has a long-term lease in place. We expect development will be a primary way to access this highly competitive asset type.

Our largest overweight is with respect to the office sector. In recent years, STRS Ohio sold office assets that offset recent office purchases which had temporarily increased office weighting. We will continue to rotate out of investments that no longer fit in the portfolio to upgrade and diversify from either a locational or physical structure standpoint, as was done with these recent transactions. Long office lease terms and credit tenancy fared well during the pandemic and we expect it will have modest returns as we sort out the work from home phenomena.

Shopping patterns changed during the pandemic and are now beginning to reverse as the economy starts to open. Last year, online sales increased at an annual rate double that of the preceding five years.

Early indications are that this will retract to a more trendline growth of 15% per year. Even as brick and mortar retail recovers the sales it lost, it continues to have challenges that are not easily resolved. These were accelerated by the pandemic, increasing risk in the sector. Dominant centers — particularly grocery-anchored shopping centers that have in-line tenants that are less exposed to online retailing — are expected to provide relatively stronger long-term returns. It is important to be very selective in the retail sector, as location and tenant line up are critical to success. Staff is satisfied with the underweight to this sector and plans to keep an opportunistic view toward acquisitions looking for pricing dislocations for high quality assets. Staff was able to make one such purchase this past year in a dense, infill submarket of Atlanta.

As discussed in the asset class presentation to the Retirement Board in the fall of 2016 and strategic initiative update in March 2018, staff continues to pursue two new property sectors — senior living and medical office, as the history of these sectors has provided uncorrelated returns to traditional core real estate. The commitments made in 2019 are continuing to fund with another $36 million funded in the past fiscal year.

Property Life Cycle

As mentioned earlier, industrial and multifamily assets are still in high demand by investors, given the continued positive long-term outlook for the fundamentals in these sectors. This popularity puts pressure on yields that are already at or below 4% and are not expected to move upward in the near future. This has caused staff to continue to consider making development an alternative route to access these property types at more attractive yields. Staff will continue to monitor the investment market, and specifically, advantageous development opportunities afforded by the current economic situation. Undertaking development in any property sector entails additional risk that should be reflected in higher expected returns.

Leverage

At March 31, 2022, the leverage ratio is approximately 28.9%. There is no significant long-term debt maturing in fiscal 2022. The above referenced leverage ratio includes a STRS Ohio's $400 million portfolio loan. This interest-only loan matures in May of 2023. Staff will manage the use of leverage in the direct portfolio below the policy limit of 50%.

International

Portfolio Composition:

- $639.8 million total portfolio
- 8.6% of total real estate
- $773.0 million in unfunded commitments
- 35 funds with 13 managers
- 289 total investments
  - 62% Europe
  - 33% Asia
  - 3% United States (via global funds)
  - 2% Latin America

2021 Activity:

- Commitments to three funds aggregating $160 million were made during fiscal 2021 allocated 63% Asia/37% Europe. The new funds continue the strategy of targeting the major markets and core asset sectors in their respective regions. Approximately $500–$600 million of the unfunded commitments is expected to be invested or expire by the end of fiscal 2024.

- COVID-related lockdowns have accelerated the structural changes required by e-commerce which has benefitted the logistics sector. This is particularly evident in Asia where strong demand is reducing the time required for assets to achieve stabilization to two years from four years. Office assets continue to show resiliency as lease defaults are virtually non-existent and demand for new/renovated space remains stable. On the other end of the spectrum, the hotel and retail sectors remain depressed throughout Europe.
- While the level of capital searching for yield remains strong, the uncertainty of the timing of a recovery from COVID caused a wide bid/ask spread for core assets, resulting in a drop off of transaction volumes. Distributions for fiscal 2021 were only 10% of NAV, well off prior years' averages of 20%–25% of NAV.
- Contributions/drawdowns of commitments approximated 21% of the unfunded commitment balance, which is on pace for the prior four years. While COVID caused a three month pause in investment activity, managers were able to assess the impact and: 1) allocated more capital to the e-commerce-influenced sectors of logistics and data centers; 2) adjusted schedules on development projects and the related drawdowns; and, 3) pursued investments in other sectors after prices were sufficiently discounted to account for COVID.
- Spreads between entry yields/yields on cost and interest rates on borrowing continue to be favorable. However, in an effort to maintain a prudent risk portfolio, managers are being diligent in their use of leverage with portfolio LTV ratios averaging 55%–60%.

Life Cycle:

- Early Stage — $184.0 million (29%) — assets held less than 25 months

  The going in basis achieved by the managers on these assets typically result in early gains, but a substantial portion of the increases in value occur in the later stages. This segment becomes the building block of future gains as the managers execute their business plans.
- Mid Stage — $315.3 million (49%) — assets held 25–60 months

  These assets should be a major driver of performance as the managers complete the business plans for each asset. The asset quality continues to improve, and value increases are recognized. A majority of the best-performing assets are sold during this period.
- Mature Stage — $69.6 million (11%) — assets held 61–84 months

  Once assets enter this stage, usually 90% of the value increase has been recognized and liquidation within the next six-to-24 months is expected; therefore, this segment will only generate minimal returns but should generate cash flow.
- Obsolete Stage — $70.9 million (11%) — assets held longer than 84 months

  Not every asset in a fund meets its return objective. Assets in this stage have failed business plans as managers await fundamentals to cycle back in their favor. These assets are typically disposed of when the funds meet their term limits (9–10 years) and LPs do not grant extensions.

Returns:

- Fiscal year–to-date as of March 31: -2.99%
- Trailing five years as of March 31: 7.55%
- Trailing five-year returns still show a favorable 174bps margin over NPI despite current fiscal 2021 trailing NPI by 663bps. The fiscal 2021 returns are negatively impacted by three significant factors: 1) COVID and its disproportionate impact on the hotel and retail industries; 2) exposure to Brazil; and 3) currency movements.
  - Hotel/Retail Exposure — The portfolio had a 21% exposure to the Hotel and Retail sectors at the beginning of fiscal 2021, excluding an investment in Brazil. These sectors experienced a 20%

write-down in gross value, resulting in an 8.5% negative valuation impact on the portfolio spread over fiscal 2020 and fiscal 2021 after accounting for leverage.

- Exposure to Brazil — The portfolio had an 8% exposure to Brazil, with the exposure allocated 90% to retail malls. Despite changes in the political arena, the economy has struggled to find its footing for several years. The onset of COVID not only has dampened the economic outlook further, but it has also exposed/hastened the unsustainable tenancy of the malls causing the investment to go into bankruptcy. This resulted in a 7.0% loss to the portfolio spread over fiscal 2020 and fiscal 2021.
- Currency — The portfolio is 80% hedged, with the objective to remove currency fluctuations from the returns. In fiscal 2021 the U.S. dollar devalued, resulting in losses in the hedges for the first time in three years — culminating in a 2% negative impact on the portfolio.

Offsetting the factors above was e-commerce. The Logistics/Data center sectors account for 28% of the portfolio, and funds with at least a 50% allocation to those sectors generated a 6.5% return for the portfolio in fiscal 2021.

Outlook going forward is positive: It appears that all of the marginal COVID assets in the portfolio have been fully reserved. During fiscal 2021 approximately 75% of the negative adjustment in valuations were confined to three funds, all with exposure to retail in the U.K. and Brazil. Also, 80% of the losses were attributable to assets in the mature/obsolete stage of the investment cycle — indicating that the more recent investments are in sectors less impacted by COVID. The result is that over 75% of the portfolio is allocated to the Logistics, Residential and Office sectors, with strategies designed to fulfill the increasing demand for space that meets the evolving demands of technology and safety. In addition, managers have liquidity reserves which should allow them to retain those hotel/retail assets that have potential to recover in value. Overall, the portfolio is well positioned to fully participate in the ensuing economic recovery.

Regional Overview:

In Europe, government furlough schemes have shielded households from the crisis, with unemployment increasing only marginally (+2%) in the eurozone and U.K. Cooperation among the EU leaders resulted in a €1.8 trillion financial package, including €750 billion in loans and grants for worse-affected countries. The increased coordination among the respective EU country heads reduced downside risk in the near term, while the economic reform requirements of the package improve prospects for long-term growth. Assuming no significant reintroduction of lockdown measures, the consensus view is that output will return to pre-COVID levels in early 2022 for the EU-28. GDP is expected to fall by 8% in 2020, followed by a +6% rebound in 2021. It is likely that there will be variation in national performance, according to economic structure, breadth and severity of lockdown measures and the degree of government fiscal support. For example, industry-orientation and generous state support in Germany are likely to enable economic outperformance. By contrast, Spain is reliant on tourism and financial support from other EU countries. Brexit also creates uncertainty in the outlook, especially for the U.K. and Irish economies given the unresolved issues concerning trade. After a slow start in countries such as Italy and Spain, European countries have also demonstrated a more coordinated public health response to the pandemic. The real estate sector provided mixed signals as investment volumes fell 20% from 2019 levels, yet yields for core assets remained steady at approximately 4% — evidencing capital's continued desire for the sector. Geopolitical trends are also likely to create opportunities as some studies suggest Europe stands to gain economically from the U.S.-China trade. All of the above factors create diversification benefits for allocations to European property sectors.

Asia Pacific (APAC) economies have adapted successfully to limit disruption to economic activity during the COVID-19 global pandemic. At the end of 2020, APAC economies had cushioned the impact of the pandemic to a contraction of 1.3% year-over-year on GDP, compared with a global decline of 3.9% year-over-year. Extensive stimulus and fiscal support schemes assisted in managing the economic downfall, and indications from government authorities show that measures are expected to continue in 2021. After a sharp and short decline in the early months of 2020, business confidence started to recover in the second half of the year. Data from a Google mobility report shows that business activities across major Asian cities were back to 80%–85% of pre-pandemic levels by late February 2021. Major Asian economies have been reporting positive growth in private investment and net employment since the third quarter of 2020. Firms, notably in the technology, medical, and financial and business services sectors, are expanding. As such, the region is projected to see an economic recovery in 2021.

Asia Pacific's commercial real estate transaction volume continued to recover, seeing an increase of 41% on a quarterly basis in Q4 2020 to U.S. $36 billion. Investment activity improved across most markets, including Japan, mainland China, Australia, New Zealand and Hong Kong. Data centers and Logistics registered strong growth in transaction volume over the year, supported by the e-commerce boom and remote working requirements. Despite concerns over office demand, investors displayed strong interest in the sector, with office transaction volume in the second half of 2020 rising by 37% over the first half of 2020.

Transaction volume in the Japanese real estate market increased 7.6% year-over-year with buyer interest concentrated on office and logistics. In Greater Tokyo, logistics vacancy remained at a record low 0.5% for a second quarter in a row. Residential rents dipped slightly by 1.9%, although demand for larger units appears to persist. With overall exceptionally low rent delinquency rates, residential investments remained popular with investors. Office leasing was subdued, increasing Tokyo Grade A vacancy slightly to a still relatively low 1.5%. Nonetheless, office transaction volume remained upbeat, making up the majority of the year's real estate transactions (38%).

In the Chinese market, office leasing activities in tier 1 cities in the mainland were static. In general, occupiers remained cautious, but fewer downsizing cases are being observed. The retail market saw leasing demand return to pre-pandemic levels, assisted in part by local government incentives. At the same time, the state regulator introduced caps on bank lending for property developers and mortgages, which is expected to create private debt opportunities in the coming months.

The South Korean real estate market saw annual net office absorption in 2020 reach 1.2 million square feet, demonstrating brisk leasing activity despite COVID-19. In Q4 2020, overall net effective rent for grade A office in Seoul increased 1.9% year-over-year. Quarterly transaction volume of $3.5 billion pushed annual totals to an historical high of $11.7 billion. With the benchmark interest rate remaining at a record low 0.5%, and the interest rate on treasury bonds also expected to remain low, the Seoul market is expected to remain upbeat on the back of abundant liquidity coupled with investor preferences for core assets.

While the path of recovery is still projected to be long with the persistence of social distancing protocols into 2021, some expect Asia Pacific will see faster recovery because of better COVID-19 containment overall. Many of the managers' target markets continue to see good liquidity, strong pricing, and stable valuations.

Latin America represents only 2% of the portfolio. Until favorable fundamentals appear on a sustained basis, new investments in Latin America will not be pursued.

For fiscal 2022, focus will be placed on pursuing strategies that can exploit dislocations wherein the price of an asset becomes detached from the underlying fundamentals in targeted markets due to undermanagement of the asset or transformation occurring due to changes brought on by e-commerce and other technological advances. Overall, such opportunities may exist in: 1) mispriced/under-managed assets in the core markets of the U.K., Germany, France, and other Western European markets; 2) industrial sector dynamics; 3) assets owned by corporations, governments, and lenders in Japan; 4) bank NPL portfolios; and 5) China, on a select basis in tier one cities, with a focus on the industrial sector.

The principal guideline continues to be to invest in regions exhibiting multiple/compelling opportunistic factors with a focus on core markets supported by improving property fundamentals, and emerging/developing markets exhibiting sustainable, strong growth underpinned by stable governments and functioning financial markets.

Strategic Initiatives

Staff continually evaluates initiatives to improve existing asset returns, as well as to analyze accretive new investments. The following describes some of these:

- Move from passive to active management of the REIT portfolio.
- Invest in new target markets. We have identified new markets and are currently evaluating new investments.
- Pursue and invest in profitable joint ventures with local practitioners. This program has had good performance and we are expanding it.
- Investigate product types. We are currently in fund vehicles to learn about medical office and senior living.
- Deal structuring. We have many structures that have proved profitable, but we are enhancing them and intend to expand them. We are currently underwriting two tax advantageous joint ventures to gain access to product types we believe will produce core plus returns.

9. Alternative Investments

Asset Allocation

The alternative investments asset class is comprised of two portfolios: private equity and opportunistic/diversified investments. The most recent asset-liability study conducted in fiscal 2017 established the current 17% neutral long-term alternatives investments allocation target, including 7% private equity and 10% opportunistic/diversified. We estimate that the allocation to alternative investments will be above this level throughout fiscal 2022, but within the net rebalancing range of the asset class.

Alternative Investments Returns

For fiscal 2022, we forecast the total return for the alternative investments asset class to be at the 7.09% STRS Ohio Policy return objective, projected within a 6.0%–9.0% range.

Commitment Pace

We anticipate new commitments of $1.25 billion to $2.6 billion across total alternative investments. This commitment pace is in line with the current long-term targeted neutral asset allocation. The range of projected commitments creates significant flexibility to address potential changes to allocation targets and long-term return targets.

Underwriting

Our investment underwriting will take into account the STRS Ohio economic forecast for the fiscal year. Our underwriting emphasizes managers that have generated returns in excess of both short-term and long-term benchmark performance and direct and co-investments with attractive projected risk-adjusted returns. Additionally, because the investment horizon of the asset class is longer than the annual investment plan forecast, we also target managers with a demonstrated ability to navigate past economic cycles, target direct and co-investments with demonstrated low- or non-cyclicality and we incorporate the possibility of future economic slowdowns into our underwriting.

Strategic Initiatives

We remain focused on building the direct and co-investment portfolio, and in fiscal 2021 we hired two new direct and co-investment professionals to support this effort. As of fiscal year-to-date April 30, 2021, we executed 30 direct and co-investments totaling approximately $300 million in market value.

We continue to execute on new strategic partnerships that we believe offer better fee economics and provide access to high-quality direct and co-investment deal flow. To date, we have established strategic partnerships within both the direct lending and direct and co-investment themes totaling $635 million in commitments and $259 million in market value as of April 30, 2021.

We also continue to refine and improve our processes for collecting and tracking fee-transparency-related information.

Private Equity

For fiscal 2022, we expect the one-year return for the private equity portfolio to be at the STRS Ohio Policy return objective of 8.15% (net of fees), projected within a range of 7%–11% (net of fees).

PRIVATE EQUITY OUTLOOK

We expect our private equity portfolio performance to continue to track the movements of the public markets in the near term, benefitting from the tailwinds of broader economic recovery, partially offset by high asset prices and potentially increasing cost of debt capital.

Fiscal 2021 year-to-date distributions from private equity funds are equal to approximately 95% of contributions. We expect the pace of contributions to decrease and the pace of distributions to increase during fiscal 2022 relative to recent fiscal years, reflecting the impact of lower commitment volume in fiscal years 2020 and 2021. Distributions are currently projected to outpace contributions in fiscal 2022.

PRIVATE EQUITY STRATEGY

In last year's Annual Investment Plan, we forecasted committing $250 million to $600 million to private equity funds during fiscal 2021. Through April 30, 2021, we have made $611 million in total private equity commitments, consisting of (on a dollar-weighted basis) 88% domestic buyout funds, 3% venture capital funds, and 8% global/international funds, and we do not project additional private equity commitments through the end of fiscal 2021.

For fiscal 2022, we currently anticipate making new commitments to private equity of $300 million to $600 million. We anticipate focusing new capital commitments on our highest performing private equity managers while selectively adding new managers with compelling track records and high expected returns. We maintain the flexibility to execute on attractive opportunities as they arise and, as a result, commitments may be below or modestly above this projected range. Two key factors which will influence our commitment strategy include the current overweight position of private equity relative to its neutral target allocation and potential opportunistic secondary sales, which remain a tactical option for private equity portfolio management.

During fiscal 2022, we anticipate that the market value weightings of the portfolio categories in the following table will generally remain within the percentage ranges shown.

PRIVATE EQUITY PORTFOLIO (AS OF APRIL 30, 2021)

(in millions)

	Projected % of Total PE Market Value	Market Value	Projected Allocation Ranges For Fiscal 2022
Domestic Private Equity Funds	50%–60%	$ 5,208	70%–80%
Venture Capital Funds	25%–30%	$ 2,868	10%–15%
Global/International Private Equity Funds	15%–20%	$ 1,711	10%–15%
Public Private Equity	0%–2%	$ 165	N/A
Stock Distribution Portfolio	0%–2%	$ 54	N/A
TOTAL		**$ 10,006**	

Opportunistic/Diversified

For fiscal 2022, we forecast the one-year return for the opportunistic portfolio at the STRS Ohio policy return objective of 6.35% (net of fees), as determined in the fiscal 2017 asset-liability study, projected in a range of 5%–8% (net of fees).

OPPORTUNISTIC/DIVERSIFIED OUTLOOK

As the world continues to recover from the economic impact of COVID-19, we believe opportunistic strategies remain attractive due to their flexibility to provide desired capital solutions to companies recovering from the crisis and ability to capitalize on potential market dislocations amidst an uneven recovery. Given the recovery in most areas of the financial markets during fiscal 2021, fewer compelling distressed and dislocation-related opportunities are projected to be available. We anticipate managers will seek privately originated capital solutions over public markets given pricing levels and ability to influence investment structures. As a result, we anticipate focusing on special situations and specialty finance managers with unique sourcing capabilities and versatility to underwrite highly complex transactions, continuing to focus on direct lending managers with strong origination and credit track records, and targeting managers with the ability to partner with us on our strategic initiative regarding our direct and co-investment program.

OPPORTUNISTIC/DIVERSIFIED STRATEGY

In last year's Investment Plan, we projected new opportunistic/diversified commitments for fiscal 2021 of $1.25 billion to $2.75 billion. Through April 30, 2021, total opportunistic/diversified commitments were $1.6 billion, consisting of (on a dollar-weighted basis) 87% opportunistic funds and 13% direct and co-investments.

During fiscal 2022, we anticipate making new commitments to the opportunistic/diversified portfolio of $1.0 billion to $2.0 billion. We expect such commitments to have a greater relative allocation toward opportunistic investments and direct and co-investments as the opportunity set within these strategies remains attractive. We will continue to utilize diligent underwriting and focus on strategies that offer downside protection, unique return sources and attractive relative risk-adjusted expected returns.

During fiscal 2022, we anticipate that contributions to opportunistic/diversified investments will likely exceed distributions; however, distributions could increase above forecast as robust credit markets will likely increase refinance activity and opportunistic managers realize investments made during the COVID-19 dislocation.

- In fiscal 2022 we expect commitments of $0.8 billion to $1.5 billion to less liquid, longer-term opportunistic funds, which call capital over several years. This commitment amount is higher than the long-term commitment pacing trend, as the opportunistic/diversified portfolio is currently underweight its long-term neutral allocation due to the rotation from the diversified portfolio into the opportunistic portfolio which began in fiscal 2021. We continue to seek attractive opportunities to re-invest distributed capital into new opportunistic commitments.

  In all opportunistic themes we anticipate allocating capital to our highest conviction managers in the existing portfolio and selectively adding new managers to diversify risk within each theme. We anticipate a keen focus on assets that benefit from data usage and digitalization trends, and staff continues to search for strategies with attractive risk-adjusted returns relative to the other themes.

- We anticipate continuing to utilize diversified investments as a source of liquidity to fund new opportunistic fund commitments and direct and co-investments. We estimate net distribution activity in fiscal 2022 for the diversified portfolio to approximate $200 million to $600 million. Diversified investments will continue to play a role in meeting investment objectives in fiscal 2022, and we will opportunistically explore new managers and strategies.

- We anticipate direct and co-investment commitments to range between $250 million to $500 million during fiscal 2022. Direct and co-investment commitment pacing will continue to be influenced by asset prices, credit spreads and overall private markets transaction volume. We will continue to take a disciplined approach building a risk-adjusted portfolio where thematic performance is accretive to the overall opportunistic portfolio performance. We expect a majority of our co-investments will continue to be originated from existing manager relationships and strategic partnerships; however, we will continue to opportunistically invest with new managers that fit opportunistic/diversified strategic criteria and underwriting standards.

In opportunistic/diversified, investment activity falls within the nine separate themes referenced in the Portfolio Summary below, each of which is subject to the market value maximum set forth in the corresponding right-hand column. We expect the market value of each theme to be within its projected range, as set forth in the column immediately next to each theme. The market value of each theme is as of April 30, 2021.

Consistent with our opportunistic/diversified strategy, in fiscal 2022 we are decreasing our market value maximums for hedge funds to $500 million from $1.0 billion and for energy & natural resources to $1.0 billion from $1.5 billion, as the near-term opportunity sets for both are less attractive on a risk-adjusted basis relative to the other opportunistic themes, and we are increasing the direct and co-investment market value maximum to $1.5 billion from $1.0 billion. Additionally, we are increasing the market value maximum of banking, insurance and asset management to $1.5 billion from $1.25 billion due to potential embedded asset value appreciation and the near-term potential pipeline.

OPPORTUNISTIC/DIVERSIFIED PORTFOLIO (AS OF APRIL 30, 2021)

(in millions)

Theme	Projected % of Total OD Market Value	$ Market Value	$ Market Value Maximum
Banking, Insurance and Asset Management	10%–20%	$ 950	$ 1,500
Direct and Co-Investments	5%–20%	$ 530	$ 1,500
Direct Lending	15%–25%	$ 1,378	$ 2,000
Energy & Natural Resources	0%–5%	$ 345	$ 1,000
Hedge Funds	0%–5%	$ 256	$ 500
Infrastructure	0%–5%	$ 16	$ 250
Liquid Alternatives	5%–25%	$ 1,500	$ 2,000
Public-Private Investment Funds	0%–5%	$ 2	$ 100
Specialty Finance	25%–35%	$ 2,249	$ 3,000
Total		**$ 7,225**	**$11,850**