Fiscal 2021
Investment Plan

June 18, 2020

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1. Purpose

The Investment Plan provides the fiscal year 2021 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 2021 Investment Plan Overview

FORECAST IN BRIEF		
	Fiscal 2021 Projected Ranges	**FY 2020 Forecast**
Real Gross Domestic Product	7%–8.5%	(11.7%)
Real Personal Consumption	11.25%–12.75%	(14.5%)
Real Business Fixed Investment	(7.5%)–2.5%	(15.3%)
Housing Starts (millions)	0.95–1.15	1.172
Real Net Exports (billions)	($780)–($720)	($847.8)
Consumer Price Index Ex Food & Energy	0.75%–2.25%	1.4%
S&P 500 Earnings	$130 10.2%	$118 (27.6%)
	Fiscal 2021 Projected Ranges	**End of April 2020**
Federal Funds Target Rate	0%–0.25%	0.125%
10-Year Treasury Note Yield	0%–1.50%	0.625%

ECONOMIC OVERVIEW

Recessions in the United States and elsewhere likely began in March when countries and regions imposed lockdown policies to slow the spread of the coronavirus pandemic. The disruption in economic activity from these governmental policies significantly affected real gross domestic product growth in fiscal 2020's third quarter even though they started largely in the last month of a quarter that had been displaying signs of stronger economic growth from a truce in the U.S.–China trade war. In the United States, real gross domestic product growth plunged an annualized 4.8% in fiscal 2020's third quarter. This marked the second largest quarterly decline in the past 38 years, eclipsed by only one quarter — an 8.4% output collapse in the Great Recession. Yet, the worst is to come with the Bloomberg weighted-average consensus U.S. growth rate projecting a 35.5% annualized plummet in fiscal 2020's final quarter. That would be more than 3.5 times worse than the post-World War II record holder of a 10% dive during 1958's first calendar quarter. Increasingly, the U.S. and foreign economies are reopening, but what will likely appear as a fast turnaround in growth from such a severe interruption to economic activity should finish fiscal 2021 well short of conditions prior to the pandemic.

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

- U.S. real (inflation-adjusted) gross domestic product (GDP) should grow in the region of 8% in fiscal 2021 after plunging nearly 12% in fiscal 2020. Real private domestic final sales growth (GDP less volatile inventory changes, government spending and foreign trade) should grow about 9% after a nearly 15% collapse in fiscal 2020. Consumer spending growth should lead the way as more and more businesses reopen and alleviate some of the pent-up demand, but non-residential investment will likely continue to fall for much of the fiscal year as companies adjust to a new way of doing business in a pandemic era. Employment trends will improve from a better than 10% drop in fiscal 2020's final quarter, but businesses will likely gradually rehire workers over fiscal 2021. The monthly unemployment rate that could peak around 15% or higher in fiscal 2020's fourth quarter should end fiscal 2021 at roughly 7% — double the unemployment rate prior to the lockdowns. With historically low mortgage rates and an improving jobs market, the housing sector should improve in fiscal 2021

from the recession collapse. Presidential election year politics could also shape U.S. economic growth in the upcoming fiscal year, according to how each of the major parties lay out future federal fiscal and regulatory policies.

- Economic recovery is going to be uneven across countries and may proceed in fits and starts as either partial lockdowns persist, or consumers and businesses stay cautious about spending and investment, respectively — preventing both developed and emerging countries from regaining all of the lost output from their recessions. Inflation in all countries should stay subdued, as businesses are unable to raise prices significantly when demand is gradually recovering. Monetary policies should remain expansionary and policymakers stand ready to do more when required. Focused currently on aid, fiscal policies should shift toward stimulating economic growth in fiscal 2021.
- U.S. inflation should remain low with the threat that deflation continues into the early stages of fiscal 2021. Federal Reserve policy is already extraordinarily aggressive by providing unmatched liquidity and monetary stimulus when the recovery begins in fiscal 2021. However, it will continue to address all shortcomings in monetary policy (excluding negative short-term rates where no consensus exists) that could hold back a recovery. No change in short-term rates and continually growing quantitative easing will be the hallmarks of Federal Reserve policy in fiscal 2021 and likely beyond.
- U.S. fiscal 2021 growth in the 7%–8.5% baseline range after a historic collapse in the second half of fiscal 2020 has about a 50% chance of occurring. A continued recession risk or weak economic activity carries about a 30% chance of occurring, while more of a V-shaped stronger recovery carries about a 20% chance. The baseline U.S. forecast of 8% real GDP growth and 1.2% GDP price index growth is notably slower than the Bloomberg weighted average consensus real GDP growth of 9.6% and the Blue Chip Economic Indicators GDP price index growth of 1.6%.

TOTAL FUND OUTLOOK

STRS Ohio investment assets are currently estimated at $75.2 billion as of the end of April 2020. Investment staff projects a base case scenario with a positive total fund return at-to-below 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 2021, 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 2021 relative to the Retirement Board's policy for expected average annual returns. The current fiscal 2020 total fund return will likely end the year with a return that is below the policy return, following above-average returns in fiscal year 2017 and 2018 and a return near the policy return in 2019. The total fund has earned a positive return in each year following fiscal 2009, but this trend may not continue in fiscal 2020, 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 2021
Liquidity Reserves	2.25%	Below Normal
Fixed Income	3.00%	Below Normal
Domestic Equities	7.35%	At-to-Below Normal
International	7.55%	At-to-Below Normal
Real Estate	6.00%	Below Normal
Alternative Investments	7.09%	Normal
Total Fund	**6.84%**	**At-to-Below Normal**

Based upon market levels during mid-May 2020. Should market levels change significantly by late June 2020, an updated projection will be issued.

INVESTMENT PLAN THEMES

- *The longest economic expansion on record has ended as the coronavirus spread globally, leading to widespread lockdowns and a historic collapse in economic conditions during the second half of fiscal 2020. The STRS Ohio economic forecast for fiscal 2021 expects the U.S. economy to grow at a real rate of about 8% with inflation below the 2% target of the Federal Reserve, representing a below-consensus forecast for nominal GDP growth. As a result, this forecast expects the U.S. economy to emerge from this deep recession in fiscal 2021, but it will fail to recover all of the lost output for several years as consumers and businesses remain cautious about spending and investment. The baseline forecast for real GDP growth reflects a range of 7%–8.5% and carries a 50% probability of occurrence with a 30% probability for recession or near-recession conditions continuing throughout the year and a 20% probability of a V-shaped upside scenario.*
- *Asset prices are adjusting to this new era amid this unusual and unprecedented disruption in the economic and capital market environment. In some cases like public equities, the surprisingly strong market recoveries in late fiscal 2020 remove some of the upside potential from fiscal 2021. As economies reopen, it is still highly uncertain how the virus will evolve and whether there will be efficacy from potential treatments or vaccines currently being studied. There is also an unusual lack of visibility for the fundamental outlook of the economy and company earnings. We expect volatility and uncertainty to remain high and expect we could potentially experience abrupt reversals in investor confidence which lead to buying opportunities in the upcoming fiscal year. With such a wide range of potential outcomes for the upcoming year, we expect the total fund return in fiscal 2021 to vary more than usual during the next 12 months, but end fiscal 2021 with a return that is at-to-below 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 onset of this deep recession. We have moved "Recession" to the high probability scenario, but retained it in the medium financial impact because it has not resulted in a significant negative return for fiscal 2020. While we are forecasting an economic recovery during fiscal 2021, if the recession persists throughout the full 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 occurred at the outbreak of the pandemic in March 2020. Another study is scheduled to begin in early fiscal 2022. The coming year in fiscal 2021 will likely provide highly useful insights that can inform decisions for the next study as we evaluate how the economy and financial markets emerge from this event and potentially impact the next business cycle and long-term expected returns.*
- *The alternative investment team is continuing its efforts to pursue direct and co-investments, consistent with the board's strategic initiative. Staff is making meaningful progress on this initiative with deal flow picking up considerably in fiscal 2020 from fully engaging new and existing strategic partnerships. The board will be updated on this progress in September 2020, a discussion which was scheduled for March 2020 before the STRS Ohio investment seminar was postponed. Staff will continue to move ahead on the initiative in fiscal 2021 as opportunities develop. We also plan to continue to build out our internal capabilities further in the asset class in fiscal 2021 with the likely hiring of two new members to the alternative investments team that were already in process in fiscal 2020.*
- *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 2020. 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 2021 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 2021

(as a percentage of total assets at market)

	July 1, 2020 Neutral Weight	Preliminary April 30, 2020 Weight	General Strategy for Fiscal 2021*
Liquidity Reserves	1%	2.7%	We expect short-term interest rates to remain stable in fiscal 2021 following two large, successive reductions in the federal funds rate totaling 150 basis points during March 2020 in the midst of the financial crisis. We expect the current Federal Reserve policy rate may remain in place for an extended period with the economy slowly recovering from the depths of the current recession and inflation forecasted to remain below the Federal Reserve's 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%	17.3%	Staff expects relatively low volatility of U.S. Treasuries with some potential for moderate price appreciation from other spread sectors, but only if economic and market conditions continue to stabilize. With a beginning yield on the benchmark near 2%, we project the asset class to generate returns below the policy return of 3%. Large withdrawals occurred during the third fiscal quarter of 2020 to facilitate total fund asset allocation rebalancing, and we begin fiscal 2021 with a reasonably large underweight and low expectations for competitive returns compared to other assets classes, leaving an underweight to the asset class likely for all of fiscal 2021.
Equities			The disruption to the global economy from the lockdown is providing significant challenges for investors to develop reasonable earnings forecasts for many companies, especially since forward guidance from company management lacks normal visibility. We don't expect overall earnings in fiscal 2021 to recover to levels that existed before the pandemic began and may even take several years to do so. With the market recovery that has occurred during April and May 2020, this has removed 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 contribute to above-average returns. We are currently modestly underweight to combined public equities, but our strategy will be altered tactically as our outlook and valuations evolve during this uncertain year.
Domestic	28%	28.1%	
International	23%	22.6%	
Total Equities	51%	50.7%	
Real Estate	10%	10.2%	The real estate asset class is projected to have returns below the long-term policy return of 6% and most likely will be negative for the fiscal year as valuations adjust lower to the challenging fundamental backdrop for real estate that has developed from the recession. We begin with an allocation near neutral to the 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 move moderately below the neutral target weight during fiscal 2021.
Alternative Investments			We project returns for the alternative asset class to be at the long-term policy returns in fiscal 2021. We will begin fiscal 2021 above the alternative investment target weight of 17%, with private equity above target and opportunistic/diversified near target. Staff will be moving to a lower commitment pace in PE to help lower the asset class weighting closer to target and will be looking to reallocate exposure from the diversified portion of opportunistic/diversified into more opportunistic areas as changing capital market conditions warrant.
Private Equity	7%	9.5%	
Opportunistic/Diversified	10%	9.6%	
Total Alternatives	17%	19.1%	
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, 2020 Weight
Domestic Equities	7.35%	18.70%	28%	23%–33%	28.1%
International Equities	7.55%	21.30%	23%	18%–28%	22.6%
Fixed Income	3.00%	3.75%	21%	12%–28%	17.3%
Real Estate	6.00%	16.45%	10%	6%–13%	10.2%
Private Equity	8.15%	32.80%	7%	4%–10%	9.5%
Opportunistic/Diversified	6.35%	12.34%	10%	6%–14%	9.6%
Liquidity Reserves	2.25%	0.90%	1%	0%–5%	2.7%
Total Fund	**6.84%***				

*Does not include active management returns.

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 $12.7 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 100 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 2.0% (two times 1.0%) of this return 95% of the time (i.e., between 6.0% and 10.0%). Similarly, in a year when the benchmark return is –3%, the STRS Ohio return is expected to be between –5.0% and –1.0%.

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, 2020, active management risk, and the fiscal 2021 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 60–140 basis points during fiscal 2021. 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 2021 ACTIVE MANAGEMENT RISK

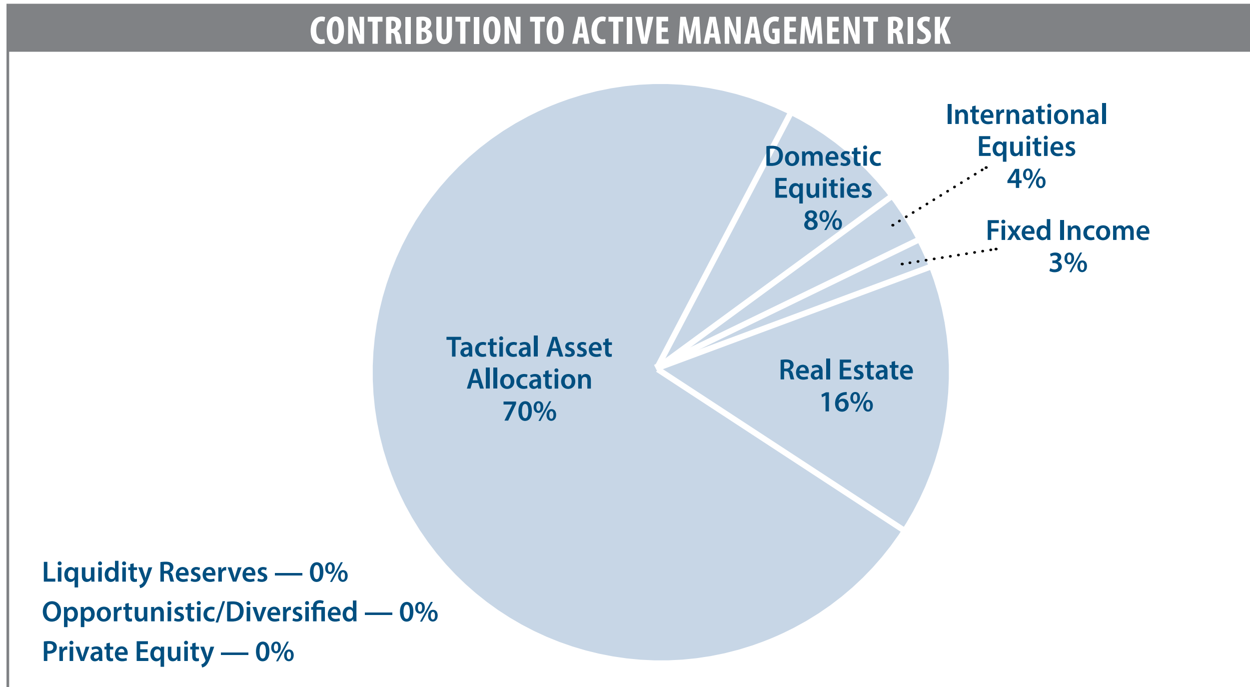
Asset Class	April 30, 2020 Active Management Risk (basis points)	Expected Fiscal 2021 Operating Range (basis points)	Policy Range (basis points)
Liquidity Reserves	N/A	N/A	N/A
Core Fixed Income	63	40–150	10–150
Domestic Equities	74	50–120	20–150
International Equities	92	75–150	60–250
Real Estate	350	350*	200–700
Alternative Investments	N/A	N/A	N/A
Tactical Asset Allocation	79	40–120	N/A
Total Fund	**100**	**60–140**	**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 ←

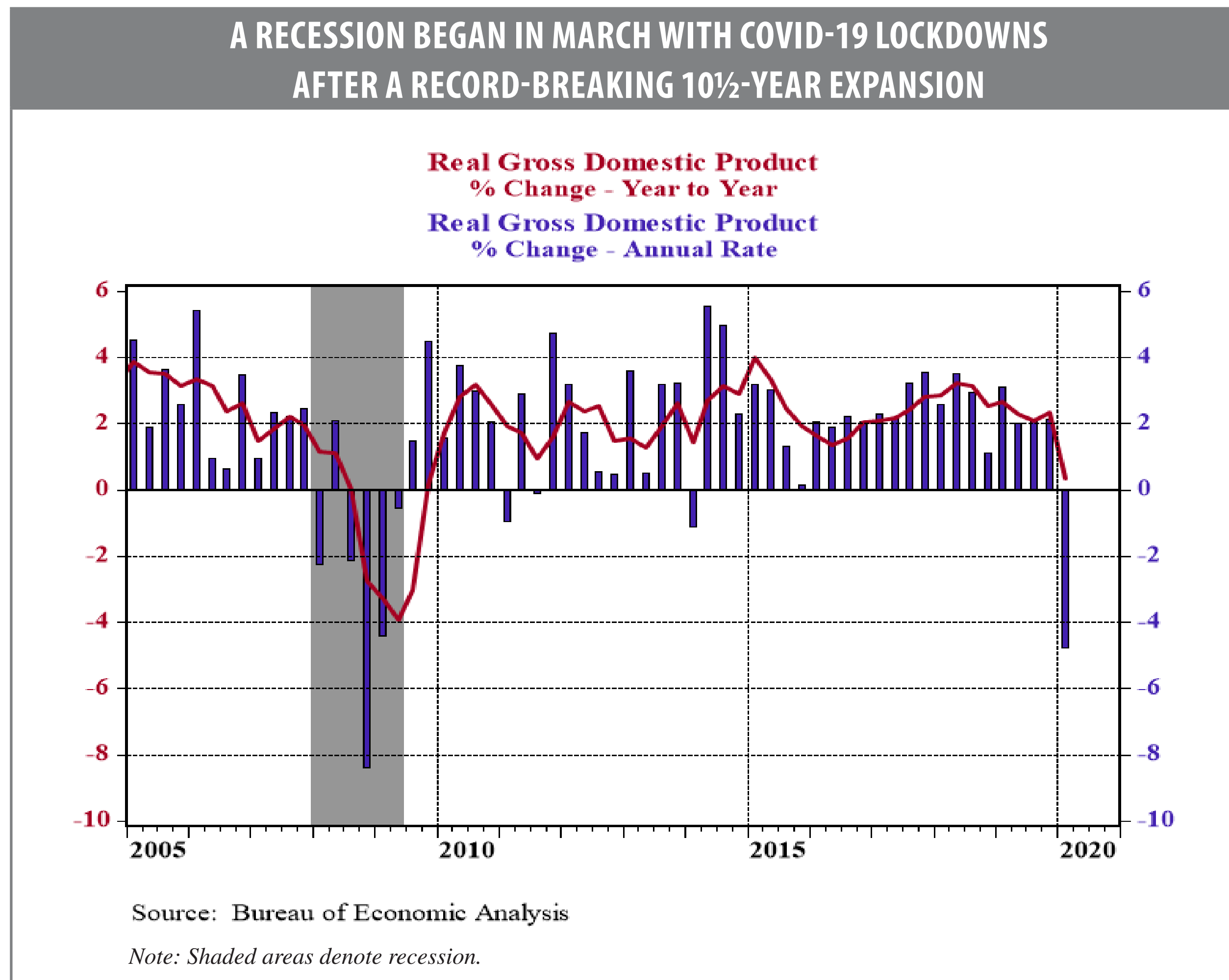
FINANCIAL IMPACT ↑	HIGH	MEDIUM	LOW
HIGH	• Not earning the actuarial assumed rate of return over the 10-year period	• Long-term sovereign deficit and debt issues	• Diversification ineffective • Significant negative investment return in any one year
MEDIUM	• Recession	• Global financial stress related 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 2021 Economic Outlook

U.S. ECONOMIC GROWTH AND INFLATION OUTLOOK

At the beginning of fiscal 2020, the United States set a record for the country's longest economic expansion — surpassing the 10-year growth cycle from 1991–2001. The expansion would last another eight months before COVID-19 pandemic mitigation efforts led to stringent lockdowns and business closures across the country that caused a 4.8% annualized plunge in real gross domestic product growth (GDP) in the third fiscal quarter (see the chart below). Other than the 8.4% annualized collapse of real GDP in the second quarter of fiscal 2009 during the Great Recession, the latest plunge was the steepest in the past 38 years. Furthermore, the magnitude of the decline was limited by the collapse occurring in the final three weeks of March while economic activity in January and February had been accelerating following a truce in the China–U.S. trade war that had clouded the economic outlook over the prior year.

A RECESSION BEGAN IN MARCH WITH COVID-19 LOCKDOWNS AFTER A RECORD-BREAKING 10½-YEAR EXPANSION



Note: Shaded areas denote recession.

The final quarter of fiscal 2020 will not avoid the lockdown timing issue of the third fiscal quarter. Economic output within the quarter will collapse by a historic amount when real GDP is reported at the end of July. Most estimates place the expected descent in that quarter's economic activity within a range of an annualized –35% to –40%. The STRS Ohio economic forecast expects a 38.7% annualized collapse of the economy in fiscal 2020's final quarter after the loss of 20.5 million jobs in April alone — more than 10 times the previous worst monthly job loss of nearly two million in September 1945 following the end of World War II. The current record holder for the worst quarterly decline in real GDP in the post-World War II period was an annualized 10% drop in the first quarter of calendar 1958 during the 1957–1958

recession. That downfall was roughly just a quarter of the expected collapse for the final quarter of fiscal 2020. Indeed, the worst quarterly economic output performance during the Great Depression was a 38.2% annualized decline in the third calendar quarter of 1932.

While the fall in quarterly economic activity should be on the scale of the worst during the Great Depression, the length of the current recession could only be about four months as opposed to the Great Depression's 43 months. Post-World War II recessions have averaged 11 months and the shortest recession during that period has been six months in 1980 that preceded a longer and deeper recession just a year later. Therefore, such a deep and short in duration recession like the one we are likely experiencing has not occurred in U.S. economic history and the rebound from this recession could be just as unusual.

Much of the mitigation efforts by states to control the spread of COVID-19 were eased or lifted in mid-May onward. Along with aggressive federal monetary and fiscal policies that were developed to, first, establish a floor to the economic freefall and, then, ultimately provide stimulus for an economic recovery, many businesses began the process of reopening and rehiring laid-off workers. The rebound in economic activity will not completely offset the decline from the second half of fiscal 2020 for many years to come as businesses and consumers adapt to ongoing concerns with the coronavirus spread and damage. Nonetheless, after a steep collapse, stronger economic growth from a much lower level of activity should lift the U.S. economy out of recession and onto a path of recovery.

U.S. real (inflation-adjusted) gross domestic product (GDP) should grow by roughly 8% in fiscal 2021 after it plunged 11.7% in fiscal 2020. 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 9.1% after a 14.7% collapse in fiscal 2020. The overall and core measures of economic activity have registered just as strong growth rates in the past following severe contractions or when better fundamentals for employment growth and productivity existed, but the likely surges for real GDP and real private domestic final sales in fiscal 2021 largely will be due to a rebound from a nearly unprecedented decline in the level of activity instead of strong underlying economic fundamentals. Their growth rates should appear impressive because they are built off far lower levels than that recorded at the end of calendar 2019 before the pandemic, yet it will take many years to recover the amount of output that was lost from even this likely short recession.

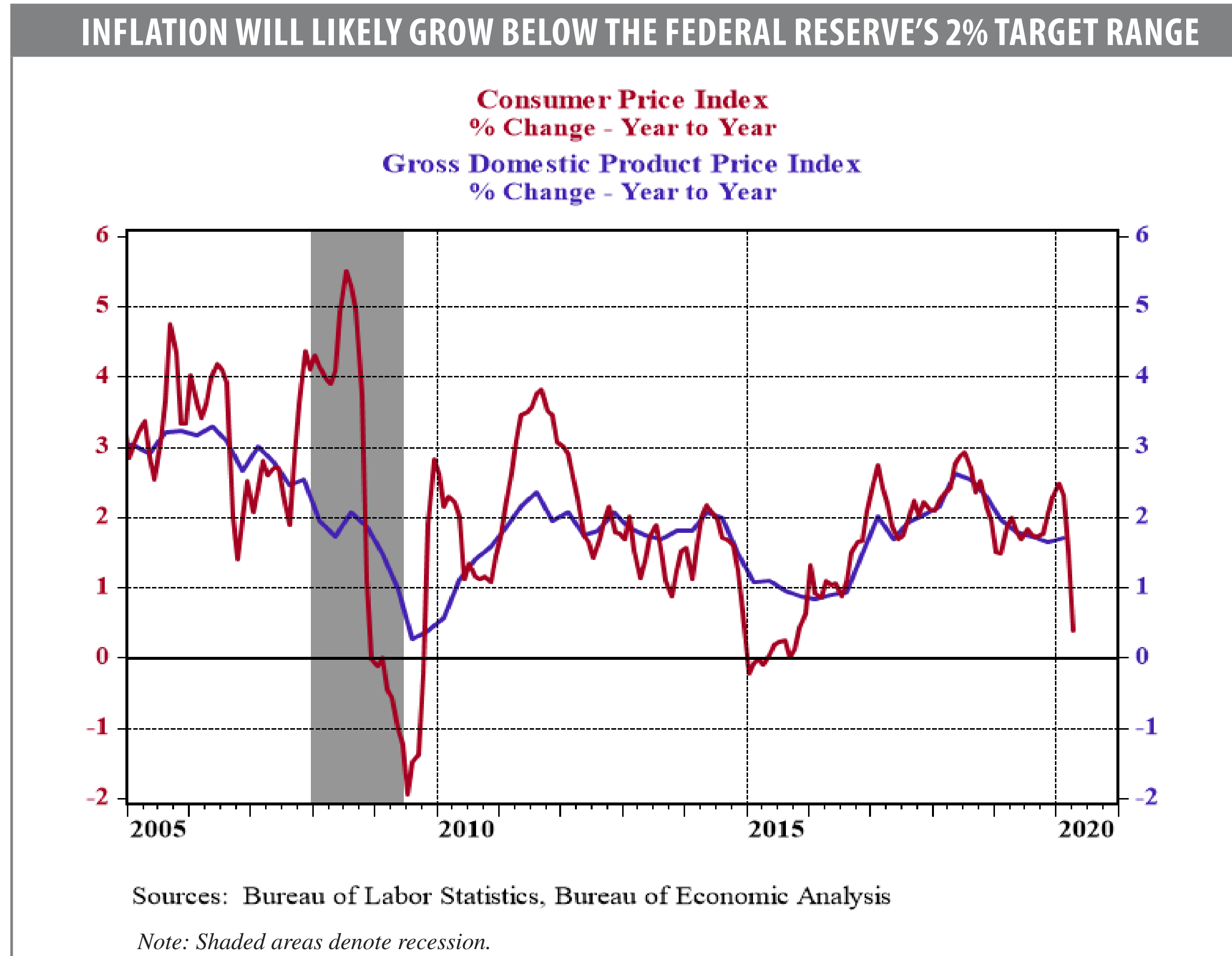
Consumer spending growth should lead the way as more and more businesses reopen and alleviate some of the pent-up demand of shoppers. Employment trends will improve for consumers from a better than 10% drop in fiscal 2020's final quarter, but businesses will likely gradually rehire workers over fiscal 2021 rather than returning all or nearly all laid-off workers at once to their jobs. The monthly unemployment rate that could peak in the 15%–20% range or go even higher in fiscal 2020's fourth quarter should end fiscal 2021 at roughly 7% — double the 50-year low in the unemployment rate that existed prior to the lockdowns. The unemployment rate should average about 8.5% for the entire upcoming fiscal year after a 6.3% average in fiscal 2020 and a 3.8% average in fiscal 2019. Personal consumption growth is expected to advance by 12.2% in fiscal 2021 after a 14.5% collapse in fiscal 2020. Its long-term trend growth rate, outside of unusual recessions like the current one, would fall into a 2%–2.5% range.

With historically low mortgage rates and an improving jobs market, the housing sector should improve in fiscal 2021 from the recession collapse. Before March, total U.S. housing starts averaged 1.42 million units in fiscal 2020, a significant improvement from fiscal 2019's 1.22 million units. However, along with all other economic sectors, the lockdowns and closing of many businesses led to a plunge in housing activity over the remainder of fiscal 2020. In April alone, only 891,000 home constructions were started, resulting in a reduced level of activity only recently beaten during the bursting of the housing bubble in the Great Recession. Housing starts should rebound to about a 1.04 million unit pace with most of the gains occurring in the second half of the fiscal year. The same applies to real residential investment growth that is expected to advance by 4% over the fiscal year from the end of fiscal 2020.

Business fixed investment will likely continue to fall for much of the upcoming fiscal year as companies adjust to a new way of doing business during an ongoing virus pandemic. The uncertainty over how they will connect with their customers should continue to slow investment in structures and equipment while

investment in intellectual property products could improve from a search to manage business in new ways and provide at-home entertainment during an uncertain global economic and public health climate. Furthermore, when the virus effects settle down, companies will be forced to reconsider how their supply chains are set up. When the virus began in China, supply lines for many American companies were heavily disrupted because of their dependence on China's comparatively cheap labor costs to produce items for products that were ultimately manufactured in the United States. However, the lack of supplies coming from China when its economy slowed to a halt also significantly slowed production in the United States. These events could lead American companies to shorten their supply lines in the future and bring some production back to the United States where it would be easier to manage. However, for fiscal 2021, non-residential investment will likely continue to fall by nearly 5% after a severe 15% collapse in fiscal 2020.

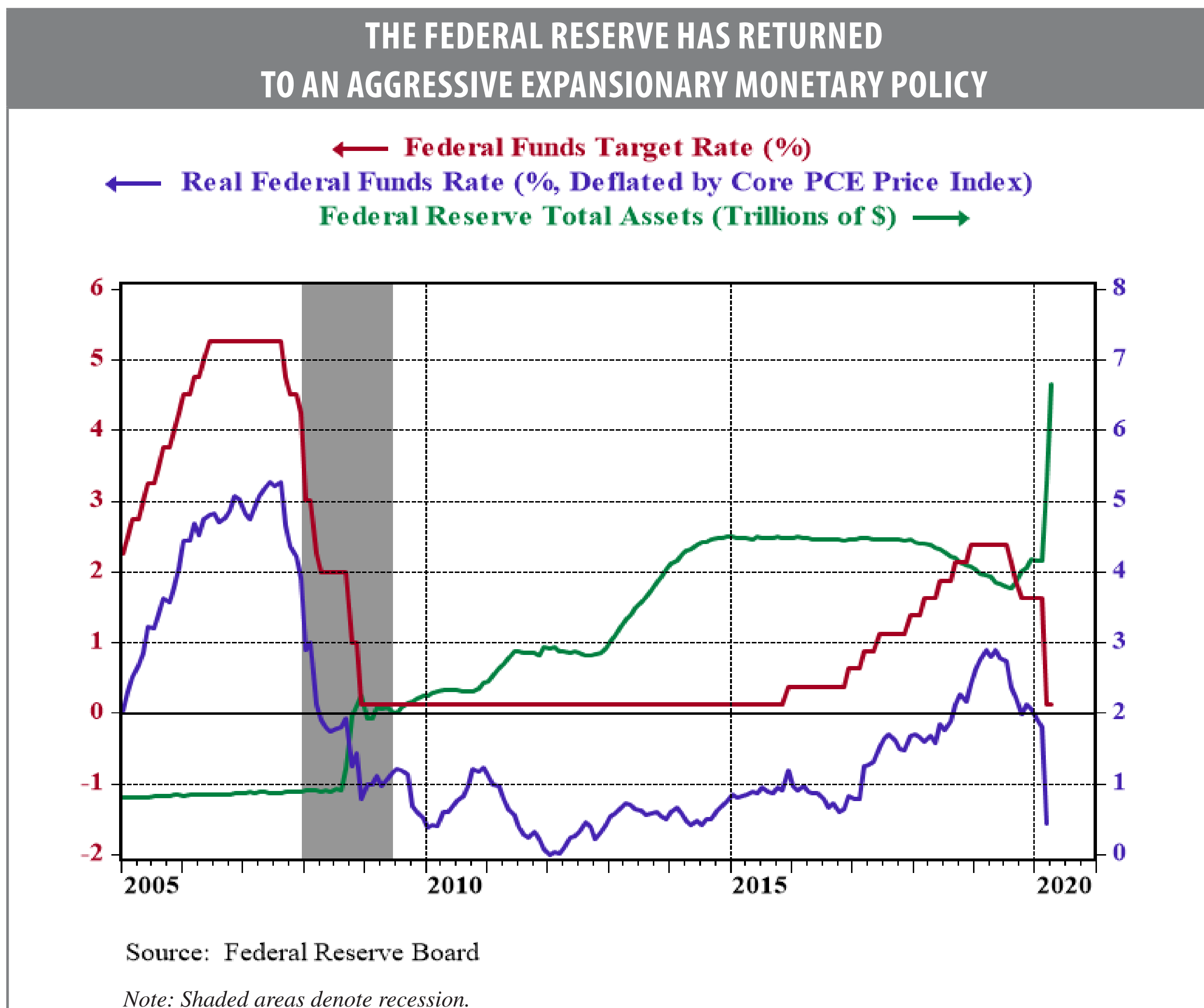
INFLATION WILL LIKELY GROW BELOW THE FEDERAL RESERVE'S 2% TARGET RANGE



Along with the nearly unprecedented decline in economic activity during the final quarter of fiscal 2020, the demand destruction from the lockdowns has significantly slowed U.S. inflation growth. Energy costs, in particular, fell dramatically from a Russia versus Saudi Arabia production battle and the much lower demand from largely closed economies around the world. Consumer prices fell an annualized 5% in March before an even larger 9.1% annualized drop in April. That lowered the year-over-year pace (red line in the above chart) to just 0.4% through April and the threat of deflating consumer price growth looms large as it last did during the Great Recession. Meanwhile, the broadest measure of inflation in the U.S. economy — the GDP price index (blue line in the above chart) — continued to grow by 1.7% over the year through the third quarter of fiscal 2020. It too, will decelerate when new information for the final fiscal quarter is added. In each case, inflation measures will be growing or declining well below the Federal Reserve's stated objective of about 2% long-term inflation. For fiscal 2021, the STRS Ohio forecast expects the GDP price index will show a 1.2% bounce from just a 0.1% increase in fiscal 2020

while consumer prices should grow by 2.2%. As with the forecasts for economic activity, the inflation forecasts suggest stronger growth than it will feel like given the massive decline that will have occurred in the second half of fiscal 2020. Energy costs have already started to increase gradually from the 63% annualized plunge over March and April.

Federal Reserve policy is already extraordinarily aggressive by providing unmatched liquidity and monetary stimulus when the recovery begins in fiscal 2021. From the end of February through the end of April, the Federal Reserve enacted at least 34 separate monetary policy actions that were meant to ensure liquidity was readily available for the credit markets and that its primary monetary policy tools were primed to provide broader stimulus to the economy after its collapse in the second half of fiscal 2020. 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 will amount to roughly $2.3 trillion or more. The Federal Reserve quickly returned short-term interest rates (red line in the chart below) to the previous zero lower bound that it used from December 2008 (one year into the Great Recession) through much of December 2015. The real (inflation-adjusted) federal funds rate (the blue line) also returned to negative territory, making monetary policy highly stimulative to future credit and economic growth. The Federal Reserve has also accelerated its quantitative easing programs (green line) to keep long-term interest rates lower than they would have otherwise been. In fact, while the monthly data of the assets kept on the Federal Reserve's balance sheet shown below was at $6.66 trillion in April, the weekly data has already jumped above $7 trillion with expectations that the monetary policymakers could ultimately settle with assets on its balance sheet hitting the lower teens of trillions of dollars.



Source: Federal Reserve Board

Note: Shaded areas denote recession.

It is clear that monetary policymakers are even more aggressive and proactive in addressing potential liquidity problems during the current recession than they were during their uncharted actions of the Great Recession and beyond. They will continue to address all shortcomings in monetary policy (excluding negative short-term rates where no consensus exists) that could hold back a recovery. No change in short-term interest rates and continually growing quantitative easing will be the hallmarks of Federal Reserve policy in fiscal 2021 and likely beyond. With highly stimulative monetary policy and the likelihood that the U.S. economy will not have fully recovered what it lost at the end of fiscal 2020 for many years to come, interest rates should remain low during the upcoming fiscal year. Relevant ranges for the federal funds rate and 10-year Treasury yield for the upcoming fiscal year based off those views are listed in the table below.

Period	Federal Funds Rate	10-Year Treasury Yield
Fiscal 2021 Ranges	0%–0.25%	0%–1.5%

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 the aggressive moves by Federal Reserve monetary policymakers, the federal government has been determined with fiscal policy actions. Four laws, most notably the Coronavirus Aid, Relief & Economic Security Act (CARES Act), accumulating to roughly $3 trillion in fiscal policy stimulus have been passed by Congress and signed by the President from early March through late April. They focus largely on providing some monetary protections for employees and businesses impacted by the government actions to limit economic activity during the battle against the spread of COVID-19. When added to the projections of monetary policy stimulus, the combined roughly $5.3 trillion in policy actions amounts to about 25% of the size of the U.S. economy — a huge stimulus package that was implemented quickly. As the economy starts to recover in fiscal 2021, there is the potential that even greater amounts of stimulus will be enacted from both sets of policymakers. 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 Great Depression. 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.

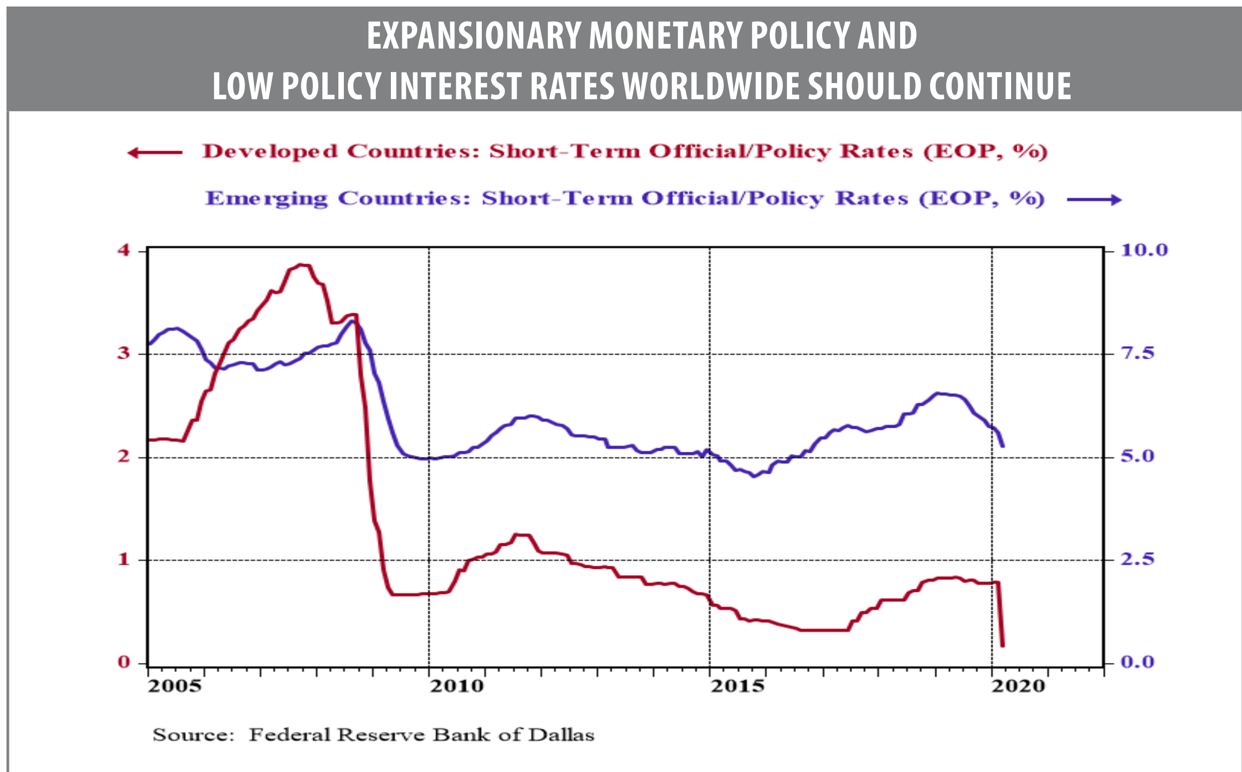
The baseline economic forecast during fiscal 2021 of improving economic activity with real GDP growth in a range of 7%–8.5% after a historic collapse in the second half of fiscal 2020 carries about a 50% chance of occurring. There remains a great deal of uncertainty how the coronavirus pandemic will play out and whether the actions by monetary and fiscal policymakers as well as public health officials appropriately deal with the health and economic crises. A continued risk of ongoing recession or significantly weaker-than-expected positive economic growth carries about a 30% chance of occurring, while more of a V-shaped rapid and stronger recovery from the collapse carries about a 20% chance of occurring. By comparison, the baseline U.S. economic forecast of 8% real gross domestic product growth and 1.2% GDP price index growth is notably slower than the Bloomberg weighted average consensus real GDP growth of 9.6% and the *Blue Chip Economic Indicators* GDP price index growth of 1.6%. The nominal GDP growth rate in the STRS Ohio forecast would be roughly 9.2% while the consensus expectation would be for about 11.2% growth in fiscal 2021.

U.S. ECONOMIC FORECAST SUMMARY

Composition of Real GDP	Fiscal Year Ranges	FY 2021	FY 2021 H1	FY 2021 H2	FY 2020	FY 2020 H1	FY 2020 H2	FY 2019
Gross Domestic Product	7%–8.5%	8.0%	12.1%	4.2%	(11.7%)	2.1%	(21.7%)	2.3%
Personal Consumption	11.25%–12.75%	12.2%	21.5%	4.0%	(14.5%)	2.5%	(26.3%)	2.6%
Nonresidential Investment	(7.5%)–2.5%	(4.9%)	(12.5%)	3.8%	(15.3%)	(2.4%)	(24.8%)	2.6%
Residential Investment		4.0%	1.0%	7.0%	(18.3%)	5.6%	(23.0%)	(3.2%)
Exports of Goods & Services		2.0%	0.8%	3.2%	(8.7%)	1.5%	(17.3%)	(1.7%)
Imports of Goods & Services		4.8%	5.0%	4.6%	(14.7%)	(3.3%)	(24.2%)	2.6%
Federal Consumption & Investment		2.6%	2.8%	2.4%	3.3%	3.4%	3.4%	3.6%
State & Local Consumption & Investment		1.9%	1.9%	2.0%	(0.2%)	1.4%	(1.7%)	1.6%
Final Sales		7.5%	11.7%	3.5%	(11.3%)	2.6%	(21.4%)	1.8%
Domestic Final Sales		7.8%	12.2%	3.8%	(12.1%)	1.9%	(22.2%)	2.4%
Private Domestic Final Sales		9.1%	14.6%	4.1%	(14.7%)	1.8%	(26.0%)	2.4%
Incomes								
Real Disposable Personal Income		5.0%	6.6%	3.4%	(1.6%)	1.9%	(4.7%)	3.0%
Nominal GDP Corporate Profits, After Tax	5%–15%	11.6%	5.0%	20.0%	(16.6%)	3.7%	(32.5%)	1.3%
Prices								
Consumer Price Index		2.2%	2.5%	1.9%	0.1%	2.1%	(1.9%)	1.8%
Consumer Price Index Ex Food & Energy	0.75%–2.25%	1.6%	1.5%	1.6%	1.4%	2.4%	0.5%	2.1%
Personal Consumption Expenditures Price Index		1.4%	1.5%	1.4%	(0.3%)	1.4%	(2.0%)	1.4%
GDP Price Index		1.2%	1.3%	1.1%	0.1%	1.5%	(1.3%)	1.8%
Other Key Measures								
Real Net Exports ($B)	($780)–($720)	($749.5)	($724.7)	($774.3)	($847.8)	($945.4)	($750.2)	($967.5)
Real Change in Business Inventories ($B)		$13.8	($15.0)	$42.5	$8.4	$41.3	($24.4)	$91.4
Light Vehicle Sales (M)		13.94	12.13	15.75	14.15	16.97	11.33	17.13
New Housing Starts (M)	0.95–1.15	1.044	0.800	1.288	1.172	1.361	0.983	1.222
Industrial Production		(1.1%)	(6.2%)	4.9%	(15.2%)	0.7%	(26.2%)	1.1%
Unemployment Rate		8.5%	9.7%	7.4%	6.3%	3.6%	8.9%	3.8%

INTERNATIONAL ECONOMIC GROWTH AND INFLATION OUTLOOK

During fiscal 2021, both developed and emerging countries will be climbing back from the deep recessions caused by the COVID-19 pandemic. By the end of the year, however, most of them will be unable to regain the vigor they had achieved before the pandemic struck. In an environment of widespread joblessness and excess supply, most businesses are set to cut investment spending. They will also be unable to raise prices confidently and disinflation should persist in this early phase of economic recovery that will extend beyond fiscal 2021. Consequently, policymakers worldwide will keep fiscal and monetary conditions highly accommodative, standing ready to provide more aid to boost economic growth and employment.



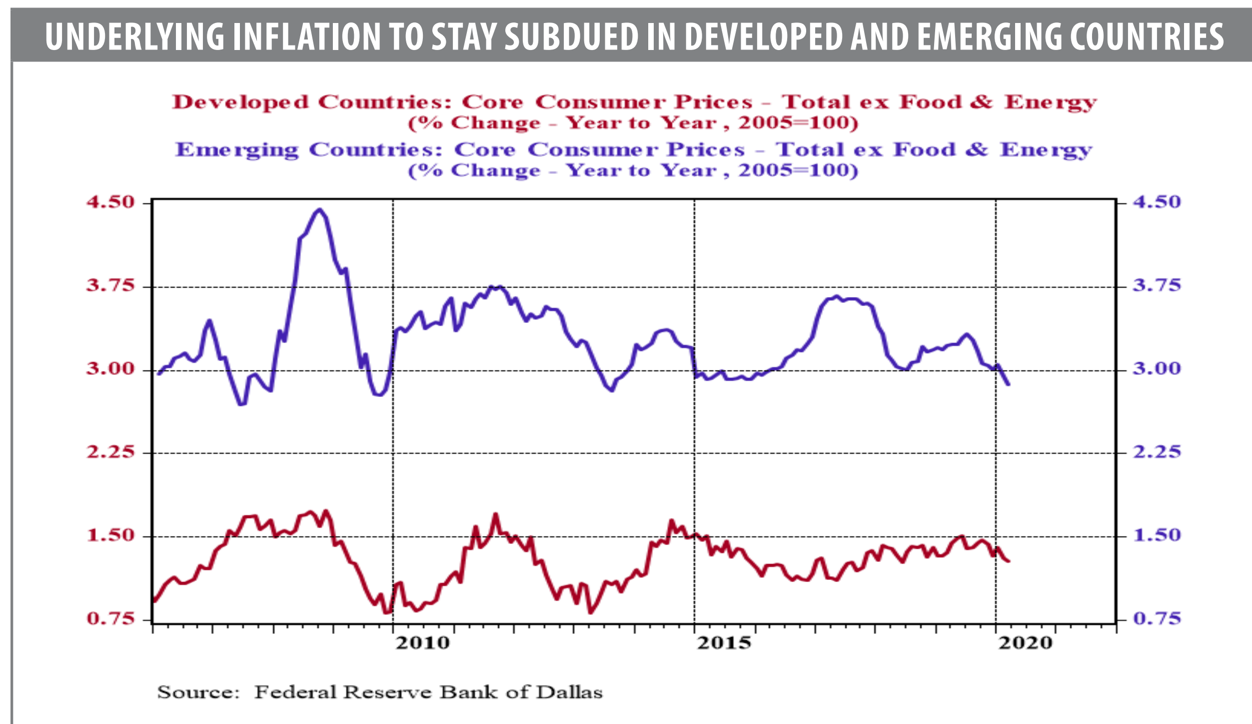
Central banks of all major developed countries have slashed their policy interest rates to zero and will be using multiple other policy instruments such as quantitative easing, direct loans to businesses and emergency liquidity facilities to keep monetary conditions expansionary. Policy interest rates in emerging countries, too, are falling rapidly and many of their central banks are adopting quantitative easing. Consequently, the gap between the policy interest rates of emerging countries and those of developed countries should narrow as fiscal 2021 progresses. Meanwhile, fiscal policies have become quite expansionary as well, and the estimated fiscal spending across all major countries stands at an unprecedented 15%–20% of global nominal gross domestic product (GDP), far more than the 3%–4% of GDP the governments provided during the 2008–2009 Great Recession.

The pandemic has struck the eurozone's economic foundation of free mobility of goods, labor and capital by disrupting the supply chain networks that crisscross across borders and by halting the movement of labor. As countries closed their borders to contain the pandemic, much of the cross-border economic activity shut down, affecting critical sectors such as agriculture, transportation, manufacturing and construction. Meanwhile, as government's imposed strict lockdowns to subdue the epidemic inside their national borders, the services sector plunged even more than the manufacturing sector, with segments such as retail trade, travel, tourism, leisure and hospitality hit the hardest. A similar economic picture has emerged in nearly all developed countries.

During fiscal 2021, the eurozone economy should inch up as the lockdowns gradually ease, though this may not occur simultaneously across countries for the cross-border supply chains to begin operations smoothly. In that sense, progress in any country hinges on the course the pandemic takes once socio-economic activity resumes in all. While the gains from this partial return toward normal economic activity may appear as substantial, they will likely fall far short of what is required to recoup the losses as joblessness has been surging. Making matters foggier for investors and policymakers, unemployment itself may have become a noisy indicator of the underlying economic weakness because a substantial amount of fiscal aid has gone toward ensuring that businesses keep workers on payrolls even though the hours worked have dropped.

Consequently, for the time being, policymakers are likely to see measures of underlying inflation along with the gap between real GDP and its full potential as clearer guides to the policies they need to adopt during the recovery. With global inflation trends subdued and with real GDP estimated to be about 10%–15% less than its full potential across developed countries, policies will stay expansionary as investors expect only about a third of that gap to narrow through the year. Acknowledging these downside risks, the large amounts of stimulus in the monetary policy actions by the European Central Bank, the Bank of England and the Bank of Japan, among others, have been set up to extend beyond fiscal 2021 and policy interest rates should remain nearly zero at least until real GDP regains its full potential.

UNDERLYING INFLATION TO STAY SUBDUED IN DEVELOPED AND EMERGING COUNTRIES



In the United Kingdom (U.K.), besides precipitating a deep recession, the pandemic has thrown the Brexit negotiations with the European Union (EU) into disarray with discussions occurring over long distance by video. Though the government has not indicated that it seeks a two-year extension past the deadline on December 2020, it still has the option of doing so until the end of June 2020. Meanwhile, with the economy in a deep recession, the BoE has slashed the policy interest rate close to zero, introduced an open-ended asset purchase program and is considering the use of other monetary policy instruments in future months. The government has rapidly introduced a fiscal aid package that includes tax cuts, loan guarantees and bridge loans to tide over the lockdown period while providing subsidies, among other forms of assistance, to businesses so that they can keep employees on the payrolls. While Brexit may have receded in investors' minds over the near term, it still stands as an additional risk for both the EU and the U.K., though it was envisioned to be far less disruptive to cross-border trade than what has already occurred due to the pandemic.

Japan's real GDP growth was already shrinking before the pandemic struck. Though the death toll so far in Japan has not been as severe as in other countries, the pandemic has pushed the economy further into recession. The government has introduced a large fiscal package aimed first at income replacement, tax incentives and loan assistance. Within this fiscal package, at some later stage it intends to begin additional measures to stimulate demand. The Bank of Japan has been aggressively purchasing various private sector assets to help prop up the asset values on business balance sheets. Though these policies may help the economy recover, investors expect Japan to take longer than other countries to recoup all the losses because of its intrinsically slower growth potential.

Meanwhile, after the first contraction of real GDP in about four decades, China faces both cyclical and long-term headwinds to its economic prospects. Imminent on the cyclical front is the nature of the economic recovery as the lockdown eases gradually. While some sectors of the economy have made rapid progress, indicators of overall cyclical activity continue to suggest that a full recovery will not be at hand during fiscal 2021. Consumers, for example, have been very cautious about spending while socioeconomic activity that requires person-to-person interaction remains restricted and under strict surveillance by the government. Furthermore, China's real GDP growth faces significant risks to the downside as it relies on the recovery of the global economy and especially that of developed countries.

Over the longer term, policymakers and businesses worldwide are reconsidering their dependency on global supply chains as these chains suddenly shut down during the pandemic and set back economic activity everywhere. Even before the pandemic had struck, there was pressure on businesses to relocate out of China due to rising relative labor costs and burgeoning political risks. Now the pandemic has driven home the message that countries need to have at least the critical parts of the supply chains closer to home, reinforcing the trend of manufacturing activity relocating from China. This is occurring on top of the slowing trend rate of real GDP growth as China's labor force has begun shrinking. Over the next few years, the trend growth rate is likely to be in the 4%–5% range and that would make the economy more susceptible to recessions than before, requiring a more market-oriented set of economic policy tools than China currently uses.

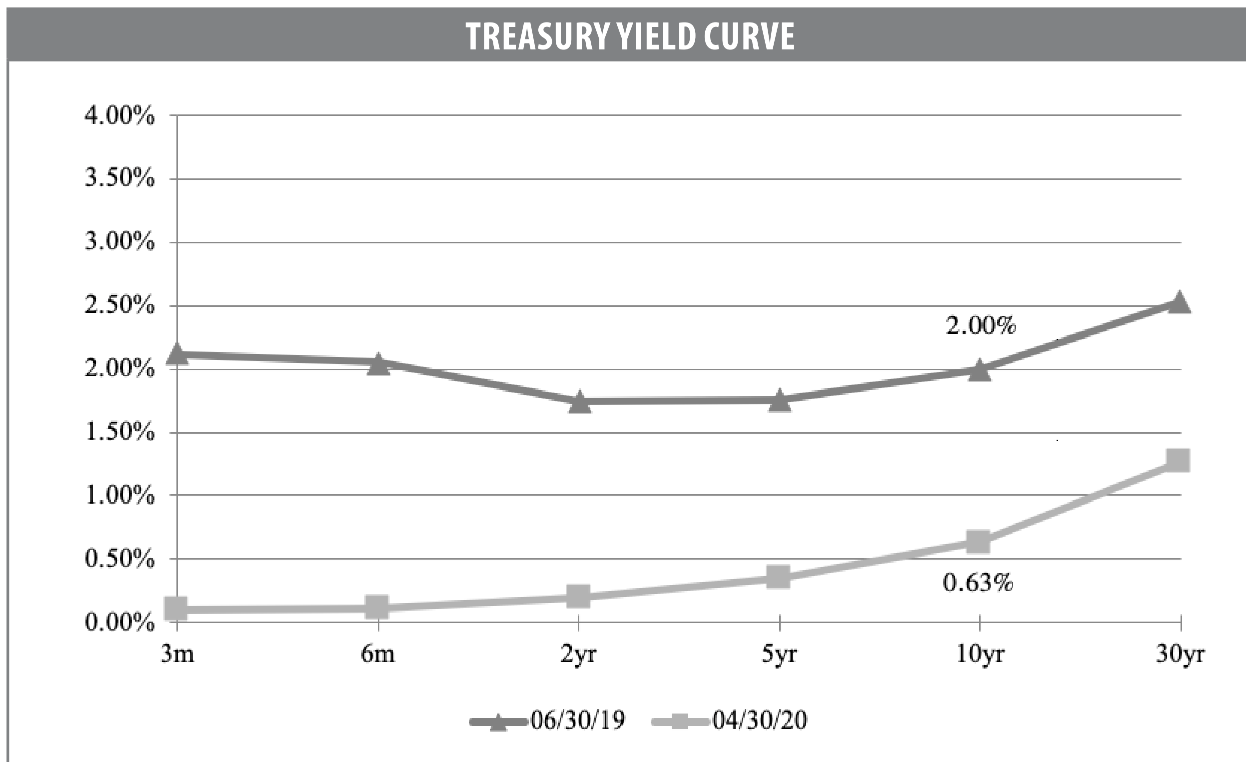
Like China, the outlook for the rest of Asia depends on the global recovery as well because many of them are export-oriented economies. Even for countries such as India that rely relatively more on domestic sources of economic growth, progress depends on healthy foreign capital inflows that are not in the offing over the upcoming year. India, too, has eased monetary policy aggressively and its central bank should cut the policy interest rates further as inflation has rapidly fallen toward the lower end of its policy target range. The government has pledged fiscal aid of about 10% of GDP, but like the situation in other countries, this is seen more as an attempt to put a floor on economic activity and as economic aid than as a cyclical boost to economic growth. Likewise, in Brazil and Mexico, their central banks have slashed policy interest rates to historically low levels and similar types of fiscal policies are shaping up in the wake of the intensifying pandemic there.

Despite accumulating support from policies in emerging countries, investors have become cautious about the near-term prospects because most emerging countries tend to have weak public health systems, and an outbreak there can rapidly spread elsewhere in their countries or even abroad. Furthermore, shrinking real GDP and capital outflows may have left some of them susceptible to defaults on debt repayment and they may need emergency financial assistance from multilateral institutions such as the International Monetary Fund and the World Bank.

All told, more than ever before in recent history, the success of monetary, fiscal and public health policies in each country has become critical to the outlook for the global economy over fiscal 2021 and beyond. The pandemic remains an ongoing global threat, one that requires countries to shoulder their own policy burdens rather than depend solely on the external economic environment to lift them from the doldrums. By doing so, they would contribute to a global economic environment that ultimately benefits all. While they have adopted strong and supportive economic policies, the socioeconomic shock has been so large that most of them will be functioning far from their full potentials by the end of fiscal 2021, requiring them to continue the monetary and fiscal policies supports thereafter.

INTERNATIONAL FORECASTS				
	Real Gross Domestic Product		Inflation	
Country/Region	FY 2021	FY 2020	FY 2021	FY 2020
Canada	3.1%	(8.1%)	1.1%	0.3%
United Kingdom	3.8%	(11.3%)	0.8%	0.7%
Eurozone	3.3%	(10.9%)	0.6%	(0.2%)
Germany	3.0%	(9.1%)	0.6%	0.1%
France	2.7%	(12.3%)	0.5%	(0.2%)
Italy	2.0%	(15.5%)	0.1%	(1.0%)
Asia–Pacific				
Japan	1.6%	(7.7%)	(0.3%)	(0.5%)
China	4.3%	(2.0%)	1.5%	1.0%
India	4.5%	2.0%	2.4%	2.2%
Australia	2.9%	(7.3%)	1.0%	1.0%
South Korea	2.0%	0.1%	1.6%	0.5%
Latin America				
Brazil	3.3%	(6.9%)	2.0%	2.0%
Mexico	2.7%	(8.2%)	1.7%	1.1%

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 2021. The fixed income benchmark yield begins the fiscal year below the policy return at 2.07%. Since we forecast the benchmark to have only modest price changes, we expect the benchmark to finish fiscal 2021 below the policy total return.

Federal Reserve

The Federal Reserve Board lowered the federal funds rate 75 basis points at its meetings in July, September and October 2019 to offset the risks of slowing global growth, U.S.–Chinese trade relations, and Brexit. In dramatic response to the economic uncertainty caused by the coronavirus, the Federal Reserve Board again lowered the federal funds rate by 150 basis points to the lower bound of 0% to 0.25% in March of 2020 to restore confidence and support the economy.

We expect the Federal Reserve to maintain the federal funds rate at the lower bound during fiscal year 2021 and are forecasting a range of 0%–0.25%. This forecast reflects the depth of the current recession and an expected economic recovery over a multiyear period. A stronger than expected economic recovery propelled by favorable coronavirus mitigation may cause the Federal Reserve to consider reducing other monetary policy measures put into place in response to the public health crisis. Conversely, a slower or protracted economic recovery combined with discouraging coronavirus events, may cause the Fed to extend or adopt additional accommodative monetary policies. Regardless of the outcome, maintaining the federal funds rate near the zero bound is the most effective use of this monetary policy tool.

The Federal Reserve unveiled an array of programs to support the economy and the markets during the height of coronavirus uncertainty. The announcement of these programs significantly improved market

function, liquidity and access to credit. In aggregate, these programs constitute an expanded set of non-traditional monetary policy tools. These programs work to blunt the full impact of the sudden economic stop by both directly purchasing securities outright and indirectly by providing confidence to investors.

We expect the Federal Reserve to remain a large buyer of U.S. Treasuries and agency mortgage-backed securities over the fiscal year. Additionally, the implementation of various programs over the coming fiscal year will directly and indirectly backstop and support the credit markets by making loans and purchasing securities to aid corporate and consumer credit channels. As the economy recovers, we expect the Federal Reserve to patiently pull back from the various credit channel programs and reduce purchases of Treasuries and agency mortgages. We expect the Federal Reserve to maintain a sizable balance sheet relative to GDP. Importantly, we expect the Federal Reserve to maintain these programs at an adequate size to support the economic recovery and assure functioning capital markets.

Market Interest Rates

Our forecasted 10-year Treasury interest rate range is 0.00%–1.50%, with a baseline expectation of a small rise from the current yield level of 0.64% and low volatility. The expected 10-year Treasury interest rate range is based on the STRS Ohio economic forecast of a prolonged recovery, inflation remaining below the Federal Reserve's target of 2.00%, monetary policy programs, and a low federal funds rate.

An economic recovery and successful mitigation of the coronavirus support the upper end of the interest rate range. A prolonged economic recovery combined with unsuccessful mitigation of the coronavirus support the lower end of our range. The factors that support the lower end of the interest rate range include the potential for a second wave of coronavirus and subsequent public health response and resulting economic contraction.

Credit Quality

Corporate credit quality will decline as the economy experiences a severe recession. However, Federal Reserve programs and capital market access should provide companies a financing bridge until the economy begins to recover. Corporate revenue and profits will fall, profit margins will likely weaken, and leverage will rise as a result of this economic downturn. We expect companies to respond to this environment by cutting expenses, capital expenditures, and shareholder payments in order to preserve cash.

Banks entered this downturn with high levels of capital and liquidity. Asset quality is deteriorating as loan losses increase. Bank earnings will fall due to increased loan losses partially offset by earnings from their capital markets businesses. Easing of capital regulations may help banks absorb some of the loan losses.

High yield corporate credit fundamentals will decline as a result of the recession. Default rates are expected to increase to the 8%–15% range in fiscal 2021. The level of defaults will depend upon the pace of economic recovery and reopening following the coronavirus pandemic. Leverage will rise as cash flow falls and companies borrow to fund cash flow shortfalls and build liquidity.

Emerging market (EM) countries will experience a recession due to the coronavirus pandemic. However, EM countries have responded to the situation with monetary and fiscal stimulus to help boost their economies. While EM countries have less developed health care systems to battle the coronavirus, they generally have younger population demographics and have considerable experience dealing with other pandemics in the past.

STRATEGY

Overview

The Core Fixed Income Portfolio will begin with an active management risk of 63 basis points and will operate in the range of 40 to 150 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 2021.

- The STRS Ohio economic forecast predicts an environment where the Federal Reserve remains supportive of an economic recovery. As a result, we expect interest rates will rise slightly from current levels.
- We have positioned the core portfolio with a current relative duration of 95.00%. Our strategy reflects the STRS Ohio economic outlook, the pending economic recovery and interest rates relative to economic fundamentals and a supportive monetary policy.
- Regarding sector allocation of the Core portfolio, we are maintaining an underweight position in U.S. Treasuries. We expect to maintain overweight positions in agency mortgage-backed securities, both investment grade and high yield corporates, and emerging markets as the Federal Reserve's expanded set of monetary policy tools not only support the economic recovery, but also support the valuation of those sectors.
- We have a sufficient amount of active management risk capacity given the uncertainty of the coronavirus and the risk of a protracted recovery. As we ultimately expect the mitigation of the coronavirus and an economic recovery to ensue, bouts of volatility may present opportunities that lead to significant valuation changes and would prompt us to increase or decrease active management risk.
- The asset class supported total fund liquidity during the market volatility experienced last fiscal year. Fiscal year-to-date through April, the Fixed Income asset class had redemptions of $4.0 billion and contributions of $600 million for a net reduction of $3.4 billion, with the majority of the flows occurring in the Liquid Treasury Portfolio. The total fund was able to respond to market volatility and pay benefits without disrupting the core bond portfolio.
- The total Fixed Income allocation is 17.3%, versus a neutral target weight of 21%.

Strategic Initiatives

- We continue to implement and review tactical and strategic opportunities including non-index sectors and managing interest-rate risk and credit exposure with derivatives. We maintain a tactical position in non-index Treasury Inflation Protected Securities (TIPS) should inflation rise unexpectedly.
- The Liquid Treasury Portfolio added liquidity to the total fund throughout fiscal 2020, providing funds for portfolio rebalancing and monthly cash flows, particularly during 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 2020, we were underweight as we added to spread sectors that offered better relative value and we expect to remain underweight in fiscal 2021.
- 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 $1.6 billion, representing 2.1% 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 to add when suitable.

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

- We begin the fiscal year underweight CMBS as commercial real estate fundamentals have significantly deteriorated. We will continue to monitor the sector for opportunities where fundamentals support valuations including opportunities in the Federal Reserve's Term Asset-Backed Securities Loan Facility.
- We begin the fiscal year overweight ABS, with a portfolio containing significant structural protection from deteriorating consumer credit trends. Consumer credit fundamentals have significantly declined as unemployment has soared. We will continue to monitor the sector for opportunities where fundamentals support valuations including opportunities in the Federal Reserve's Term Asset-Backed Securities Loan Facility.

Mortgages

- We begin the fiscal year significantly overweight Agency Mortgage-Backed Securities (MBS).
  - We expect a high level of prepayments to occur during the fiscal year as homeowners refinance at low mortgage rates although forbearance and the economic recovery might make this uneven at times.
  - As the fiscal year progresses, we expect volatility to decline, increasing the attractiveness of the sector.
- We expect the Fed will continue to purchase and reinvest its Agency MBS principal payments into mortgages during the fiscal year.
  - This will support spread stability since the Fed has been the largest and most consistent buyer within this market.
- Our selection will be focused on Agency MBS with lower expected prepayment characteristics leading to more stable cash flows and a higher relative return.

Investment Grade Corporates

- We begin the fiscal year overweight investment grade corporates. Yield spreads have increased as valuations are reflecting a declining credit environment.
- We expect to maintain the overweight to investment grade corporates during fiscal 2021 as yield spreads are attractive and Federal Reserve programs support the investment grade corporate credit market.
- Our credit selection will be focused on companies with strong credit characteristics that will be able to weather the economic downturn and perform well when the economy ultimately recovers.

High Yield Corporates

- We begin the fiscal year overweight high yield corporates. Yield spreads have increased and reflect a weakening credit environment with higher default rates.
- We expect to maintain the high yield overweight during fiscal 2021 as yield spreads are attractive and provide compensation in excess of the credit risk in the current environment.

Emerging Market Debt

- We begin the fiscal year overweight emerging market debt. Yield spreads have increased due to the coronavirus pandemic and the resulting global recession.
- We expect to maintain the emerging market overweight during fiscal 2021 and view the increased yield spreads as attractive and provide compensation in excess of the credit risk in the current environment.

BOND STRUCTURE REPORT

(as of April 2020)

Portfolio	Market Value* ($ millions)	% of Asset Class	Portfolio Annualized Active Management Risk[1]	Portfolio Duration[2]	Targeted Relative Duration
Core Fixed Income	**$ 11,464**	**88%**	**63 bps**	**5.29 yrs**	**95.0%**
Liquid Treasury Portfolio	**$ 1,579**	**12%**	**2 bps**	**3.87 yrs**	**100.0%**
Total Fixed Income	**$ 13,043**	**100%**			

Core Fixed Income	Market Value* ($ millions)	Percent of Portfolio*	Yield	Relative to Index[3]
Treasuries	**$ 2,327**	20%	0.5%	0.67x
Government Related[4]	**$ 83**	1%	1.3%	0.12x
Mortgages[5]	**$ 2,829**	25%	1.2%	1.89x
CMBS & ABS[6]	**$ 320**	3%	1.7%	0.38x
Investment Grade Corporates[7]	**$ 4,100**	36%	2.1%	1.17x
High Yield Corporates[8]	**$ 823**	7%	7.8%	1.60x
Emerging Market Debt[9]	**$ 982**	9%	11.8%	1.16x
Total Core Fixed Income	**$ 11,464**	**100%**	**2.8%**	

Liquid Treasury Portfolio	Market Value* ($ millions)	Percent of Portfolio*	Yield
Treasuries	**$ 1,579**	100%	0.3%
Total Liquid Treasury	**$ 1,579**	**100%**	**0.3%**

***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 2021 we forecast total returns to be in a range of –2% to +8%, at-to-below the STRS Ohio policy return of 7.35%. Key factors behind this forecast are:

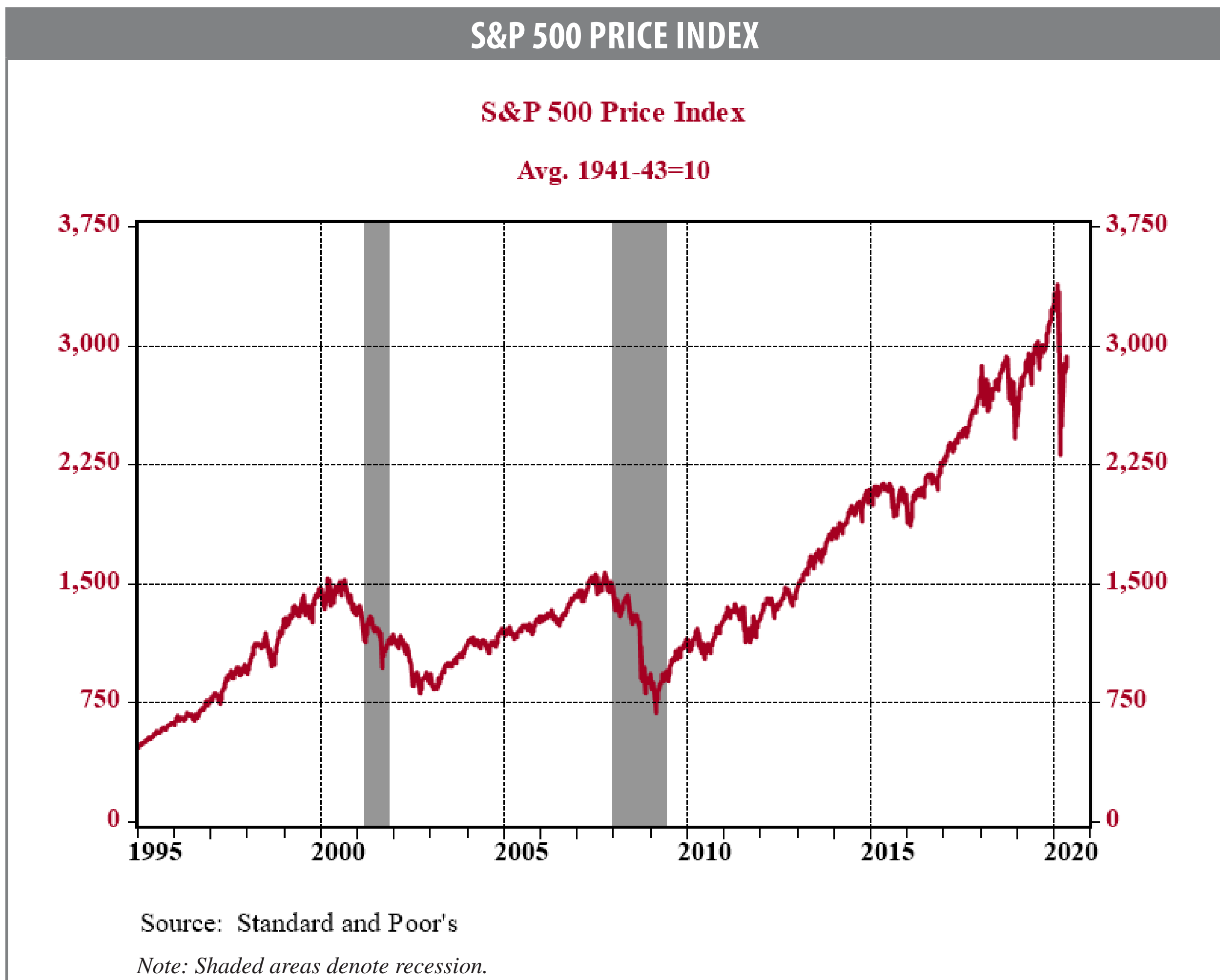
- Positive earnings per share growth.
  - Rebounding economic growth should result in strong revenue growth off the fiscal fourth quarter 2020 lows.
  - Margins should rebound as positive operating leverage in the second half should offset rising costs and a lack of pricing power.
  - Unprecedented amount of stimulus works through the global economy.
  - Flat share counts as capital allocation will likely focus on rebuilding balance sheets through debt pay down and cash accumulation rather than share buybacks.
- Price to earnings (P/E) multiples are likely to be flat to down slightly.
  - P/E multiples are well above the normal trading range.
  - The evolution of the COVID-19 virus as well as economic uncertainty and the potential for trade conflicts will remain major risks for the market.
  - Bouts of increased volatility should also serve to hold valuations down.

Summary of 2020

The U.S. equity market experienced unprecedented volatility in fiscal 2020. A strong gain of 16.5% for the S&P500 Index through Feb. 19 was followed by the fastest bear market decline in history with the arrival of the COVID-19 pandemic in the United States and the resulting slowdown of the U.S. economy. The market fell 33.8% off its peak by March 23. A subsequent 30.4% rally has succeeded in erasing much of the losses, with the index eking out a small 0.6% gain for the fiscal year through April 30, but it remains 13.7% off the February peak. Strong economic policy measures from the Federal Reserve and the Treasury Department appear to have taken the worst-case economic scenarios off the table, but the full magnitude of the damage to the economy and the strength of any recovery remains to be seen. As of April 30, the S&P 500 stood at 2912.43.

Sector performance has been mixed for the fiscal year through April. Technology (+18.5%) as well as Health Care (+10.0%) have managed double digit gains, whereas the more cyclical sectors have declined considerably on the economic weakness led by Energy (–36.4%), Financials (–16.0%), and Industrials (–15.5%).

Growth stocks have outperformed Value by more than 22% this year, and Small Caps have underperformed Large Caps by more than 15%. Both of these disparities are extremely wide by historical standards. Volatility spiked with the decline in the market and the VIX Index topped 80 for the first time since the Global Financial Crisis. Although the market and cyclical sectors have recovered to a certain degree, VIX index remains elevated as the market still appears to be in a risk-off mode due to the unprecedented uncertainty.



Economic Drivers

While economic growth will appear to be rapid quarter-over-quarter during fiscal 2021, recessionary conditions will still be present throughout the period. Companies will be in cost-cutting mode, trying to right size their businesses in the face of ongoing disruptions to demand and supply chains. International economies will also be recovering from the pandemic-induced slowdown, reducing overseas sales and earnings. Increasing tensions with China could provide additional headwinds to a recovering economy should they result in any trade or tariff retaliation. An additional uncertainty this year is the election, with wide differences in policy between the two potential candidates. Divided government is still the most likely scenario but a sweep by the democrats could result in less business friendly policies going forward, including higher corporate tax rates and increased regulation.

Earnings

Earnings uncertainty is extremely high for fiscal 2021. Companies, unable to forecast their business and earnings projections, are pulling guidance — leaving analysts and investors in the dark. Using our central economic forecast as a guide, earnings per share for the S&P 500 is expected to rebound from a depressed fiscal 2020, increasing a little over 10% to $130. Although growth will be rapid quarter-over-quarter throughout the year, we anticipate year-over-year gains will only return by the third fiscal quarter and predict that full-year earnings growth will be only modest.

S&P Operating EPS	FY 2019	FY 2020 (est.)	FY 2021 (est.)
STRS Ohio Forecast	$163	$118	$130
EPS Growth (YoY)	+15.8%	–27.6%	+10.2%
Consensus Forecast		$126	$145
EPS Growth (YoY)		–22.8%	+15.6%

Revenues for the S&P 500 are likely to grow in line with economic growth at 8% for the fiscal year. Margins should be flat to slightly up year-on-year as low capacity utilization in the first half gives way to increasing operating leverage in the second half. Additionally, comparisons will be easier with the fourth quarter of fiscal 2020 marking the trough. Many businesses saddled with extra costs to return to safe operation will be aggressively paring other expenses and may be reluctant to add employees back from furloughs. A high level of unemployment should keep wage pressure down although a low inflation environment could make raising prices difficult.

Earnings for financial companies will be hurt by the combination of lower interest rates and higher loan loss provisioning expenses. The length of the recession will dictate whether we see a high level of bankruptcies and extended provisioning and losses for the banks. If the banks experience severe financial distress the economy could face a more difficult recovery.

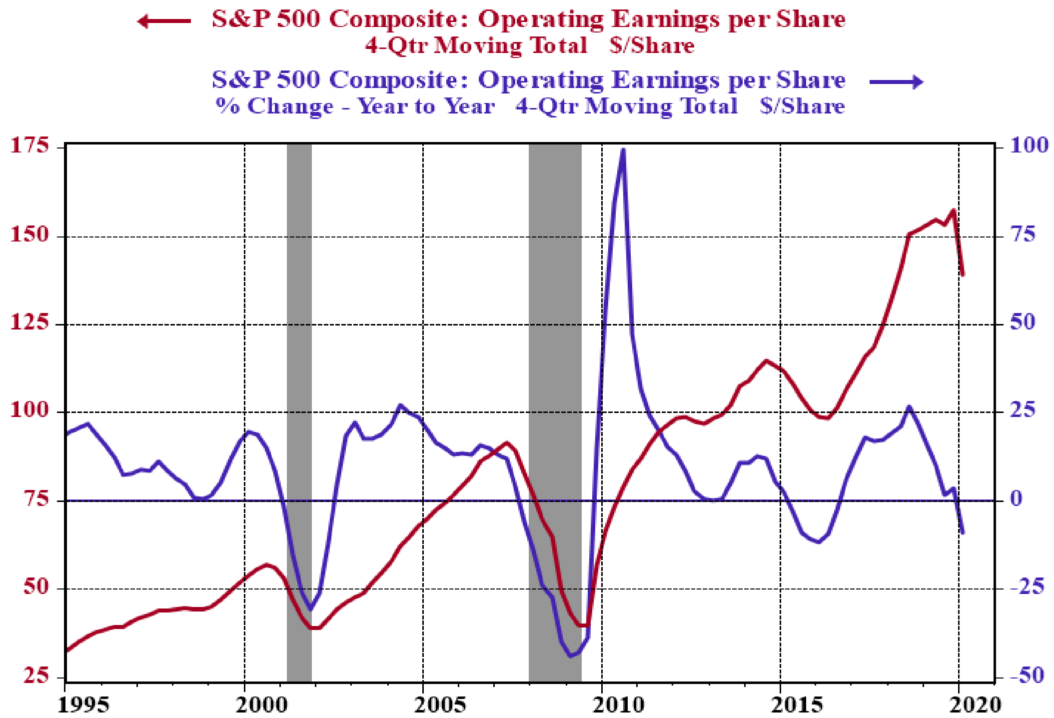
Within the technology sector, the digital transformation trends in the economy have accelerated under the work from home rules. Cloud based software, computer hardware and remote connectivity companies have seen a rise in sales during the pandemic.

Other industries many find their businesses permanently or semi-permanently impaired going forward. Travel-related industries such as airlines, cruise lines and hotels will find a recovery to be slow and elusive. These companies are often heavily indebted, hindering their ability to recover going forward. While 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 rapid transition to online business-to-consumer transactions.

The energy sector has been hit particularly hard with demand for energy severely curtailed by the stay at home orders. In addition, disagreement between Russia and Saudi Arabia on further production cuts actually resulted in a production increase and oversupply conditions were exacerbated. Oil prices have plunged, leading to collapsing earnings and bankruptcies among energy companies. This situation is yet to resolve itself and earnings for energy companies may be slow to recover in the coming fiscal year,

The following charts show a sharp drop in operating earnings and operating margins through the third quarter of fiscal 2020. The fourth quarter data of the fiscal year will be much lower and will likely be the trough for operating earnings and operating margins.

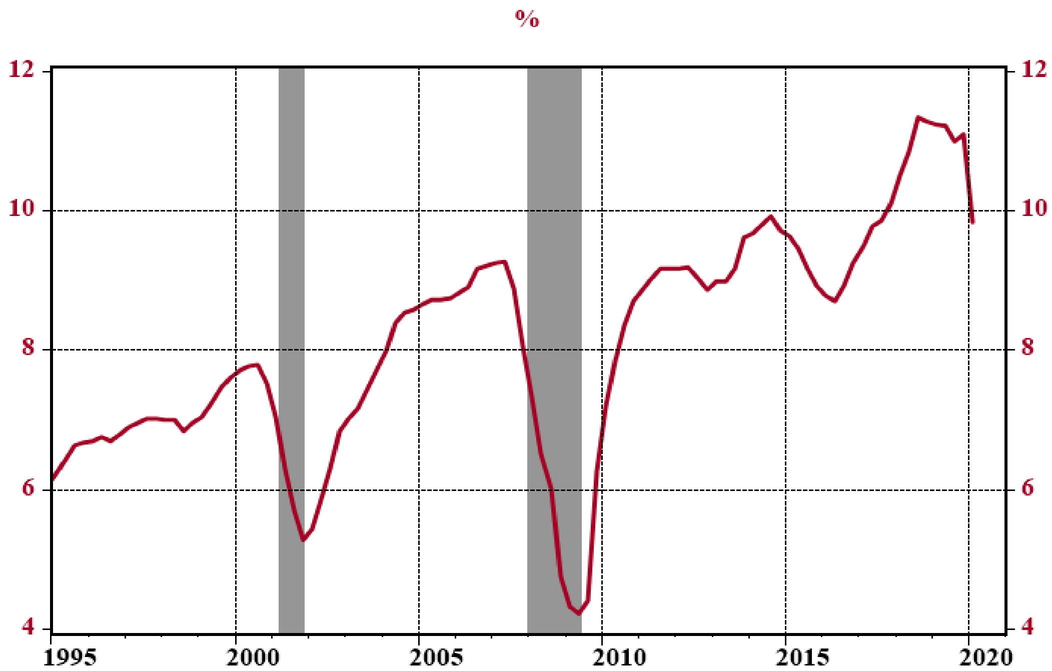
S&P 500 OPERATING EARNINGS



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 improve balance sheets through debt reduction and cash accumulation. Many companies took on extra debt to help bridge the gap in economic activity and will need to reduce leverage over the coming quarters before more expansionary capital allocations can be made. Additionally, capital expenditures may not be necessary, as capacity utilization is extremely low. Offsetting this would be the potential for onshoring of manufacturing and supply chains from China, as well as technology investments to reduce costs and improve efficiency. Share buybacks will also be reduced and only conducted by the most well capitalized companies. Share buybacks have also come under political scrutiny particularly for companies that have taken government assistance in the downturn. Many companies have cut dividends to conserve cash. Merger and acquisition activity will be down sharply year-over-year with few firms having enough balance sheet strength to take advantage of distressed situations.

Valuations

The S&P 500 is currently trading at 20.6 times trailing 12-month operating earnings and 22.4 times forward earnings estimates. Valuations are full and well above the historical average closer to 15 times earnings. Investors will be looking through the earnings trough towards fiscal 2022 earnings and beyond. Although the P/E ratio is likely to decline slightly, it may also act as a dampener on volatility in this environment, rising a little when earnings are low and falling when they recover. Possible risks to valuations on the down side would be a second wave of COVID-19 cases, an extended recession resulting in a financial crisis or a further escalation of trade tensions. Factors that could drive valuations higher are an acceleration of economic growth that gets back to 2019 levels faster than we are forecasting.

Forecast

Under the central economic forecast, we would expect a target range for the S&P 500 to be 2800–3100. This estimate is based on a P/E multiple expectation of 22–24 times $130 in estimated earnings. Under alternative scenarios, an accelerating U.S. economy with benign inflation could drive earnings to $170 and the market to new highs above 3300. Should the U.S. economy experience an extended recession and/or a financial crisis, earnings could fall to $100 or below — resulting in the S&P 500 at 2200 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	$130	22–24	2800–3100	–2% to +8%
Upside case	$170	19.5	3300	19%
Downside case (recession)	$100	22	2200	–16%

STRATEGY

For fiscal 2021 we have a flat to slightly positive outlook on the equity markets resulting in returns that will be at to below the policy return. Currently, domestic equities represents 28.1% of total assets, very close to 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 currently balanced between growth and value factors. Given the relative outperformance of growth relative to value stocks, we may look to move more toward value this year. Valuation spreads between growth and value stocks are near all-time highs, which typically has led to value outperformance. Small cap stocks are similarly cheap and may offer interesting opportunities as well.

Volatility has increased dramatically this fiscal year, although it is currently off the recent peak. We would likely be opportunistic adding on market declines and reducing on market increases as we expect volatility to remain elevated this year.

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 have slightly increased the allocation to the factor-based index strategy, which is replacing some of our passive assets. The portfolio size is still relatively small as the value and momentum factors used in the portfolio construction have been out of favor. The portfolio could scale to be much larger once we feel the timing is more favorable.

We will once again look to evaluate option strategies that could also replace some passive exposure. While we did look at this several years ago, we did not feel the environment was conducive to the strategies at that time. With volatility much higher in the current environment, some opportunities may present themselves.

7. International Investments

OUTLOOK

In fiscal 2020, the international markets are recording negative returns due to the severe economic impact from the COVID-19 pandemic. The MSCI World ex-US (50% Hedged) Index for developed markets has decreased 10.3% through the end of April, while the MSCI EM Index for emerging markets has decreased 10.7%. 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 a decrease of 10.3%. At this writing, staff anticipates total returns earning near-to-below normal levels in fiscal 2021 with risks to the downside if the pandemic continues without effective vaccines and treatments and thus suppresses the anticipated global economic recovery.

Developed Markets

The developed market returns in fiscal 2020 rose slowly through mid-January before the COVID-19 outbreak, which then caused the MSCI World ex-US benchmark to lose 35% of its value from peak to trough in the first quarter of calendar year 2020. Subsequently, the benchmark recovered 24% from the trough through April 30, 2020. As many countries went into stringent lockdowns, the resulting economic recession caused corporate earnings expectations to drop and forced some companies to withhold any guidance. As countries are now working to reopen the economies cautiously, consumers and corporates may remain timid under the shadow of COVID-19 as an effective vaccine or treatment may not be available any time soon. The –10.3% overall return for the 50% hedged benchmark through the end of April was 2.0 percentage points better than the unhedged benchmark due to the U.S. dollar strengthening against the euro, pound and a few other developed market currencies. Staff expects the U.S. dollar to retain a slight strengthening bias in fiscal 2021 while the pandemic uncertainties remain, although interest rate differentials are much less supportive for the dollar. Barring another debilitating wave of infections, some earnings growth is possible during the second half of fiscal 2021, primarily as the low base effect takes hold. Due to a wide range of possible outcomes for overall earnings levels in fiscal 2021, forward-looking price/earnings multiple analysis is less helpful than normal to gauge valuation attractiveness. Thus, price/book multiples will be used in the valuation commentary for the developed markets discussed below. While valuations of most markets appear attractive relative to history on price/book value multiples, they are at average levels considering substantially weakened earnings and return on equity profiles. The heightened risks associated with how the pandemic may develop and further harm the economies and corporate earnings will warrant significant caution. The forecast for the total return in developed markets for fiscal 2021 is for positive returns slightly below normal with the primary drivers being modest valuation multiple expansion and dividend yield.

Now the longest serving Prime Minister in Japan's history, Shinzo Abe is likely to contend for the next election that must be held by October 2021. Although market perceptions held that initial reactions from the Japanese government toward the COVID-19 crisis were late and inadequate, the reported infection and death rates have been significantly below developed market averages. However, the economy is in recession and the Abe government has rolled out massive monetary and fiscal stimuli. In addition to sharply increased ETF purchases, the Bank of Japan has increased purchases of commercial paper and corporate bonds to shore up liquidity. There will be a record fiscal stimulus package, greater than 10% of GDP, implemented in phases with adjustments dependent on the extent of the economic slowdown. Financing of this increased fiscal spending will occur by issuing Japanese government bonds that will subsequently find a ready purchaser in the Bank of Japan. Reducing this debt burden will prove challenging in the longer term due to Japan's aging demographics. Earnings growth forecasts are significantly behind the curve, with Japanese companies in aggregate missing consensus expectations. It is conceivable that earnings will not recover to pre-pandemic levels any time soon. MSCI Japan is trading at a price/book value multiple near 1.2x currently. While valuation is optically attractive, return on equity is bound to decline.

The pandemic has thrown a wrench into the Brexit negotiation this year as the latest round of talks have just restarted via video links. While a one-time extension of up to two years remains available should the United Kingdom ask before July 1, Boris Johnson's government has so far insisted that it will not seek one and is prepared to leave without a trade deal if an agreement cannot be reached by Dec. 31. In the meantime, the reported COVID-19 case death rate and new case growth rate in the United Kingdom remain higher than developed market averages, with Boris Johnson's "stay alert" reopening message being met with much confusion and skepticism. In response to the economic recession, the central bank has cut its policy rate to 0.10% and added £200bn to its asset purchase program, while the treasury has rolled out a £387bn fiscal stimulus package encompassing loan guarantees, emergency funds, tax cuts and wage subsidies. As a result, the budget deficit could approach 10% of GDP by the end of calendar year 2020. The pound is likely to remain under pressure in light of Brexit uncertainties and COVID-19 damages. Consensus earnings estimates for the MSCI UK benchmark have significant risks to the downside, with the most severe pressure seen in sectors including energy, materials and financials. MSCI UK is trading at 10-year historical lows on a price/book value multiple this year, with the aforementioned cyclical sectors explaining a large part of the decline.

The recession in eurozone economies has prompted the European Union institutions to provide a stimulus package amounting to 540 billion euros, including the European Stability Mechanism accessible to countries to pay for health care-related expenses, an increase in the European Investment Bank lending capacity by 200 billion euros, and a 100 billion euro backstop for employment protection. The eurozone as a whole could have a budget deficit of about 5% of GDP in 2020 and 3% in 2021. With deficits ballooning, the eurozone government debt-to-GDP may increase by double-digit percentage points to close to the 100% level. On the monetary front, expanded quantitative easing measures from the European Central Bank (ECB) must circumvent a recent German constitutional court warning that the plans could breach German law and ordered the Bundesbank to stop supporting quantitative easing within three months unless the ECB could prove it was not excessive. While the ECB plans to continue its easing, there is some investor concern over the sustainability of its monetary responses to the COVID-19 crisis. Current earnings growth estimates in the eurozone have significant risks to the downside. Financials, energy and materials companies form the cheapest sectors, although they have challenging outlooks with dividend payments at significant risk if not outright cancelled already. While valuation for the eurozone markets as a whole appears attractive relative to history, the most attractive markets are the cyclically challenged Germany and COVID-19 ravaged Spain and Italy. Greater presence of higher valued consumer companies in France has rendered that market less attractive on valuation grounds.

The political landscape continues to evolve in France, after President Macron's party lost its majority of seats in the National Assembly, when a left wing faction formed a new political group focused on green initiatives and social justice. This division will make it more difficult for Macron's government to pass any new reformatory legislation. In the meantime, approval ratings for Macron have also been shifting. Whereas his popularity suffered after the installation of the highly unpopular pension reforms that incited protests, it has improved in the latest polls, where he received credit with slowing the spread of COVID-19 by imposing stringent restrictions. The reported infection rate in France is lower than both Spain and Italy and the new case count is slowing. As the country moves to lift restrictions gradually, concerns are rising due to the still high number of active cases and the relative lack of medical equipment and testing capacity. If another wave of infections arises to put the country into partial or full lockdown again, Macron's bump in approval ratings could easily reverse.

In Germany, uncertainty looms for the next federal election scheduled for between August and October 2021, with campaigning expected to begin in earnest midway through fiscal year 2021. Angela Merkel, who resigned from the head of the leading party Christian Democratic Union (CDU) in 2018, has announced that she will not seek another term as Chancellor. Her chosen replacement as CDU leader and Chancellor-hopeful, Annegret Kramp Karrenbauer, resigned in February 2020 after repeated public gaffes, leaving the party in need of another election due in early December 2020. The three leading candidates are a state governor, a federal minister, and a former politician turned business executive. Regardless of who gets the nod, the CDU will have to confront a new political reality as the progressive Green Party has

gained significant foothold on the German political arena. In the meantime, Merkel's fact-based, steady response to COVID-19 has helped herself and the CDU gain much respect and popularity while quieting speculation of her early termination as Chancellor. Germany's death rate and new case growth rate have been some of the lowest in Europe, and the country has taken on cautious steps to reopen its economy.

Italy suffered the earliest and one of the deadliest COVID-19 outbreaks on the continent. Being the first country going into lockdown in Europe, new case counts in Italy have slowed and thus, there is a gradual lifting of the lockdown. With the tourism industry accounting for over 10% of GDP and employing three million people, the collapse in tourism revenue is hitting the Italian economy particularly hard. The governing coalition partners, Five Star Movement and Democratic Party have conflicting views toward accepting emergency aid from the European Stability Mechanism. Whereas the Democratic Party is in favor, Five Star opposes on the ground that the funding could subject the country to future austerity measures imposed by the European Union. The coalition is holding together as Prime Minister Giuseppe Conte continues to play a mediator role. While the next general election is not due for another three years, a snap election could occur if the coalition falls apart.

Similarly, barring another snap election, the next general election in Spain is not due until December 2023 as the minority coalition government led by the Spanish Socialist Workers' Party (PSOE) and Podemos was just installed in November 2019. Spain has so far reported one of the highest COVID-19 infection rates in the world. The new case growth rate remains elevated, but the country has moved to lift restrictions gradually.

In Australia, Prime Minister Scott Morrison's crashing popularity rating after his poor handling of the bush fires was resurrected ironically by COVID-19, as the public's view toward the government's response appears favorable. Australia's death rate and new case growth rate remain low and the government has moved to relax restrictions gradually. As the Australian economy contracts in 2020, the government has rolled out a fiscal stimulus package totaling $340bn AUD that includes unemployment benefits, wage support, airline industry support as well as credit facilities and guarantees. The package amounts to 17% of GDP with expectations to bring the budget deficit to as high as 10% of GDP for 2020. At the same time, the central bank has cut the cash rate to 0.25% and vowed to keep it low. MSCI Australia has a high weighting in financials and materials that adds considerable uncertainty to earnings forecasts. While the Aussie market appears cheap on a price/book value multiple basis, it becomes less attractive when the falling returns on equity are considered.

Justin Trudeau's Liberal Party won enough seats in the 2019 federal election in Canada to allow Trudeau to form a minority government and continue to serve as Prime Minister. Since then, ratification of the United States–Mexico–Canada Agreement will set it to come to force in July 2020. Trudeau's administration has carried out swift measures to support a contracting economy under COVID-19, handing out a CA$146 billion fiscal package amounting to almost 7% of 2019 GDP. On a national level, Canada's COVID-19 death rate and infection rate are both significantly lower than neighboring United States. With new cases hardly growing, provinces are working toward reopening their economies. Earnings estimates for MSCI Canada have risks to the downside, particularly as the high concentration of financials and materials companies casts significant uncertainties on the overall market. The Canadian market is trading near 10-year historical lows on a price/book value basis that may not adequately account for heightened risks for profitability looking forward.

Emerging Markets

The emerging markets return of –10.7% through April in fiscal 2020 is quite close to the return for developed markets despite 21 of the 26 constituent countries performing worse than the emerging markets benchmark. China, which now is approaching a 41% benchmark weight, increased 4.4% through April and thus is a major factor why emerging markets overall were in line with developed markets performance. Although China was the origin of the pandemic outbreak, the country's equity market received support from digital economy stocks that benefitted from the stay at home period. Staff forecasts

that the overall emerging markets in fiscal 2021 will earn a return near normal primarily due to valuation multiple expansion and dividend yield. The forecasted return has greater downside risk than upside potential due to the risk of an extended recession in several larger emerging markets if the Covid-19 outbreak lingers throughout fiscal 2021.

The valuation in emerging markets 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 lower than average, but this can be explained by a lower than average return on equity. Although the forward-looking price/earnings multiple is not inexpensive, there could be further multiple expansion as the market looks beyond the current earnings weakness in anticipation of a recovery in corporate profits in the second half of fiscal 2021. The valuation multiples in the emerging markets remain at significant discounts relative to the current levels in the developed markets.

Investors welcomed the signing of the U.S.–China Phase 1 trade agreement in January 2020 as at least a temporary cessation of the escalating deterioration in relations between the two countries. However, the COVID-19 pandemic is both a threat to President Trump's reelection prospects and a headwind for China being able to fulfill its commitments to purchase U.S. exports. Therefore, there are risks that Trump could reinitiate pressure on China on several fronts. The dual impact of trade friction and the temporary closure of manufacturing plants within China earlier this year to control the pandemic is prompting multinational companies to reassess their supply chains and consider reducing reliance on China. Certain lower-cost countries in Asia could benefit from corporate efforts to diversify supply chains, but the equity markets in China's trading partners on balance suffer headwinds when U.S.–China trade barriers intensify.

As economic activity in China recovers slowly from the impact of the lockdown measures within the country in the first quarter of calendar 2020, the economic shocks across the globe due to the pandemic will also significantly restrain exports. The government has used fiscal and monetary levers to support a recovery, but the overall fiscal stimulus is not as significant as during the global financial crisis (GFC) because high debt levels restrain the capacity for broad initiatives. Additional stimulus will continue as needed to support the economy, but China's growth in fiscal 2021 will not likely be robust enough to provide material tailwinds for other emerging markets as happened post the GFC.

The second and third largest countries in the emerging markets, South Korea and Taiwan, combine for another 24% of the benchmark. Both economies are dependent on trade with China, and as mentioned in last year's plan, each country is subject to geopolitical issues that can intensify if U.S.–China relations are worsening. However, both countries have outperformed the overall emerging markets benchmark this fiscal year through April 30 as they managed better the COVID-19 outbreak and also had favored technology stocks. Most of the other emerging market countries are struggling with the severe economic impact from the pandemic and in some cases are still grappling with controlling the first wave outbreak. Fiscal deficits and debt issuance in many emerging countries are widening to levels not usually tolerated by investors, so quantitative easing by the emerging world's central banks is becoming more common. Currency swap programs and IMF/World Bank assistance are other tools used to help stabilize financial conditions. Although Argentina may default and other countries face ratings agency downgrades of sovereign debt, the greater risk for emerging markets equity investors in fiscal 2021 could be corporate debt defaults if lenders do not agree to restructurings. Equity issuance in the form of rights offerings, asset write-downs and dividend cancellations will become more pervasive. The pandemic is also causing the risks for longer-term geopolitical issues to become elevated, such as more pronounced autocratic leadership within countries, rising backlash against global trade and the dangerous implications from mass unemployment of younger adults.

STRATEGY

As fiscal 2020 draws to a close, the international portfolio at this writing is approximately $17.0 billion or 22.6% of total assets (includes 0.7% of total assets in Global Equities), lower than the neutral target weight of 23%. The international asset class weighting did not deviate materially from the 23% neutral target through much of fiscal 2020 before markets dropped on COVID-19 developments. Rebalancing activity to manage toward the neutral target weight led to a net cumulative flow of funds out of the asset class of $404 million through February 2020. However, the March 2020 equity market downturn pushed the asset class weighting lower to levels that required significant contributions to rebalance back toward neutral. As of April 30, the net cumulative flow of funds into the asset class in fiscal 2020 is $717 million. Staff is projecting a near-to-below normal total return for the International Blended Benchmark for the next 12 months, so the international asset class will likely be held at a neutral-to-small underweight versus the target weight in fiscal 2021 unless the risk/reward outlook becomes more favorable.

Growth stocks in fiscal 2020 continued their multi-year outperformance versus value stocks with a particularly large difference in the March 2020 quarter. When economic growth is weak or there is a recession, companies with attractive growth opportunities become scarcer and investors typically gravitate toward growth stocks and reduce exposure to cyclical stocks. Currently, growth stocks are receiving additional support from low interest rates that effectively raise the relative worth of companies that have a large percentage of firm value coming from distant years' free cash flows. Certain digital economy companies also have structural fundamental growth tailwinds that were magnified during the stay at home mandates. For example, in China, mega caps Tencent and Alibaba benefitted from spikes in electronic game playing and ecommerce buying, respectively. The commentary in the Outlook section above centered on a restrained economic recovery picture and downside risks as long as the pandemic uncertainty prevailed. However, if vaccines become available or the virus mutates into a less potent adversary, then economic growth projections will improve, and the equity markets are likely to quickly anticipate the improvement and thus discount a more robust corporate earnings recovery for cyclical stocks. The value style typically outperforms during the exit from recession and early stages of recovery. Currently, valuation spreads between growth and value stocks are at quite wide spreads that could offer opportunity for value-style outperformance. Therefore, the international portfolio will have a slight tilt to the value-style early in fiscal 2021 in anticipation of an eventual sustained global economic recovery. An increase in the tilt later in the fiscal year is likely if conviction increases in this scenario, which again is more likely once vaccines for COVID-19 are available. Higher conviction would also occur with an increase in inflation expectations and higher interest rates as the financial sector is a large component of value stocks.

Staff will prepare a request for proposal (RFP) in the first half of fiscal 2021 to search for international small cap managers. Meanwhile, the international quantitative team will be working to build a standalone developed markets small-cap portfolio model for evaluation versus available external manager products for performance, risk and cost comparisons. A decision to hire external managers or initiate a new internally managed portfolio could occur by the end of calendar 2020. Small-cap performance in the past three years in the overall international markets has been worse than the large/midcaps, so fiscal 2021 could be an opportune time to add exposure if the pandemic risks recede and the recession ends.

Staff will review the foreign currency hedging policy and the available active currency hedging opportunities in fiscal 2021. The objective of the long-standing policy to hedge 50% of developed market currency exposure is to reduce the volatility of returns. A reduction in volatility has indeed occurred and the risk-adjusted return ratio for the 50% hedged benchmark is higher than for the unhedged benchmark since policy implementation in 1999. However, there can be multi-year cycles when 50% hedged returns are lower than unhedged returns. The U.S. dollar has strengthened in a multi-year cycle since 2011 but appears overvalued now on a purchasing power parity basis versus key currencies in several instances and no longer has material support from higher relative real interest rates. Once international economies sustainably resume growth after the pandemic threat ends, foreign currencies might begin a strengthening cycle against the U.S. dollar. Staff will evaluate this possibility and available opportunities to produce incremental performance.

Staff continues to anticipate that the current internal/external manager platform will offer the flexibility to make allocation changes as necessary when market conditions change. The termination of one externally managed emerging markets portfolio in fiscal 2020 did not reduce this flexibility. The potential hiring of small-cap managers mentioned previously would provide 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 run actively. The staff will continue to monitor and evaluate the proper allocation of risk across the international portfolio. Any new allocations to the asset class in fiscal 2021 are more likely for the actively managed portfolios than to the passive core-EAFE component.

The chart below shows the estimated allocations for assets internally managed, externally managed, developed and emerging markets investments at the end of fiscal 2020. We will be near an 80%/20% split between the developed and emerging markets within the asset class, which matches the neutral points set for each. Staff anticipates that the developed/emerging split will continue close to neutral points in fiscal 2021 as the slightly higher return expectation for emerging markets comes with an elevated risk profile. However, if a COVID-19 vaccine becomes available for the global population in mass quantities, then there may be a tactical decision to move emerging markets to an overweight position later in the fiscal year. As shown below, the split between internally and externally managed funds is 59% internal and 41% external.

FISCAL YEAR-END 2020
(estimated)

	$ Invested (at Market)	Percent of International Assets
External Managers	$ 9,730 million	59%
Internal Managers	$ 6,727 million	41%
	$16,457 million	**100%**
Developed Markets	$13,191 million	80%
Emerging Markets	$ 3,266 million	20%
	$16,457 million	**100%**

As of April 30, 2020, $520 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.

8. Real Estate Investments

OUTLOOK

Overview

At this time last year, staff indicated it expected the Blended Real Estate Benchmark to be at or slightly below the Board's long-term expected return for the asset class (6.00%). Through March 31, 2020, the benchmark return stands almost flat at (0.01) % and will likely finish the fiscal year close to where it was at the end of the third quarter. While private real estate is expected to start in earnest its decline in the current quarter, the public markets (REIT) recovery in April from March's sharp decline will act as a buffer, keeping the blended benchmark at or slightly below zero.

Public market real estate (REITs) has returned –22.23% fiscal year to date through March; this was driven by an exceptionally sharp year-to-date decline of 34% by the third week in March, mirroring the overall equity market decline, followed by a rebound of 26% off that bottom as of this writing. Staff anticipates returns will finish the fiscal year in the negative mid-teens.

As of March 2020, the total return for private market real estate, as measured by NCREIF Property Index (NPI), is 3.7% fiscal year to date — about 1% less than last year at this time. Appreciation has been decelerating over the last three years, with last quarter's return turning negative for the first time in more than ten years. Staff anticipates the NPI to end the fiscal year just slightly in positive territory at 0% to 2% range.

Transaction volume for the January to March quarter was 10.7% ahead on a year-over-year basis before the effects of the pandemic. According to Real Capital Analytics (RCA), by the end of March, United States monthly deal volume had fallen 40% off of January and February levels. Preliminary information on April and May indicates a slow market with the exception of deals that were in the pipeline that continued to move slowly toward closing.

Cross border investment was down 48% in calendar 2019 vs. 2018, with $49 billion of activity — compared to the recent peak in 2015 of $100 billion. This represents only 8% of total investor activity compared to the recent high of 18% in 2015 according to RCA. This is below the long-term average of 12%. As a country, Canada was the largest cross-border investor in 2019, representing 27% of cross-border investment activity, close to their 10-year average of 30%. Activity in both Asia and the Middle East increased in 2019; however, the activity resulted in a net divesture. China lagged again this year with net investment in the United States of only $851 million. The last time Chinese investment in the United States was less than a billion dollars was in 2012. As a region, Europe was the greatest net investor in the United States at $15 billion, easily surpassing Asia at $10 billion.

Due to the effects of the pandemic, transaction activity will be down over the previous year. With interest rates markedly down from this time last year and limited recent transactional data, overall cap rates have yet to move in a meaningful way in response to the pandemic and their continued decline following treasury yields seems halted until there is more clarity as to the effects of the crisis on expected investor returns. Spreads to 10-year U.S. Treasury yields have widened significantly due to the decline in interest rates, keeping cap rates stable even in an environment of heightened investor risk aversion.

Through March, fiscal year-to-date total return for REITs stands at a negative 22% versus a positive 9.8% for the same period last year. According to Green Street Advisors, the mall sector, which was already trading at a discount to private market real estate (NAV), will fare the worst going forward as a decade's worth of evolutionary thinning of retail stores is compressed into a tight time span. Recovery of value in this sector from its recent drop will be prolonged significantly due to this erosion in the components of cash flow. Health care and industrial seem to have taken a hit that is greater than warranted due to strong underlying fundamentals. While the office sector may have a limited effect on near-term cash flow due to longer-term leases and higher credit tenancy, this sector will have to reconcile the competing forces of the work-from-home phenomena versus the demand for more individual space due to social distancing.

In fiscal 2020, staff anticipates the blended benchmark total return will be below the Retirement Board's long-term expected return for the asset class (6.00%) due to the continuing effects of the pandemic.

Property Markets

The effects of the global economic shock due to the pandemic response has affected real estate fundamentals. The initial effect has been with regard to rent collection and cash flow. The loss of income has affected all property types, albeit some more than others. The most pronounced effect has been on retail. With the forced closure of stores, movie theaters and restaurants, tenants have been searching for methods of preserving cash flow. Tenant bankruptcies in this property type have begun in earnest and are expected to continue throughout the next fiscal year. The immediate effects on other property types have been somewhat insulated in the near term due to either tenants not being able to move due to the lockdown (for apartments), the predominance of long lease terms & higher credit tenancy for office buildings, or in the case of industrial, some positive projected effects due to logistical changes brought on by the pandemic.

After a strong start to the calendar year (10% ahead of 2019, RCA), the capital markets have slowed greatly for most property types, with only transactions that were already in the pipeline being able to proceed to closing in April and May. Debt was still available for credit worthy buyers, unlike the GFC when nearly all capital markets closed. CMBS and debt funds have generally stopped underwriting, but Fannie and Freddie are still in business for financing the multifamily sector.

Supply and demand for retail space has been in balance and vacancy had started to drift lower with the continued strong consumer demand in this recent economic expansion. Many retailers had adjusted to ecommerce developing an omni-channel approach to sales. However, with the impact of the pandemic, only necessity-based retail has been able to shine in a mostly bleak horizon. Restaurants, theaters and entertainment-based retail have suffered greatly, as have apparel and specialty retailers without a viable ecommerce outlet. Many of the poorly capitalized companies in this group will seek significant lease adjustments to cut costs if a return to normal shipping activity does not begin soon. The weakest of these have begun and will continue to file for bankruptcy protection.

The apartment sector has been a strong relative 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 be firmly in place. Nationally, supply and demand seem to be in balance, while some select markets are experiencing overbuilding.

The shock from the pandemic has, and will, negatively impact rent collections for fiscal 2020 and into 2021. The Multi-Family Housing Council reported an 80% collection of rent in May as compared to almost 82% for the same period last year. Rent growth has halted and concessions to entice would-be-renters have started, thus lowering effective rent. Job and income growth drive rental growth and both of these drivers have suffered in the current situation and have temporarily diminished investor demand. The sector's health and subsequent value enhancement is directly dependent on the solidification of these drivers as the economy recovers.

The industrial sector has had a strong run up to the recently ended quarter. New supply has been averaging 1% per year for the last six years and is in line with net absorption, which has steadily dropped the national vacancy rate to 5.4% according to CoStar, the data collection company. CoStar also reports that rental growth has outpaced inflation at 4.4% over the same period last year. Investor demand for this product has been strong as it is viewed as still being in the early part of a rent growth cycle, as described by Green Street Advisors. New development has also been relatively well constrained. This had driven national average of cap rates to the lowest point in more than twenty years, equaling the national rate for apartments (Green Street Advisors).

There are three positive effects on industrial space demand created by the pandemic and subsequent responses. The first is the obvious boost of ecommerce and the requisite space required to meet that demand. Next is the "re-shoring" or "near-shoring" phenomena that illustrate how companies are bringing production home to the United States to better insulate against future supply chain shocks to the United States. The last driver of demand is the reevaluation of just-in-time inventory management and production. This typically involves very intricate supply chain and logistic systems that minimize inventory storage for a manufacturer. These networks were severely disrupted due to the effects of the pandemic. CBRE projects that just a five percent change in warehousing space to address any combination of the above potential drivers will produce a demand for 400–500 million square feet (SF) of new warehouse space. New supply averages about 150–200 million SF per year.

Office space supply was just entering a building phase of the cycle, especially in the technology-driven markets in the San Francisco Bay Area, Seattle, Austin and Los Angeles, as well as in Manhattan. In the rest of the country most markets were relatively balanced with supply and demand thereby allowing vacancy to continue its slow decline since the last recession. Rent growth has averaged 3%–4% nationally over the last few years as the office market has benefited from the long economic expansion and subsequent job growth. Investor interest in the office sector was relatively strong with cap rates hitting new lows in the first quarter (Real Capital Analytics) before nearly all activity came to a halt toward the end of March.

The investor activity and interest in this sector going forward will be greatly influenced by the shape and nature of the recovery from the pandemic shock. The work-from-home phenomena has been growing for years and was given a catalyst in the form of COVID-19. This trend is expected to grow as some major tech and financial firms have announced work from home initiatives for the future. The effect of this on the office market will take years to sort out as many of these corporations have long-term leases and have spent billions of dollars providing employee space for collaboration and creating a community culture for their workforce. Additionally, firms have been downsizing the space per office employee for almost 25 years. This trend may reverse, and more space will be leased if the mandate for greater personal space becomes the norm due to social distancing guidelines. These trends and their influence on the institutional office investment market will take time to develop.

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 in the second half of the fiscal year. Last quarter, NPI Price Return turned negative for the first time since the recovery began (–0.4%). We expect NPI returns in the current fiscal year to finish in the 0% to +2% range. Fiscal 2021 will likely continue the downward trend and staff expects NPI to be in the **negative** 5%–7% range. The table below demonstrates the changes in private real estate returns during the last three years as of March 31, 2020. The NPI represents 85% of the STRS Ohio Real Estate Blended Benchmark.

NCREIF PROPERTY INDEX (NPI)			
One-Year Ending	Income	Price	Total
March 31, 2020	4.5%	0.7%	5.3%
March 31, 2019	4.6%	2.2%	6.8%
March 31, 2018	4.7%	2.4%	7.1%
Three-Year Annual Average	**4.6%**	**1.8%**	**6.4%**

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 high income component the primary appeal of real estate. Dating back to the years just before the recession, the capital market component 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 the total NPI return of –16.9%. With the current economic conditions, the capital markets will drive total NPI return for the next couple years. Cash flow, while consistent, will also see some fundamental deterioration in the short term. Based on NPI, overall net operating income ("NOI") increased by about 4.2% in the 12 months ending March 2020, which is down 180 basis points from last year at this time.

Specifically, the capital markets 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 contributing as much due to spreads to the treasury. However, the recent drop in treasuries to historic lows may be a strong influence going forward. Deteriorating economic conditions will cause investors to lower future cash flow assumptions, thus reducing values. In the short term, the greatest influence on valuation and thus total return will be pessimistic assumptions regarding cash flow growth. This will turn the greatest recent contributor to total NPI return into the greatest detractor. Real estate is now widely accepted as an important component of a multi-asset class portfolio, which brings much more capital market influence than the early years as it matured into an institutional asset class.

The recent decrease in the 10-year U.S. Treasury yield from this time last year has widened cap rate spreads. This spread varies on what cap rate measurement is used; however, by any measure, these spreads are at least 100bp higher than this time last year. Due to this, it appears that cap rates will have resistance to move up significantly, thereby muting 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. There is a significant amount of capital allocated to real estate that has not been deployed, with both points creating a floor for pricing. Staff expects total returns to be negative in fiscal 2020, with the prospect of a return to positive relying on the speed of the economic recovery and its effects on expected cash flow growth going into fiscal 2022.

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 overlay as seen by the extreme price fluctuations in March and April. REITs experience a more immediate pricing impact to changing interest rates or weaker investor sentiment. REIT valuation relative to NAV is currently in flux due to the economic shock. Green Street Advisors projects that some sectors have been oversold in relation to their fundamentals. Other sectors, like lodging and malls, may have been appropriately reduced closer to expected long-term changes in NAV. Overall, according to Green Street Advisors, REITs are still considered "pricey" — especially for the core property types — but may have less short-term depreciation than is still expected for the private market due to appraisal lag.

Staff anticipates the blended benchmark total return for the asset class in fiscal 2021 to be well below the Retirement Board's long-term expected return for the asset class of 6.00%.

The table on the next page outlines the expected range of returns, based on property type, for transaction market pricing in fiscal 2021. There has been a slight change of the initial yield expectations with the exception of the industrial properties. This reflects the impact, albeit small in relation to other economic downturns, of the pandemic's effect on the economy and the slowing of investment activity in general. Staff expects the investment market to remain soft through the first half of the year at a minimum, before stabilizing as we move into fiscal 2022. There is still significant capital allocated for real estate, and the exceptionally low interest rate environment has caused yield spreads to real estate to be attractive on a relative basis. Competition for high quality assets will return and will be most focused in industrial and apartments, which will remain high on institutional investor's wish list. It is possible there may be some transactions appropriately priced below these levels.

TRANSACTION MARKET PRICING EXPECTATIONS FOR FISCAL 2021	
Property Type	Initial Yield*
Retail	4.00%–7.00%
Apartments	4.00%–5.75%
Industrial	4.00%–6.25%
Office	5.00%–7.25%

*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 April 30, the real estate asset class is just under $7.7 billion. Including expected year-end loan proceeds and potential write-downs due to the pandemic, the asset class will finish slightly lower at $7.3 billion — down from $7.8 billion at the beginning of the fiscal year. This translates into a weighting for the asset class of 9.7% by the end of this fiscal year, just below its 10% neutral allocation. This is down marginally from the start of the fiscal year.

Over the course of the year, staff evaluated the direct portfolio for disposition candidates and by fiscal year end we expect to have sold almost $500 million. New investment is expected to end the year near $160 million. Portfolio debt was increased slightly due to advantageous interest rate environment.

Staff expects to see write-downs to continue following the economic shock through the fiscal year and slowly rebound in fiscal 2022. If the other asset classes remain stable or experience mild recovery, this combination will keep the real estate asset class under allocated in fiscal 2021.

Diversification

Public Investment (REITs)

The REIT portfolio is managed passively and is expected to be at or close to its 15% neutral weighting with quarterly rebalancing.

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 transaction activity in each of the regions in fiscal 2020 with the bulk of that activity in dispositions and the completion of development projects entered into in previous years.

GEOGRAPHIC DIVERSIFICATION (CORE ONLY) (forecast at June 30, 2020)		
	STRS Ohio	STRS Ohio vs. NPI*
East	35%	1.13X
Midwest	17%	2.06X
South	13%	.64X
West	35%	.87X

*Based on NPI figures as of March 31, 2020

Staff will continue to focus portfolio holdings and acquisitions in major metropolitan markets across the country to provide for diversification — both geographic and economic. 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, along with higher expected growth over the long run. 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 office sector's absolute weighting decreased as a result of expected valuation changes and reallocation of the portfolio loan to this sector. Decrease in apartment allocation is due to sales and loan allocation. The increase in industrial is due to acquisitions and stable valuations versus other property types.

PROPERTY TYPE DIVERSIFICATION (CORE ONLY)
(forecast at June 30, 2020)*

	STRS Ohio	STRS Ohio vs. NPI
Apartment	22%	.81X
Industrial	20%	1.01X
Office	43%	1.34X
Retail	14%	.66X

*Based on NPI figures as of March 31, 2020

STRS Ohio has two apartment projects under development with an operating partner. Completions are expected in spring of 2020. We also consummated a pre-sale joint venture investment with a developer for a recently completed high-rise apartment project that funded this fiscal year. Staff expects values to increase in these projects as lease up progresses and thus an increased allocation to the sector. These apartment projects are consistent with staff's strategy of focusing on urban infill or transit-oriented locations that appeal to the younger population that is attracted to properties providing a live-work-play environment, as well as empty nesters wanting easy access to an active social life. It is likely these trends may be modified by the pandemic and changes in social behavior; however, staff believes they will be strong drivers going forward.

The industrial sector, essentially even to the benchmark weighting, is STRS Ohio's top performing property type for the fifth 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 that is vacant and will require repositioning in a constrained market. An alternative path is to access industrial is through development. As such, STRS Ohio entered into a development joint venture in Southern California in fiscal 2017. Construction was completed this fiscal year and was 100% leased at completion.

Our largest overweight is with respect to the office sector. STRS Ohio recently sold two major office assets in the Atlanta market that offset the recent office purchases in Dallas the last two years which had increased the weighting to the sector. We will continue to rotate out of investments that no longer fit in the portfolio in an effort to upgrade from either a locational or physical structure standpoint, as was done with these recent transactions.

The largest underweight in the portfolio is the retail sector. Retail continues to have challenges that are not easily resolved, and these were exacerbated by the pandemic and subsequent response, greatly 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 is critical to success. Staff is satisfied with the large underweight to this sector and plans to keep it underweighted for the foreseeable future. Retail opportunities will be considered if they can justifiably be underwritten considering the substantial inherent risks.

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.

In 2019 we committed $50 million to a closed end fund and another $50 million to an open end fund with the same manager for medical office, senior housing life sciences and self-storage, as well as $25 million in a co-investment vehicle to invest exclusively in senior housing and medical office. In 2020 we were also able to get a more pure play with a $40 million commitment in a core plus medical office fund. This was done to enable STRS Ohio to have a more concentrated investment in medical office, given the previous manager's multi-sector strategy.

Property Life Cycle

As mentioned earlier, industrial and to a lesser degree, multi-family 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 around 4% and have projected little increase even given the pandemic's affects. This has caused us 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. Due to the fluid nature of the markets during this pandemic shock, any new development initiatives will be limited and very selective. Undertaking development in any property sector entails additional risk that should be reflected in higher expected returns.

Leverage

At March 31, 2020, the leverage ratio is approximately 26%. There is no significant long-term debt maturing in fiscal 2021. The above leverage ratio does not include a recent transaction that expands STRS Ohio's $250 million portfolio loan to $400 million. This will increase the leverage ratio by approximately 270bp to just under 29%. This interest-only loan was also extended to three years at favorable interest rate of 1.39% compared to the previous one-year loan at an interest rate of 2.95%. Staff will manage the use of leverage in the direct portfolio below the policy limit of 50%.

International

Portfolio Composition *(at March 30, 2020)***:**

- $616.7 million total portfolio (includes forwards)
- 8.2% of total real estate
- $737.1 million in unfunded commitments
- 32 funds with 14 managers
- 288 total investments
  - 54% Europe
  - 31% Asia
  - 10% Latin America
  - 5% United States (via global funds)

2020 Activity:

- Commitments to four funds aggregating $245 million were made during fiscal 2020 allocated 50% Asia/50% 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 fiscal year-end 2023.

- The logistics sector continues to be buoyed by structural changes brought about by ecommerce. This is particularly evident in Asia where strong demand is reducing the time required for assets to achieve stabilization from four years to two years. In Europe, strong demand is also evident in the office sector for well located assets resulting in holding periods reduced from four years to three years.
- Distributions were healthy, aggregating approximately 22% of the portfolio NAV attributable to: 1) strong demand from occupiers for the space created by the managers, resulting in an accelerated pace of execution of business plans and exits; and, 2) continued high level of liquidity as capital chases assets generating yield. The level of distributions was slightly off the 25% of NAV pace for the prior two years as fewer assets in the obsolete stage were sold.
- Contributions were double the prior two years average, attributable to: 1) the balance of unfunded commitments at the beginning of fiscal 2020 was 50% higher than average of the prior two years. 2) the level of capital drawdowns approximated 25% of unfunded commitment balance which was six percentage points higher than the activity for the prior two years as managers paid down subscription based lines of credit and saw an increase in the number of institutional quality assets, suitable for repositioning, coming to the market.
- 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 profile, managers are being diligent in their use of leverage with portfolio LTV ratios averaging 55%–60%.

Life Cycle:

- Early Stage — $189.6 million (31%) — 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 — $252.2 million (41%) — 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 — $66.2 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 — $108.7 million (17%) — 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 +7.0%
- Trailing five years as of March 31 +10.5%
- Fiscal 2020 year-to-date returns, while exceeding NPI by 332 bps, are depressed as multiple factors combined to impact the portfolio this year: 1) The increased pricing of acquisitions over the past several years has begun to impact gains on exit. This resulted in a decrease in funds posting double digit gains from 46% of the portfolio to 27% with an estimated 125bps impact on returns.
  2) Latin American currencies depreciated 7%, impacting returns by 60 bps. 3) The high level of capital drawdowns reintroduced the J-curve, impacting returns by an estimated 120bps.

- For the balance of fiscal 2020, three other factors will negatively impact returns: 1) Late stage funds will post a net loss for the first time in several years impacting returns by 220bps. 2) Latin American currencies depreciated an additional 25% thru March, impacting returns by 120bps. 3) Valuation adjustments attributable to COVID-19 will reduce returns by 220bps.
- Portfolio returns lag a quarter on a "real time" basis as they are based on the most recent quarterly reports from the managers. Therefore, returns are not yet fully reflective of the impact from the pandemic. Preliminary discussions with managers indicate a negative impact of 5%–10% in the second and third quarter of calendar year 2020 before stability takes place. Due to the wide spectrum of recovery scenarios, returns for fiscal 2021 are estimated at 0%–10%.

Global Overview:

The impact of the pandemic is being felt globally as countries, states, and provinces accounting for 51% of global GDP had required all non-essential business establishments to close their physical premises in order to contain the spread of the virus. Much of the rest of the world faces significant partial restrictions on business activity and gatherings. Global GDP is likely to shrink in 2020. The global economic outlook has deteriorated markedly for the second half of fiscal 2020. There will now be technical recessions, defined as at least two back-to-back quarters of contraction in real GDP, in key countries such as Japan, Germany and Italy. Growth in general will slow everywhere else.

Regional Overview:

To lessen the impact, multiple fiscal and monetary policies/stimulus packages have been implemented across several countries. These measures will be supportive to confidence and economic growth.

United Kingdom — Across multiple packages announced since March 11, the UK stimulus plan currently totals £65.5 billion or approximately 3% of GDP. It is about 50% larger than the stimulus enacted during the Global Financial Crisis. It includes loan guarantees, grants and tax cuts for businesses, increased welfare spending and wage subsidies. The Bank of England held two emergency meetings on March 11 and March 19 to cut its base rate by a total of 65 bps to a record low of 0.10%, and also announced £200 billion of bond purchases.

Germany — The €750 billion euro package, aggregating 20% of GDP, will support businesses with direct payments, social security protection for the self-employed, funding for medical protection equipment and research, and a stabilization fund offering €400bn euros in loan guarantees to secure corporate debt at risk of defaulting.

France — €45 billion euro package, approaching 2% of GDP, includes loan guarantees, increased welfare spending in the form of benefits for unemployed workers and forced time workers, and a solidarity fund for the self-employed and small businesses. More stimulus spending is expected to be announced.

European Central Bank — Left the policy rate unchanged at 0%. However, the ECB announced a massive €750 billion asset purchase plan (the Pandemic Emergency Purchase Program PEPP) not subject to previous limits, such as the share of a country's debt that could be owned by the ECB. It also includes Greece. The bank also earlier added €120 billion to its existing asset purchase program.

China — In addition to tax breaks, reduced power charges, and fee reductions, further fiscal stimulus in China will primarily aim to spur infrastructure investment, backed by government bonds. Note that this figure does not capture losses absorbed by state-owned enterprises as a result of the COVID-19 crisis. Total package estimated at 2.0%–2.5%. In addition, the People's Bank of China cut the one-year Loan Prime Rate to 4.05% from 4.15%. It also cut the cash reserve requirements for banks for the second time this year on March 13.

South Korea — Additional spending is directed toward support for medical institutions, wage support for small and medium-sized businesses, and business loans. Package estimated at 2%–4% of GDP. The Bank of Korea on March 16 cut its base rate by 50 bps to a record low 0.75% following the second emergency U.S. rate reduction. It also cut rates on the Bank Intermediated Lending Support Facility by 50 bps to 0.25%.

Japan — Prime Minister Shinzo Abe has stated that the to-be-announced fiscal stimulus would be larger than the stimulus enacted during the Global Financial Crisis, which totaled 57 trillion yen. It will likely include cash payouts to households, expanded credit lines and guarantees. Total package estimated at 10% of GDP. In addition, The Bank of Japan increased its purchasing of ETFs and corporate bonds to provide monetary support. They also extended one-year, zero-rate loans to various financial institutions.

Real estate and GDP are directly correlated. Sectors considered most at risk from the economic disruption are hotel; senior care; and retail malls focused on leisure and entertainment — whereas, logistics is considered one of the better insulated sectors. The allocation of the current portfolio is: Office 31%; Industrial 19%; Residential 15%; Retail 18%; Hotel 11%; and Other 6%. While no sector will be immune from the drop off in GDP, the portfolio exposure to the most vulnerable sectors is approximately 20%–30%.

It is apparent that the various governments are taking all measures to ensure stability and recovery. For fiscal 2021, caution is the overriding sentiment, but the managers' strategies are designed to take advantage of distress in the markets. At this point they will proceed on a very reduced pace of investing until there is a clearer resolution on the virus. After the disruption caused by the virus, the economies will recover under various scenarios and return to the metrics seen in times of stability. At that time strategies will focus on exploiting dislocations wherein the price of an asset becomes detached from the underlying fundamentals in targeted markets or transformation occurring due to changes brought on by ecommerce and other technological advances. 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.

9. Alternative Investments

Alternative Investments Returns

We forecast the total return for the alternative investments asset class in fiscal 2021 to be at the STRS Ohio Policy return objective, falling within a 5.75%–9.0% range. The alternative investments asset class is comprised of private equity and opportunistic/diversified investments. We expect private equity to be at-to-below its long-term absolute return objective and opportunistic/diversified to be at-to-above its long-term absolute return objective.

Asset Allocation

We estimate that the allocation to alternative investments will remain above its 17% neutral long-term target throughout the fiscal year, but within the rebalancing range of the asset class. We will begin fiscal 2021 overweight to the private equity target allocation and approximately neutral to the opportunistic/diversified target allocation. We anticipate that both portfolios will remain in these relative positions throughout most of the fiscal year.

Commitment Pace

We anticipate new commitments of $1.5 billion to $3.35 billion across all alternative investments strategies. This commitment pace is in line with our long-term targeted neutral asset allocation. The range of projected commitments creates significant flexibility to meet asset allocation targets and long-term return targets.

Underwriting

Our investment underwriting will take into account the STRS Ohio economic forecast for the fiscal year. Since the investment horizon of the asset class is longer than the annual investment plan forecast, we incorporate the possibility of future economic slowdowns into our underwriting. Our underwriting emphasizes managers that have demonstrated an ability to navigate economic downturns and generate superior long-term investment performance through economic cycles.

Strategic Initiatives

We continue to make progress in developing the direct and co-investment program. In fiscal 2020 through April 30, 2020, we executed 16 new co-investments totaling $208 million in market value, and as of such date the direct and co-investment portfolio included 31 investments totaling $427 million in market value. We remain focused on continuing to grow and diversify the direct and co-investment portfolio.

We also continue to execute on new strategic partnerships that we believe offer better fee economics and governance, while providing access to high-quality direct and co-investment deal flow. We established four such strategic partnerships in fiscal 2020, totaling $310 million in commitments.

Additionally, we continue to improve our processes for collecting and tracking fee-transparency-related information.

Finally, we expect to recruit two new investment professionals, one dedicated to private equity and one dedicated to opportunistic/diversified.

Private Equity

For fiscal 2021, the projected one-year return for the private equity portfolio is at-to-below its long-term absolute return objective of 8.15% (net of fees) (as determined in the fiscal 2017 asset-liability study), falling within a range of 5%–10%. This projected return is highly dependent on economic recovery and stabilization of markets following the downturn caused by COVID-19.

PRIVATE EQUITY OUTLOOK

We expect private equity fundamentals and valuations to largely track the corresponding movements in the public market during fiscal 2021, including with respect to the economic downturn caused by COVID-19 (and any recovery therefrom). We anticipate that in fiscal 2021 private equity managers will be defensively focused and take actions to ensure their portfolios are well positioned to withstand the effects of COVID-19. Private equity deal activity typically falls during periods of market uncertainty, as valuations are in flux, credit spreads increase, access to leverage becomes tighter, and company growth trajectories are difficult to assess. While we thus expect overall contributions to and distributions from private equity to decline in fiscal 2021, we anticipate that private equity portfolio companies will seek to opportunistically acquire stressed and distressed competitors at relatively low valuations to boost their market share and add new geographies or products.

PRIVATE EQUITY STRATEGY

In last year's Investment Plan, we projected new private equity commitments for fiscal 2020 of $1.2 billion to $1.5 billion. The actual fiscal 2020 commitments will be approximately $625 million, consisting of (on a dollar-weighted basis) 62% domestic buyout funds and 38% venture capital funds.

During fiscal 2020, in order to manage the private equity weight relative to its neutral target, actual commitments to private equity were roughly half of the projected commitments. Similarly, over the next several fiscal years, we forecast private equity commitments to be below our average pace in order to bring the private equity weight closer to our long-term neutral target. We may pursue opportunistic secondary sales to accelerate this move to a neutral weight.

For fiscal 2021, we currently anticipate making new commitments to private equity of $250 million to $600 million. We maintain flexibility to execute on attractive opportunities as they arise and, as a result, commitments may be below or above this projected range. We anticipate focusing our new commitments during fiscal 2021 on top-performing existing and prospective managers in the categories in the following table. During fiscal 2021, we anticipate that our category allocations will generally remain within the corresponding percentage ranges set forth in the right hand column.

PORTFOLIO SUMMARY (AS OF APRIL 30, 2020)

(in millions)

	Market Value	Projected Allocation Ranges Fiscal 2021
Domestic Private Equity Funds	$ 3,779	55%–65%
Venture Capital Funds	$ 1,974	15%–30%
Global/International Private Equity Funds	$ 1,213	15%–25%
Public Private Equity	$ 188	N/A
Stock Distribution Portfolio	$ 13	N/A
TOTAL	**$ 7,167**	

Opportunistic/Diversified

For fiscal 2021, the projected one-year return for the opportunistic/diversified portfolio is a range of 6.75%–8.5%, which is at-to-above its long-term absolute return objective of 6.35% (net of fees) as determined in the fiscal 2017 asset-liability study.

OPPORTUNISTIC/DIVERSIFIED OUTLOOK

We believe opportunistic strategies have entered an attractive investment environment due to the economic impact of COVID-19. The economic uncertainty and disruption caused by COVID-19 have resulted in market dislocations across corporate credit, structured products, and various other assets classes as evidenced by elevated risk premiums, widening spreads, and liquidations/forced selling due to margin calls. As a result, we expect distressed and special situation managers to rapidly deploy capital into what may be one of the largest opportunity sets since the Global Financial Crisis. Additionally, we anticipate that performing credit strategies will find attractive opportunities to lend to high quality companies with lender-friendly credit terms and at wider spreads and lower leverage multiples relative to the last several years.

OPPORTUNISTIC/DIVERSIFIED STRATEGY

In last year's Investment Plan, we projected new opportunistic/diversified commitments for fiscal 2020 of $1.4 billion to $2.1 billion. Through May 2020, total opportunistic/diversified commitments were $1.8 billion, consisting of (on a dollar-weighted basis) 55% opportunistic funds, 15% direct and co-investments, and 30% diversified strategies.

During fiscal 2021, we anticipate making new commitments to the opportunistic/diversified portfolio of $1.25 billion to $2.75 billion. We expect such commitments to have a greater relative allocation to opportunistic investments in light of what we expect to be an increased opportunity set within the opportunistic strategy due to the impact of COVID-19. We anticipate funding our opportunistic/diversified commitments during fiscal 2021 primarily with liquidity from the diversified portfolio and distributions from opportunistic investments. We will continue to utilize conservative underwriting and focus on defensive strategies with downside protection, unique return sources, and high relative risk-adjusted expected returns.

During fiscal 2021, we anticipate that contributions to opportunistic/diversified investments will exceed distributions (by up to 50%), as we expect a significant portion of such distributions to be in connection with redemptions from our diversified portfolio. Due to the impact of COVID-19, this ratio could be higher if redemptions and other realizations are delayed due to market uncertainty and volatility.

- In fiscal 2021 we expect commitments of $1.0 billion to $2.0 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 rotating from liquid, absolute return strategies into less liquid, higher potential return opportunities. Given the unprecedented impact of COVID-19 on the global economy and financial markets, the opportunity set for distressed and special situation managers may be the largest since the Great Financial Crisis. Additionally, we expect private lending opportunities in fiscal 2021 to provide attractive risk-adjusted returns.
- As stated above, we anticipate utilizing diversified investments as a source of liquidity to fund new opportunistic fund commitments and direct or co-investments. We expect redemptions from hedge funds and liquid alternatives in fiscal 2021 of $600 million to $1.8 billion, net of new commitments. Diversified investments will continue to play a role in meeting investment objectives in fiscal 2021, albeit at a lower weight within the opportunistic/diversified portfolio. During fiscal 2021, we anticipate sourcing new market-neutral strategy opportunities within hedge funds and public specialty credit opportunities within liquid alternatives, in each case with the objective of increasing liquidity, diversification, and risk-adjusted returns of the portfolio.

- We anticipate commitments of $150 million to $350 million to the direct and co-investment theme during fiscal 2021. Due to the impact of COVID-19, it is more challenging to predict the pace and composition of direct and co-investment opportunities. In addition to our standard opportunity set, we anticipate that attractive risk-adjusted debt and equity investment opportunities supporting business liquidity and recapitalization needs may arise. We expect that the 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, 2020.

At present, the specialty finance theme includes special situations, distressed, opportunistic credit, direct lending, and other specialty funds investments. As a result of increased opportunities we anticipate in direct lending, we are separating the direct lending strategy from specialty finance and creating a stand-alone direct lending theme, with a market value maximum of $2.0 billion. We anticipate continuing to seek opportunities during fiscal 2021 in the other themes within specialty finance, which will maintain its current $3.0 billion market value maximum. We anticipate adding new managers to diversify the specialty finance and direct lending portfolios and continuing to strengthen relationships with our highest conviction managers.

Consistent with our anticipated emphasis on opportunistic strategies in fiscal 2021, we are decreasing our market value maximums of hedge funds and liquid alternatives to $1.0 billion and $2.0 billion, respectively.

PORTFOLIO SUMMARY (AS OF APRIL 30, 2020)

(in millions)

Theme	Projected %	$ Market Value	$ Market Value Maximum
Banking, Insurance and Asset Management	10%–15%	$ 815	$ 1,250
Co-Investment & Direct Investments	5%–15%	$ 427	$ 1,000
Direct Lending	15%–25%	$ 1,137	$ 2,000
Energy & Natural Resources	0%–10%	$ 618	$ 1,500
Hedge Funds	0%–5%	$ 874	$ 1,000
Infrastructure	0%–5%	$ 29	$ 250
Liquid Alternatives	5%–25%	$ 1,480	$ 2,000
Public-Private Investment Funds	0%–5%	$ 6	$ 100
Specialty Finance	25%–35%	$ 1,785	$ 3,000
Total		**$ 7,172**	**$12,100**