

City of Marlborough
Contributory Retirement System

Q2 2020 Meeting Materials

Fund Evaluation Report

Agenda

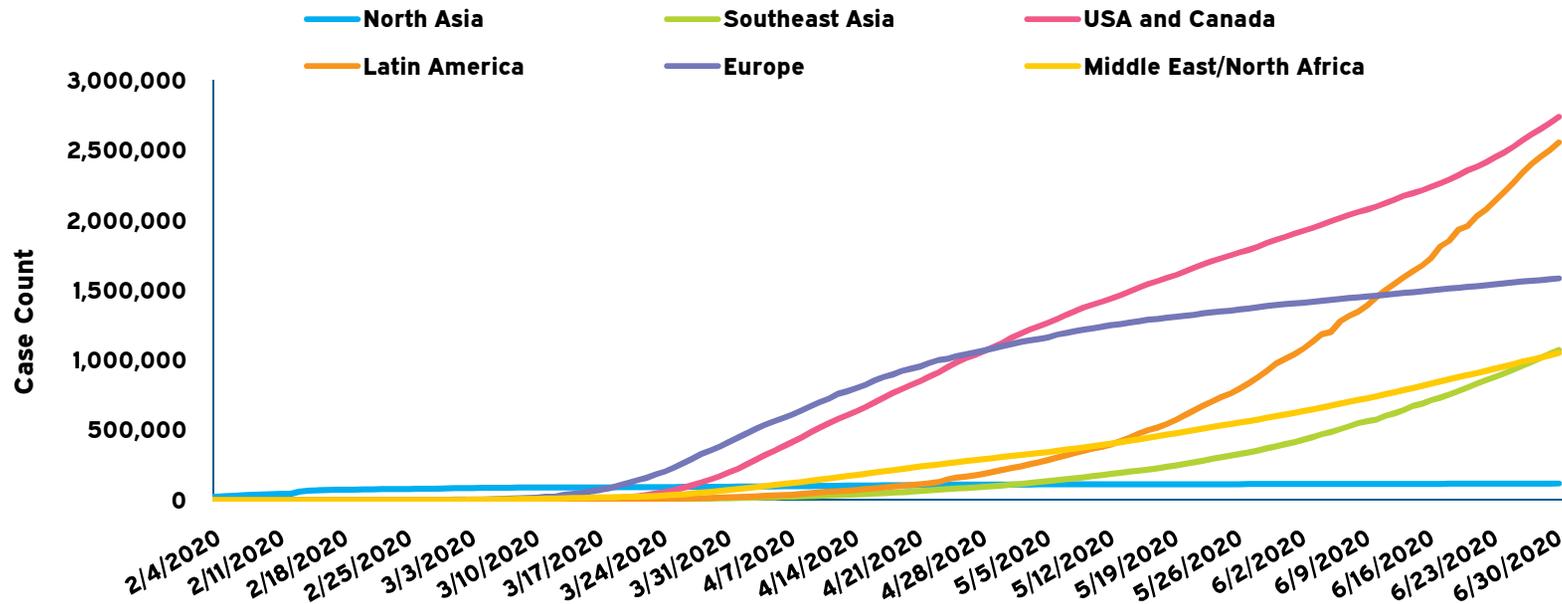
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Economic and Market Update

Data as of June 30, 2020



Case Count by Select Region^{1,2}

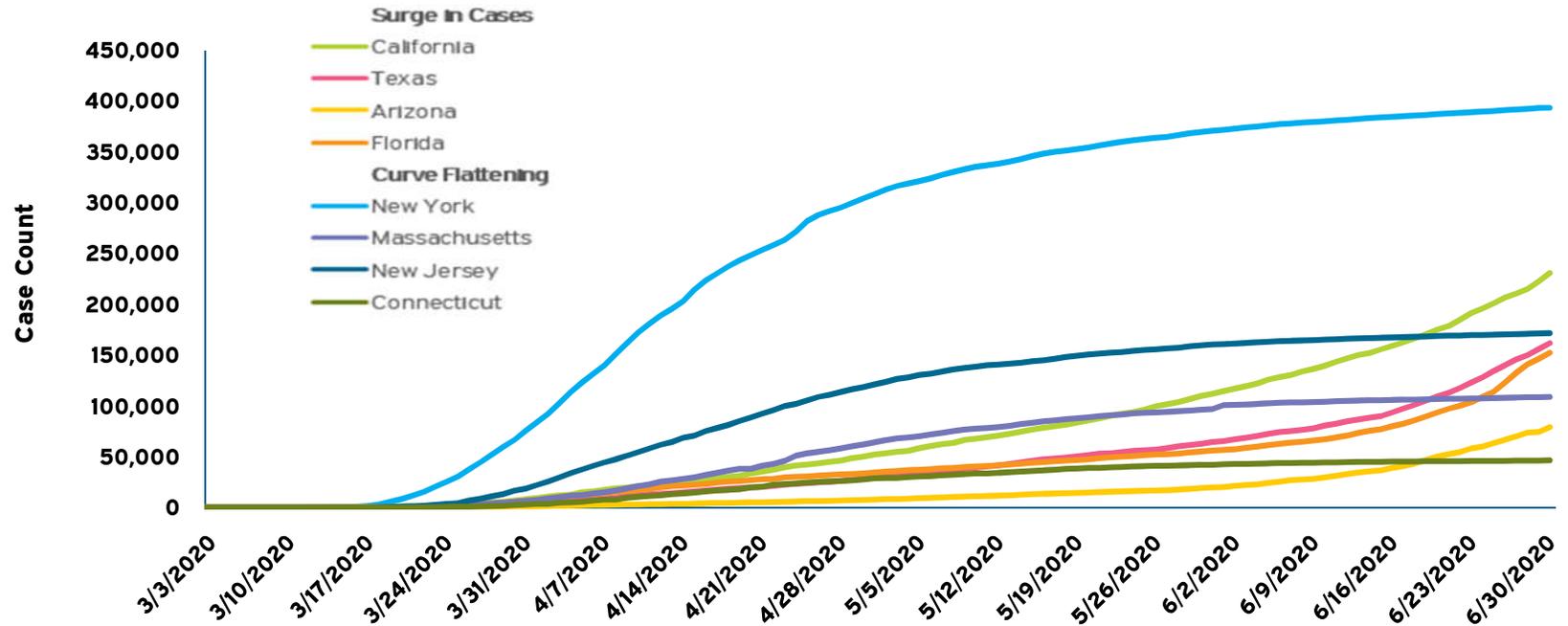


- Cases of COVID-19 continue to grow globally with now over 11.5 million reported cases across 188 countries.
- The US remains the epicenter with numbers in Latin America surging, driven by Brazil, which now has the second highest case count.

¹ Source: Bloomberg. Data is as of June 30, 2020.

² North Asia: China, Hong Kong, Japan, South Korea, and Taiwan. Southeast Asia: Singapore, India, Indonesia, Malaysia, Pakistan, Philippines, Thailand, Bangladesh, Sri Lanka, and Vietnam. Europe: Austria, Belarus, Bulgaria, Croatia, Czech Republic, Denmark, France, Germany, Hungary, Italy, Netherlands, Norway, Poland, Romania, Spain, Sweden, United Kingdom, Switzerland, and Ukraine. Latin America: Chile, Brazil, Mexico, Argentina, Colombia, Peru, Venezuela, Ecuador, Panama, Paraguay, Costa Rica, Bolivia, Uruguay, El Salvador, Honduras, Cuba, Dominican Republic, Haiti, and Nicaragua. Middle East/North Africa: Algeria, Bahrain, Egypt, Iran, Iraq, Israel, Jordan, Kuwait, Lebanon, Libya, Morocco, Oman, Qatar, Saudi Arabia, Syria, Turkey, Tunisia, United Arab Emirates, and Yemen.

COVID-19 Cases by State¹



- As the US economy slowly reopens, there has been a spike in cases in certain states that is creating stress on their healthcare systems, leading to officials slowing, or reversing, reopening plans.
- Some of the states that were hardest hit in the early stages continue to make progress on containing it.
- Looking forward, a continued trend of rising cases could significantly weigh on economic growth.

¹ Source: Bloomberg. Data is as of June 30, 2020.

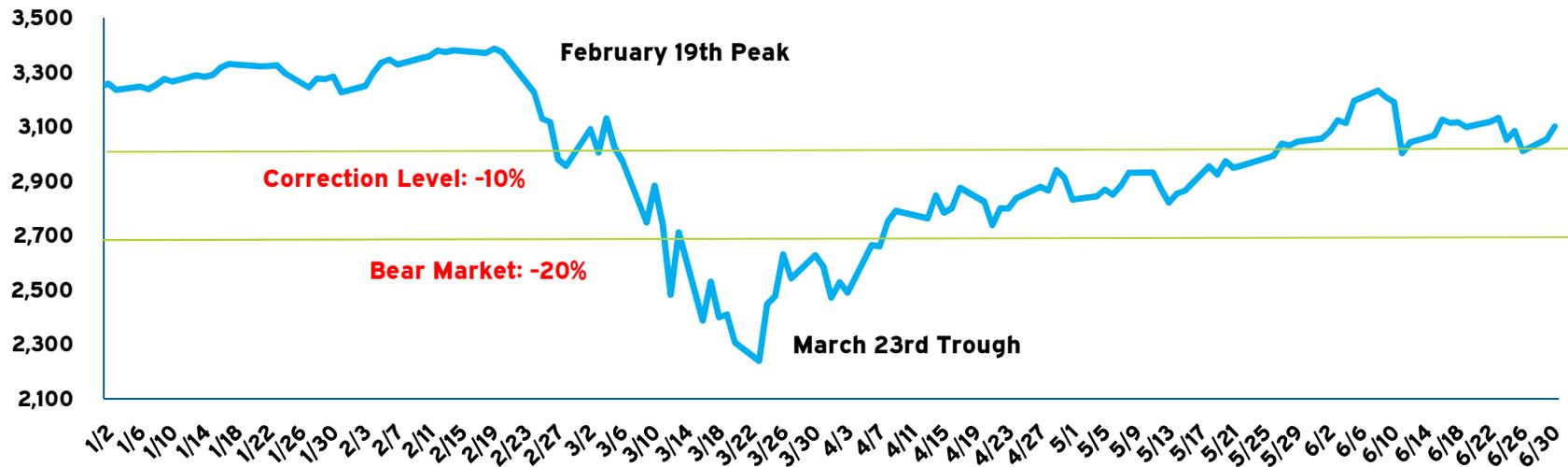
Market Returns¹

Indices	Q2	YTD	1 Year	3 Year	5 Year	10 Year
S&P 500	20.5%	-3.1%	7.5%	10.7%	10.7%	14.0%
MSCI EAFE	14.9%	-11.3%	-5.1%	0.8%	2.1%	5.7%
MSCI Emerging Markets	18.1%	-9.8%	-3.4%	1.9%	2.9%	3.3%
MSCI China	15.3%	3.5%	13.1%	8.6%	5.3%	6.4%
Bloomberg Barclays Aggregate	2.9%	6.1%	8.7%	5.3%	4.3%	3.8%
Bloomberg Barclays TIPS	4.2%	6.0%	8.3%	5.0%	3.7%	3.5%
Bloomberg Barclays High Yield	10.2%	-3.8%	0.0%	3.3%	4.8%	6.7%
10-year US Treasury	0.7%	12.7%	14.2%	6.6%	4.8%	4.7%
30-year US Treasury	-0.7%	24.9%	29.8%	12.4%	9.7%	8.5%

- Global risk assets have recovered meaningfully from their lows, largely driven by record fiscal and monetary policy stimulus; the S&P 500 recovered by over 39% from the mid-March lows.
- Risk assets have reacted positively to the gradual re-opening of the global economy, some economic data beating expectations, and the potential for a vaccine being developed sooner than initially expected.
- Despite the recovery in risk assets, yields on safe-haven assets like US Treasuries remain at record lows due to expectations for extremely accommodative monetary policy for the foreseeable future.

¹ Source: InvestorForce and Bloomberg. Data is as of June 30, 2020.

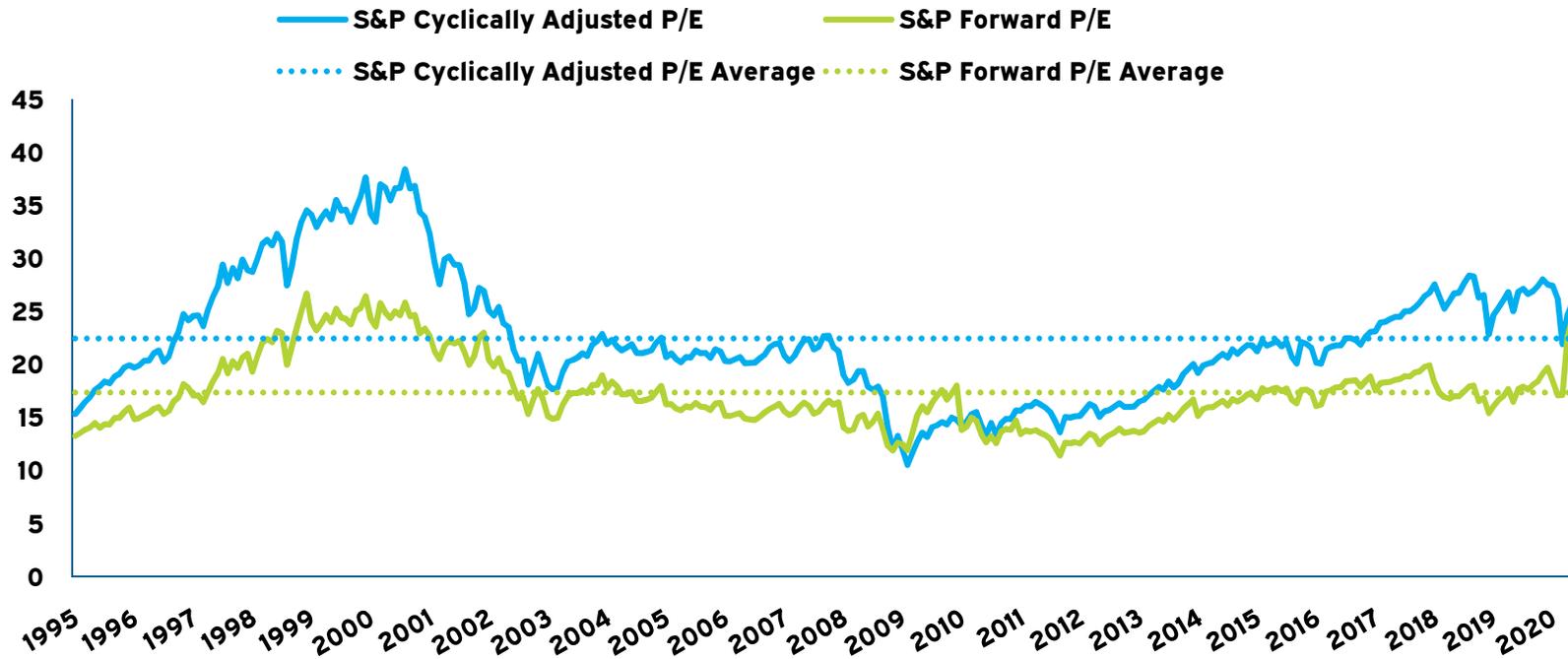
S&P 500 Continues to Recover¹



- Given the anticipated economic carnage surrounding the pandemic, US stocks declined from a February peak into bear market (-20%) territory at the fastest pace in history.
- From the February 19 peak, the S&P 500 plunged 34% in just 24 trading days.
- The index rebounded from its lows, and is only down around 3% year-to-date through the end of June, primarily due to the unprecedented monetary and fiscal stimulus announced in the US, as well as improvements in virus data, and the economy slowly reopening.
- It is unclear whether the US equity market's recovery is temporary, particularly given the recent surge in cases.

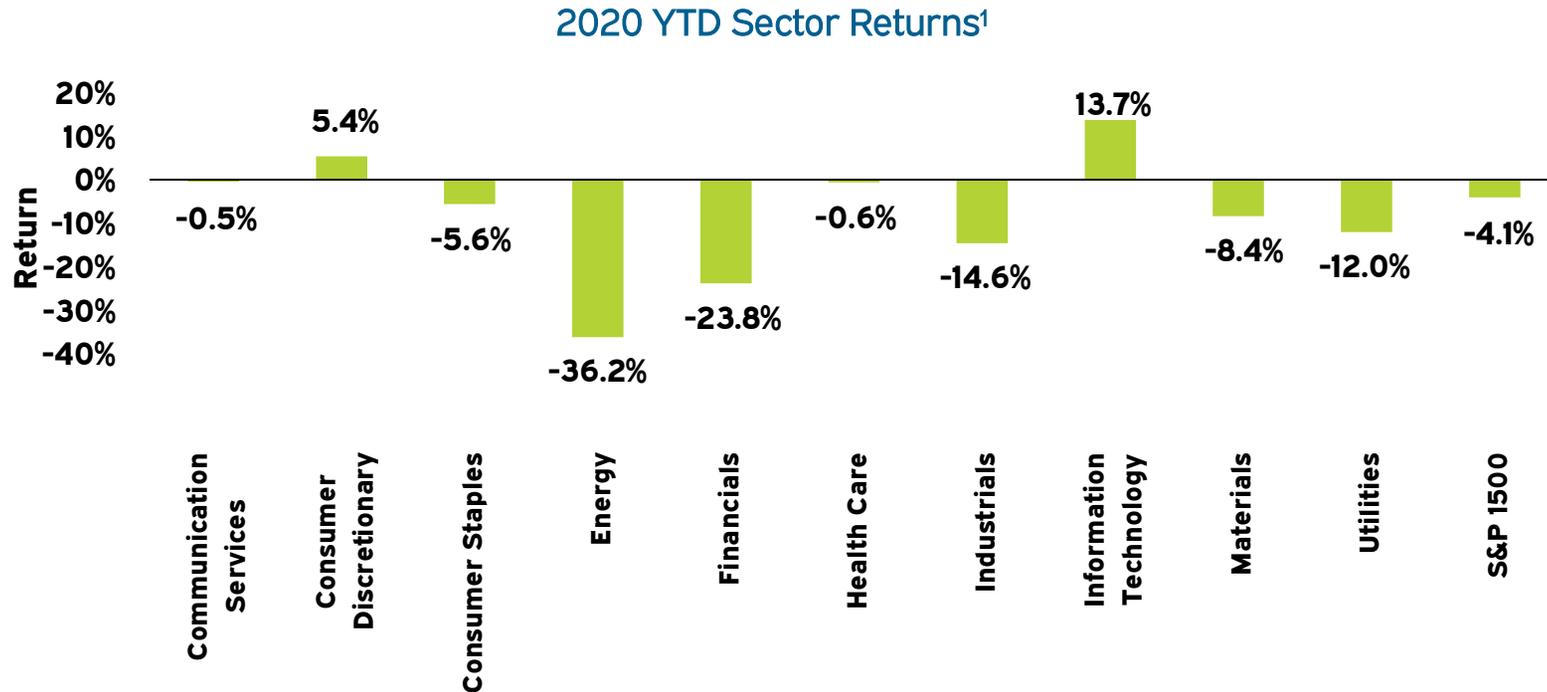
¹ Source: Bloomberg. Data is as of June 30, 2020.

S&P Equity Valuations¹



- Valuations based on both forward and backward looking earnings for the US stock market remain well above long-term averages, driven by the recent run.
- Many are looking to improvements in earnings to support market levels as the US economy continues to reopen.
- The key risk remains that a spike in COVID-19 cases could slow, or reverse, the reopening plans.

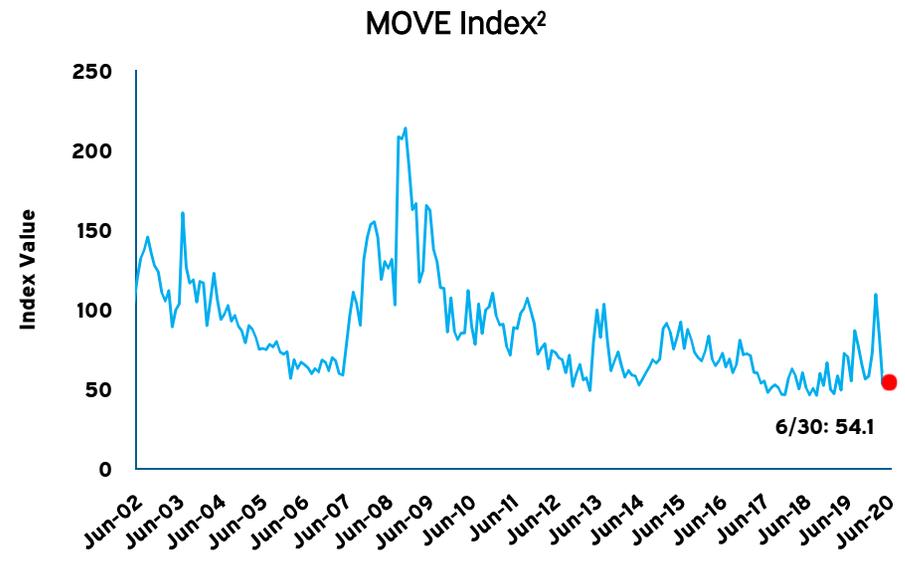
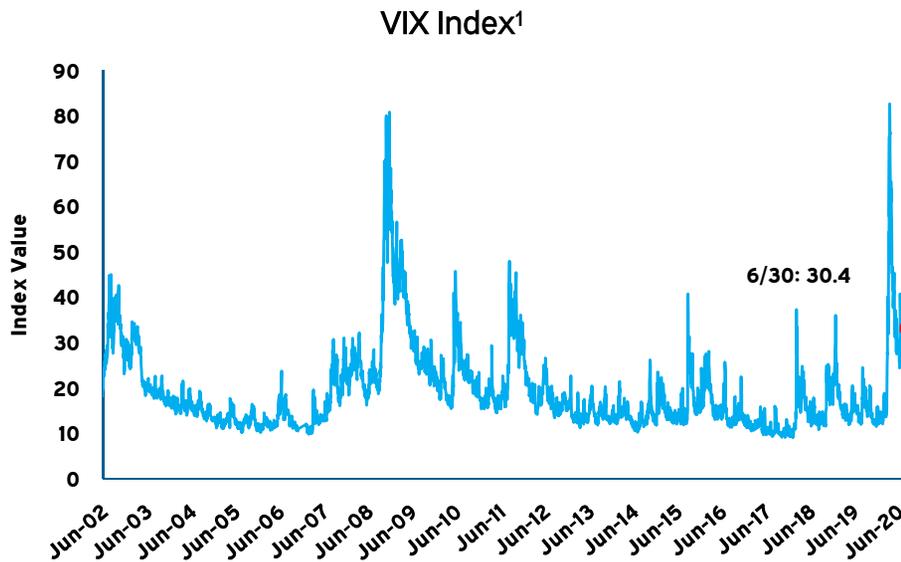
¹ Source: Bloomberg. Data is as of June 30, 2020.



- Information technology is the best performing sector, with a narrow group of companies like Amazon and Netflix largely driving market gains. The outperformance has been due to consumers moving to online purchases and entertainment.
- The consumer discretionary sector also experienced gains as the economy slowly reopens, people return to work, and as stimulus checks are spent.
- The energy sector has seen some improvements given supply cuts and economies starting to reopen, but it remains the sector with the greatest decline, triggered by the fall in oil prices.

¹ Source: Bloomberg. Data is as of June 30, 2020.

Volatility has Declined



- Given the recent fiscal and monetary support and corresponding improvement in investor risk sentiment, expectations of short-term equity volatility, as measured by the VIX index, continues to decline from record levels but remains elevated.
- At the recent height, the VIX reached 82.7, surpassing the pinnacle of volatility during the GFC, showing the magnitude of the crisis, and of investor fear.
- Expectations of volatility within fixed income, represented by the MOVE index, remain near historic lows given the broad monetary support including interest rate cuts, funding programs, quantitative easing, and forward guidance.

¹ Source: Chicago Board of Exchange. Data is as of June 30, 2020.

² Source: Bloomberg. Data is as of June 30, 2020.

Global Financial Crisis Comparison

	2007-2009 Global Financial Crisis	COVID-19 Crisis
Primary Causes	<p>Excess Risk Taking Due to:</p> <ul style="list-style-type: none"> Deregulation, un-constrained securitization, shadow banking system, fraud 	<p>Pandemic/Natural Disaster:</p> <ul style="list-style-type: none"> Large scale global restrictions on businesses and individuals leading to immediate and significant deterioration in economic fundamentals
Fiscal Measures	<ul style="list-style-type: none"> American Recovery Reinvestment Act of 2009: \$787 billion Economic Stimulus Act of 2008: \$152 billion 	<ul style="list-style-type: none"> PPP Act: \$659 billion CARES Act of 2020: \$2.3 trillion Families First Coronavirus Response Act: \$150 billion Coronavirus Preparedness & Response Supplemental Appropriations Act 2020: \$8.3 billion National Emergency: \$50 billion
Monetary Measures		
Lowering Fed Funds Rate	X	X
Quantitative Easing	X	X
Primary Dealer Repos	X	X
Central Bank Swap Lines	X	X
Commercial Paper Funding Facility	X	X
Primary Dealers Credit Facility	X	X
Money Market Lending Facility	X	X
Term Auction Facility	X	
TALF	X	X
TSLF	X	
FIMA Repo Facility		X
Primary & Secondary Corp. Debt		X
PPP Term Facility		X
Municipal Liquidity Facility		X
Main Street Loan Facility		X

Global Financial Crisis Comparison (continued)

- The US **fiscal** response to the COVID-19 Crisis has been materially larger than the response to the 2007-2009 Global Financial Crisis (GFC), and stimulus is acutely focused on areas of the economy showing the greatest need, including small and mid-sized companies. For example, the Paycheck Protection Program (PPP) helps small businesses keep employees working by offering forgivable loans to cover salaries.
- On the **monetary** side, markets targeted during both crises represent those most in need, but for the COVID-19 Crisis the policy response was dramatically faster, measured in weeks, not years, as in the GFC.
- Of the monetary stimulus measures, the corporate debt (Primary & Secondary Corporate Debt) programs and Main Street Loan Facility are new and garnered much attention from market participants.
- Through the end of June, Fed programs have experienced various degrees of usage. However, at this point, none has come close to reaching program limits. Still, the psychological value of knowing the programs are available, if necessary, likely supports market sentiment.

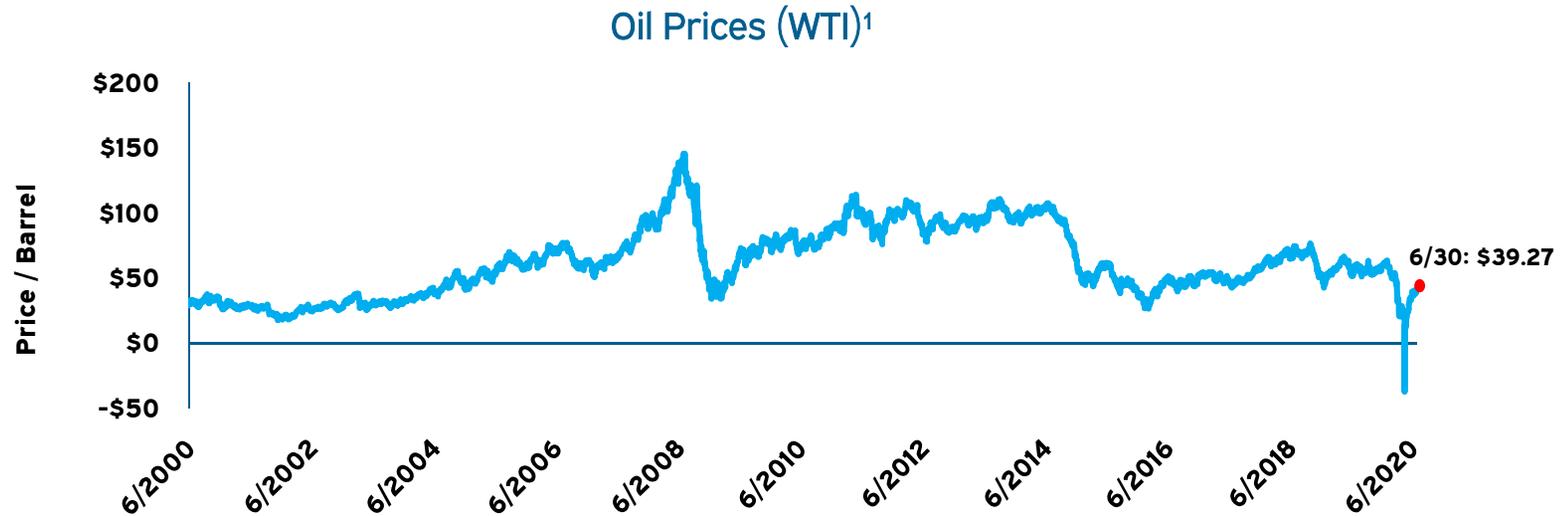
Historic \$2T US Fiscal Stimulus

Destination	Amount (\$ Billion)
Individuals	\$560
Large Corporations	\$500
Small Business	\$377
State & Local Governments	\$340
Public Health	\$154
Student Loans	\$44
Safety Net	\$26

- Late in March, a historic \$2 trillion fiscal package was approved in the US, representing close to 10% of GDP and including support across the economy.
- Individuals received cash payments of up to \$1,200 per adult and \$500 per child, and extended and higher weekly unemployment benefits (+\$600/week).
- The package also includes a \$500 billion lending program for distressed industries like airlines, and \$377 billion in loans to small businesses (this program was recently extended).
- Other parts of the package include allocations to state and local governments, support for public health, student loan relief, and a safety net.
- With certain programs scheduled to expire, active discussions are going on now related to the next round of fiscal stimulus, with various extensions and expansions being considered.

Policy Responses

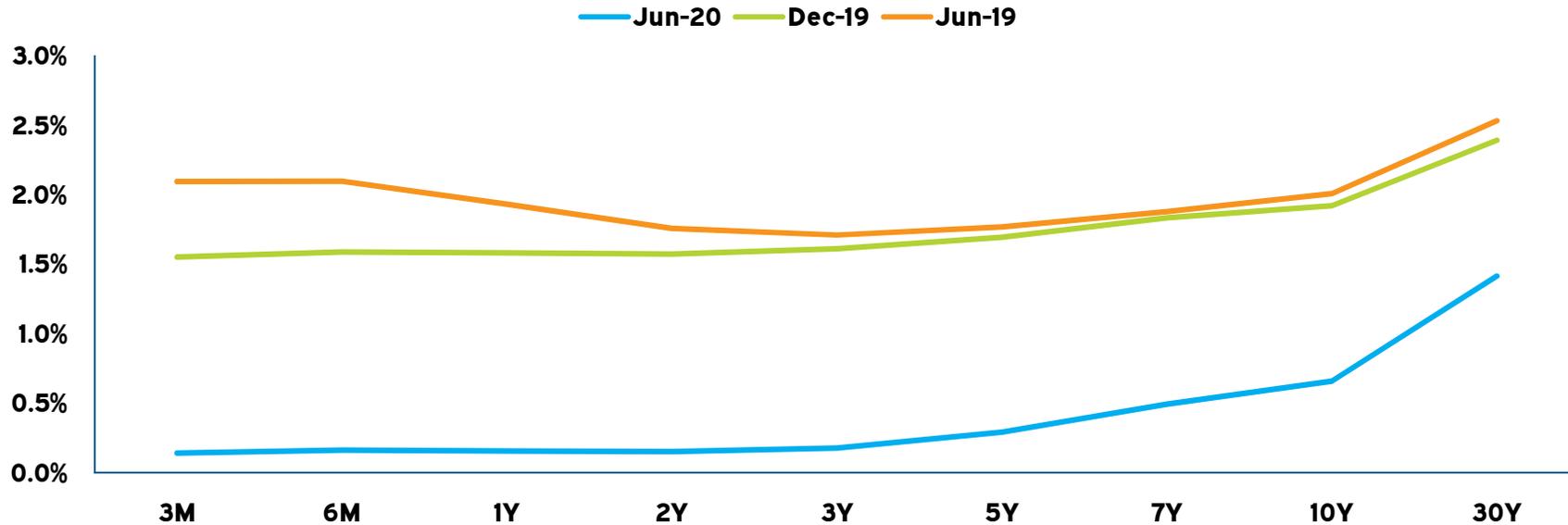
	Fiscal	Monetary
United States	\$50 billion to states for virus related support, interest waived on student loans, flexibility on tax payments and filings, expanded COVID-19 testing, paid sick leave for hourly workers, \$2 trillion package for individuals, businesses, and state/local governments. Additional \$484 billion package to replenish small business loans, provide funding to hospitals, and increase testing.	Cut policy rates to zero, unlimited QE4, offering trillions in repo market funding, restarted CPFF, PDCF, MMMF programs to support lending and financing market, expanded US dollar swap lines with foreign central banks, announced IG corporate debt buying program with subsequent amendment for certain HY securities, Main Street Lending program, Muni liquidity facility, repo facility with foreign central banks, and easing of some financial regulations for lenders.
Euro Area	Germany: Launched 750 billion euro stimulus package. France: 45 billion euro for workers, guaranteed up to 300 billion euro in corporate borrowing. Italy: 25 billion euro emergency decree, suspending mortgage payments for impacted workers. Spain: 200 billion euro and 700 million euro loan and aid package, respectively.	Targeted longer-term refinancing operations aimed at small and medium sized businesses, under more favorable pricing, and announced the 750 billion euro Pandemic Emergency Purchase Program, and then expanded the purchases to 1.53 trillion and including lower-quality corporate debt
Japan	\$1.1 trillion in small business loans, direct funding program to stop virus spread among nursing homes and those affected by school closures, and direct payments to individuals	Initially increased QE purchases (ETFs, corporate bonds, and CP) and then expanded to unlimited purchases and doubling of corporate debt and commercial paper, expanded collateral and liquidity requirements, and 0% interest loans to businesses hurt by virus
China	Tax cuts, low-interest business loans, extra payments to gov't benefit recipients.	Expanded repo facility, policy rate cuts, purchase of small business loans, and lowered reserve requirements.
Canada	\$7.1 billion in loans to businesses to help with virus damage.	Cut policy rates, expanded bond-buying and repos, lowered bank reserve requirements.
UK (BOE)	Tax cut for retailers, small business cash grants, benefits for those infected with virus, expanded access to gov't benefits for self and un-employed.	Lowered policy rates and capital requirements for UK banks, restarts QE program and subsequently increased the purchase amounts.
Australia	\$11.4 billion, subsidies for impacted industries like tourism, one-time payment to gov't benefit recipients.	Policy rate cut, started QE.



- Global oil markets rallied from April lows, including from the technically-induced negative levels that saw the May futures contract trade at nearly -\$40 per barrel.
- In addition to improvements in sentiment as the global economy begins to reopen and some measures of economic fundamentals reporting better than expected numbers, OPEC+ recently agreed to extend supply cuts of 9.7 million barrels/day (~10% of global output) through July.
- Counterbalancing the OPEC+ production cut agreement, US oil producers (particularly shale output) are reportedly turning wells back on as the price of oil rises.

¹ Source: Bloomberg. Represents WTI first available futures contract. Data is as of June 30, 2020.

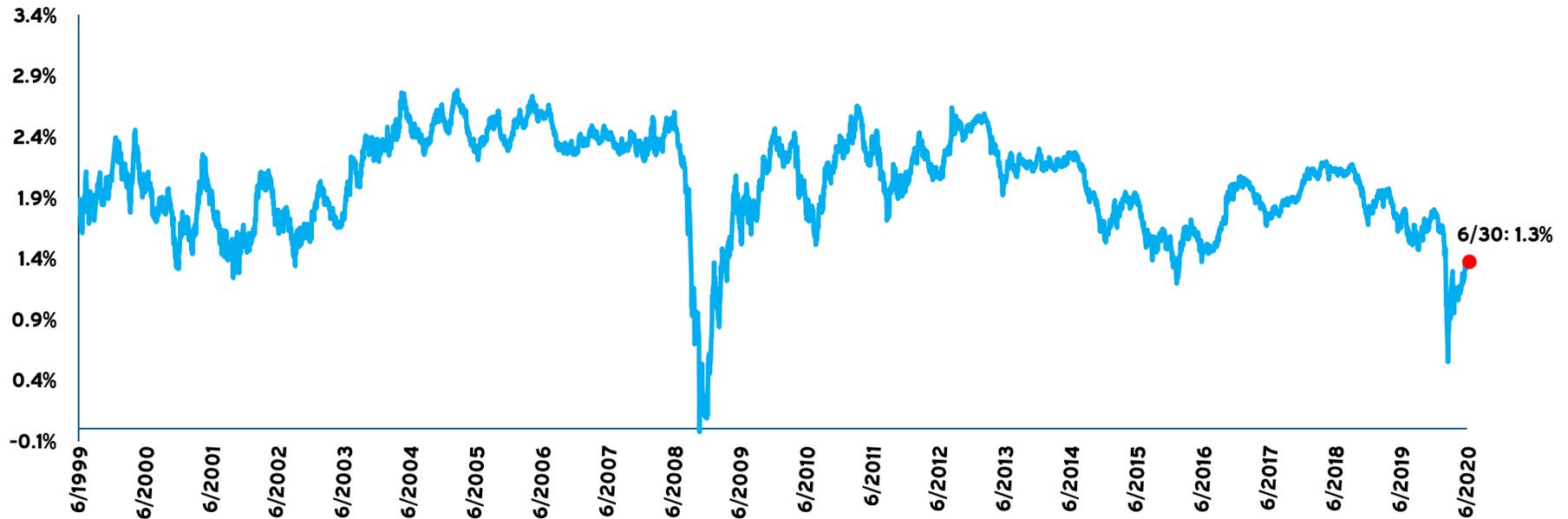
US Yield Curve Declines¹



- The US Treasury yield curve has declined materially since 2019, largely due to central bank policy actions, safe-haven demand, and weak economic expectations.
- Yields out to the 5-year maturity point have been principally driven by cuts to monetary policy rates, the Federal Reserve’s ongoing purchase program, and commitments by policy makers to keep policy rates accommodative for the foreseeable future.
- Longer-dated yields have also been heavily influenced by monetary policy actions, but have recently risen on modest increases in longer-term inflation expectations.

¹ Source: Bloomberg. Data is as of June 30, 2020.

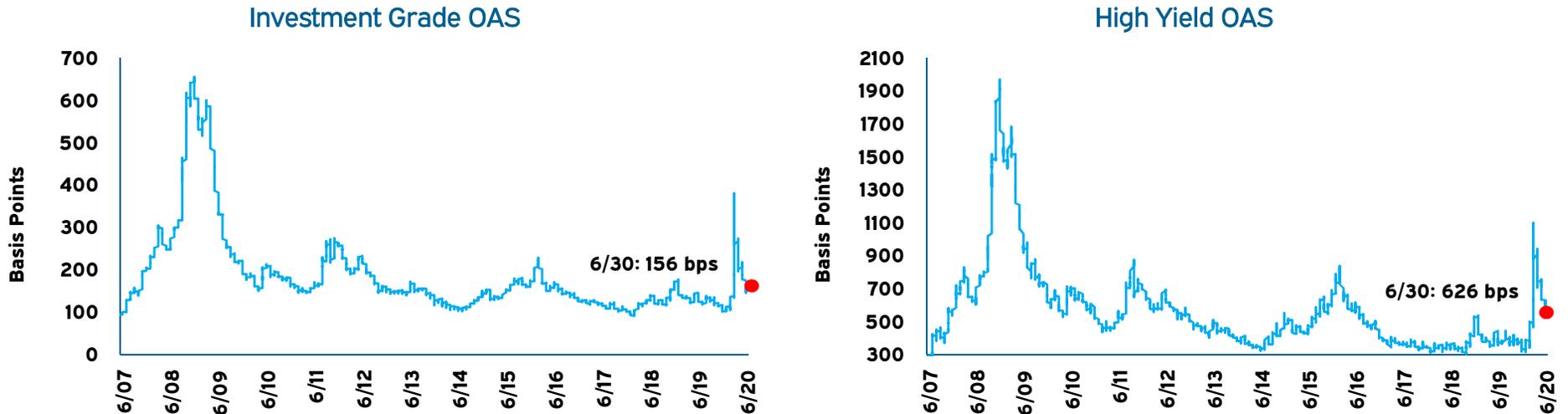
10-Year Breakeven Inflation¹



- Inflation breakeven rates initially declined sharply, due to a combination of lower growth and inflation expectations, as well as liquidity dynamics in TIPS during the height of rate volatility.
- Liquidity eventually improved and breakeven rates increased, but given the uncertainty regarding economic growth and the inflationary effects of the unprecedented US fiscal and monetary responses, inflation expectations remain well below historical averages.

¹ Source: Bloomberg. Data is as of June 30, 2020.

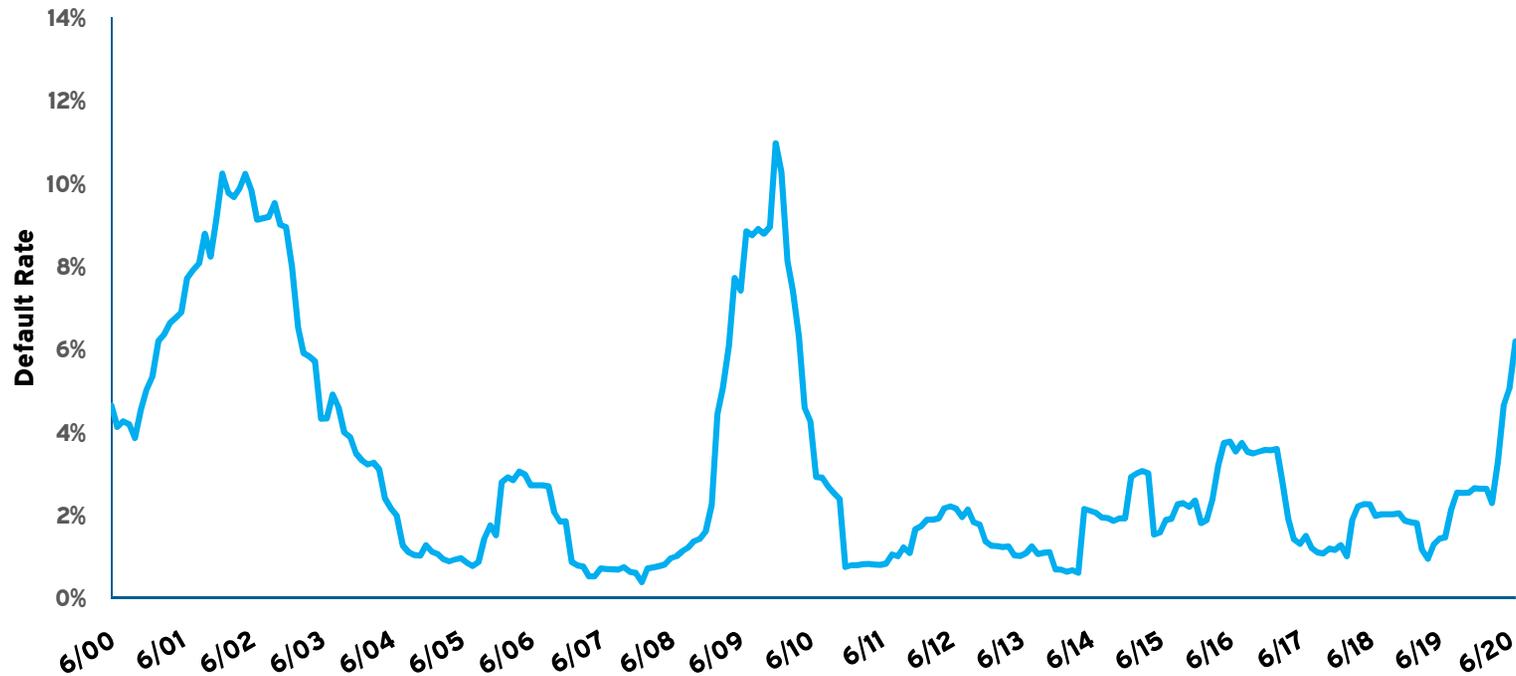
Credit Spreads (High Yield & Investment Grade)¹



- Credit spreads (the spread above a comparable Treasury bond) for investment grade and high yield corporate debt expanded sharply as investors sought safety.
- Investment grade bonds held up better than high yield bonds. The Federal Reserve’s corporate debt purchase program for investment grade and certain high yield securities that were recently downgraded from investment grade, was well received by investors, leading to a decline in spreads.
- Overall, corporate debt issuance has more than doubled since 2008, which magnifies the impact of deterioration in the corporate debt market. This is particularly true in the energy sector, which represents over 10% of the high yield bond market.

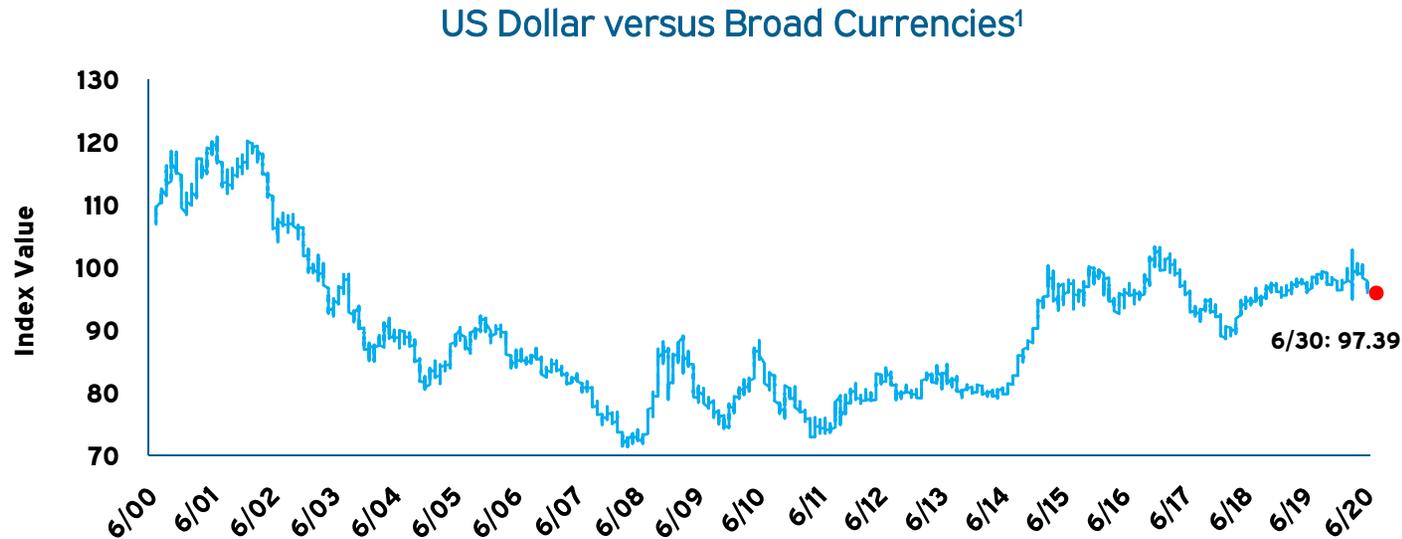
¹ Source: Federal Reserve Bank of St. Louis Economic Research. Data is as of June 30, 2020.

US High Yield Credit Defaults¹



- Even though spreads have declined given the Federal Reserve’s support, defaults, particularly in the high yield sector, increased dramatically.
- The energy sector has been hard hit given the decline in oil prices, with defaults reaching double-digit levels and expectations for them to increase.

¹ Source: J.P. Morgan; S&P LCD. Data is as of June 30, 2020.



- When financial markets began aggressively reacting to COVID-19 developments, the US dollar came under selling pressure as investors sought safe-haven exposure in currencies like the Japanese yen given its current account surplus and its status as the largest creditor globally.
- As the crisis grew into a pandemic, investors' preferences shifted to holding US dollars and highly liquid, short-term securities like US Treasury bills. This global demand for US dollars led to appreciation versus most major currencies.
- A relatively strong US dollar makes US goods more expensive for overseas consumers and causes commodity prices outside the US to rise, affecting foreign countries, and particularly emerging markets.
- To help ease global demand for US dollars, the Federal Reserve, working with a number of global central banks, re-established the US dollar swap program, providing some relief to other currencies. Usage of the program continues to decline as dollar funding demands have eased.

¹ Source: Bloomberg. Represents the DXY Index. Data is as of June 30, 2020.

Economic Impact

Supply Chain Disruptions:

- Factories closing, increased cost of stagnant inventory, and disrupted supply agreements.
- Reduced travel, tourism, and separation policies including closed borders: Significant impact on service-based economies.

Labor Force Impacts:

- Huge layoffs across service and manufacturing economies.
- Increased strains as workforce productivity declines from increased societal responsibilities (e.g., home schooling of children) and lower functionality working from home.
- Illnesses from the disease will also depress the labor force.

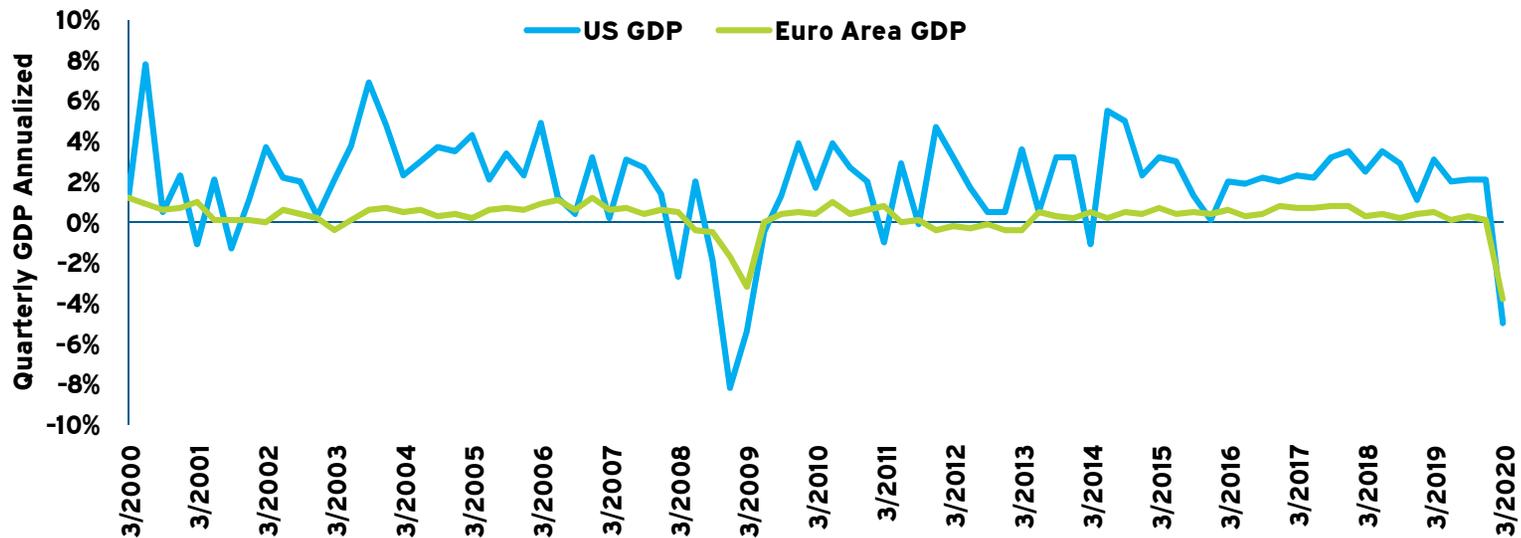
Declines in Business and Consumer Sentiment:

- Sentiment drives investment and consumption, which leads to increased recessionary pressures as sentiment slips.

Wealth Effect:

- As financial markets decline and wealth deteriorates, consumer spending will be impacted.

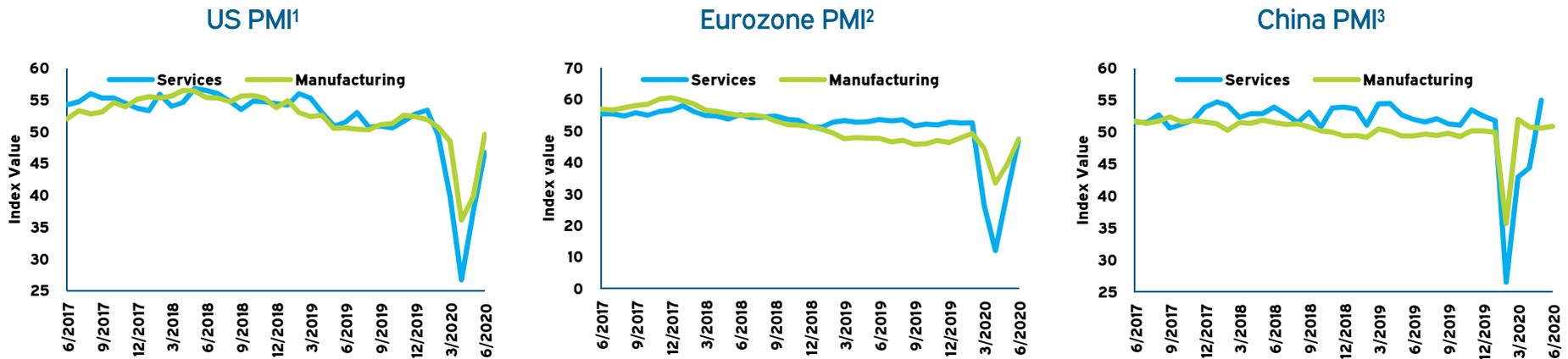
GDP Data Shows First Signs of Crisis¹



- The global economy faces major recessionary pressures this year, but optimism remains for improvements in 2021, as economies are expected to gradually reopen.
- In the US, the third estimate for first quarter GDP came in at -5.0%, with personal consumption declining the most since 1980. Eurozone GDP fell (-3.6%) with the major economies in France, Spain, and Italy experiencing historic declines.
- Bloomberg Economics estimates that second quarter US GDP could be as low as -5.6% (YoY).

¹ Source: Bloomberg. Q1 2020 data represents third estimate of GDP for Euro Area and third estimate of GDP for United States.

Global PMIs



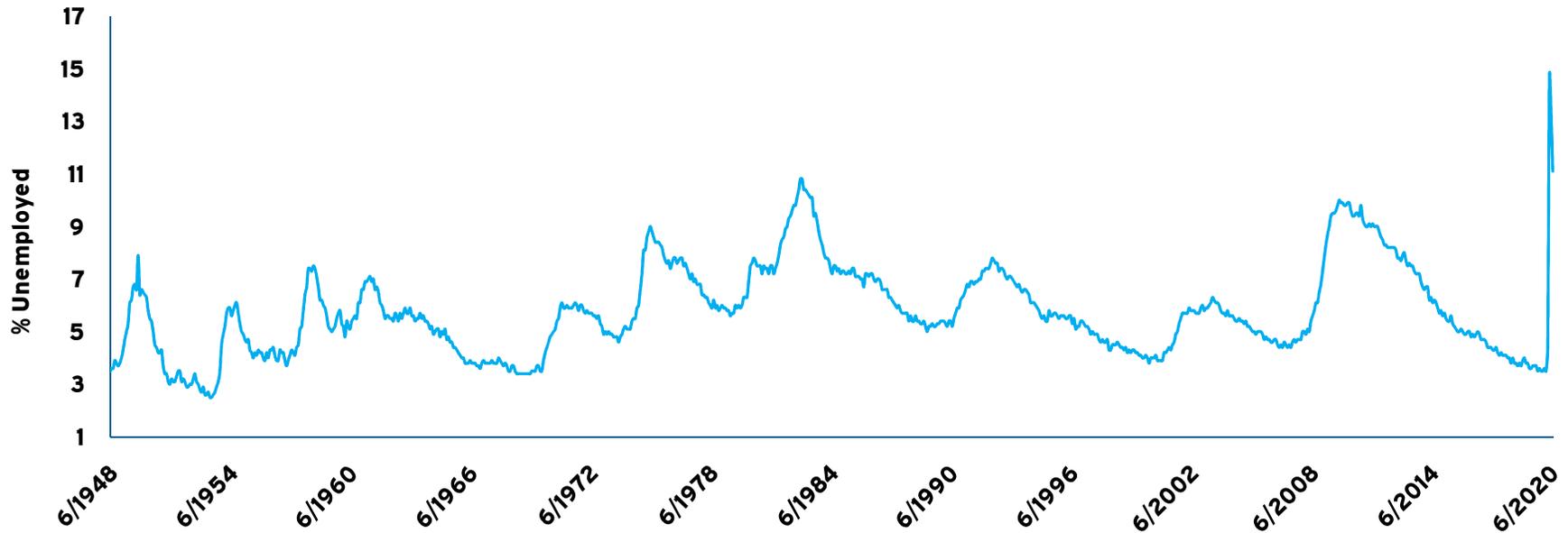
- Purchasing Managers Indices (PMI), based on surveys of private sector companies, collapsed across the world to record lows, as output, new orders, production, and employment have been materially impacted by closed economies. The service sector was particularly hard hit by the stay at home orders.
- Readings below 50 represent contractions across underlying components and act as a leading indicator of economic activity, including the future paths of GDP, employment, and industrial production.
- Recently, there have been improvements in data as economies reopen, contributing to the optimism in equity markets.

¹ Source: Bloomberg. US Markit Services and Manufacturing PMI. Data is as of June 2020.

² Source: Bloomberg. Eurozone Markit Services and Manufacturing PMI. Data is as of June 2020.

³ Source: Bloomberg. Caixin Manufacturing PMI data is as of June 2020. Caixin Services PMI as of May 2020

US Unemployment Rate¹

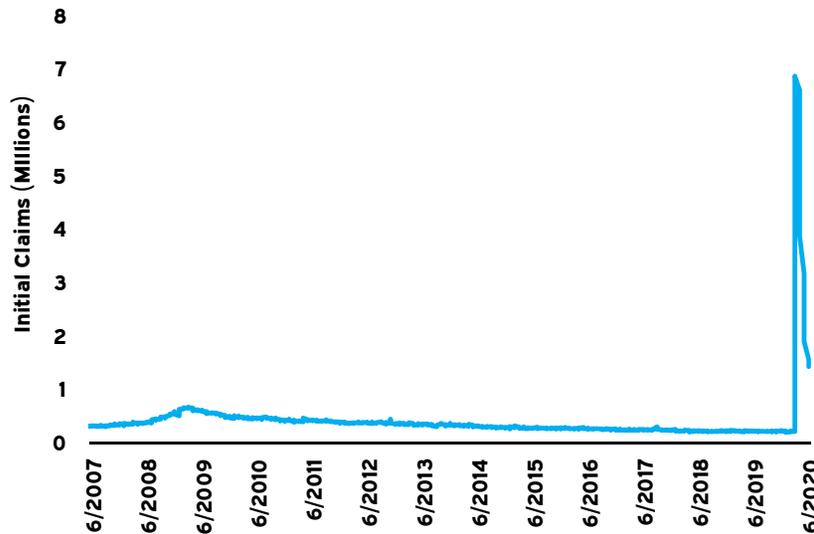


- In May, the unemployment rate continued its decline from the recent April 14.7% peak, falling to 11.1%.
- Despite the improvement, unemployment levels remain well above pre-virus readings and are likely higher than reported due to issues related to some workers being misclassified. According to the Bureau of Labor Statistics, absent the misclassification issue, the June unemployment rate would be higher by 1.0%.
- The recent increase in COVID-19 cases could lead to an increase in the unemployment rate going forward.

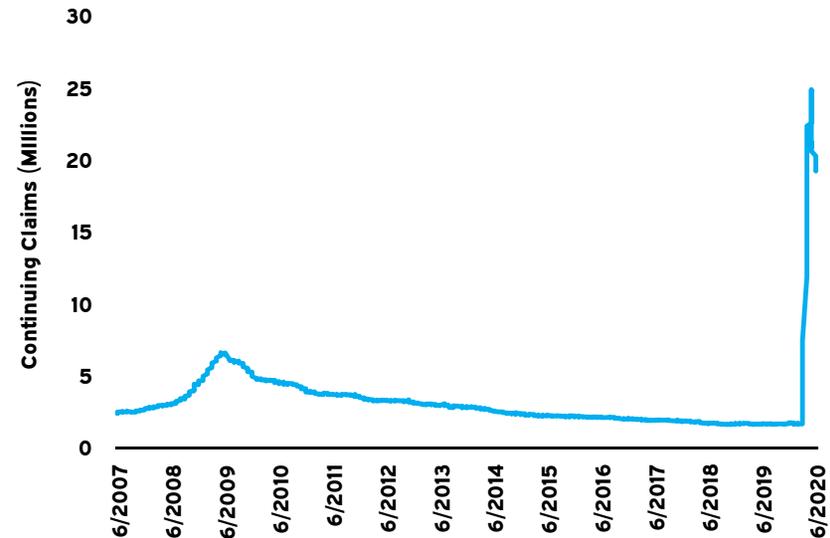
¹ Source: Bloomberg. Data is as of June 30, 2020.

US Jobless Claims

US Initial Jobless Claims¹



Continuing Claims²

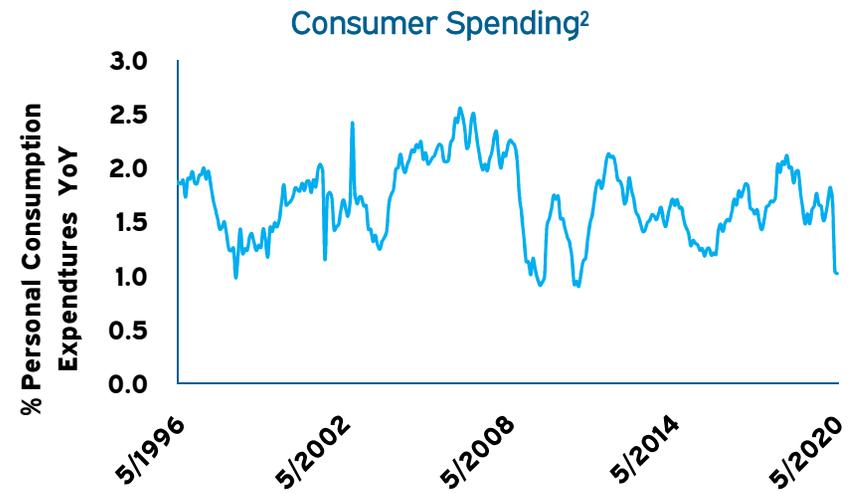


- Over the last 15 weeks, close to 49 million people filed for initial unemployment. This level far exceeds the 22 million jobs added since the GFC, highlighting the unprecedented impact of the virus.
- Despite the continued decline in initial jobless claims, the 1.4 million level of the last reading remains many multiples above the worst reading during the Global Financial Crisis.
- Continuing jobless claims (i.e., those currently receiving benefits) has also declined from record levels, but remains elevated.

¹ Source: Bloomberg. First reading of seasonally adjusted initial jobless claims. Data is as of June 26, 2020.

² Source: Bloomberg. US Continuing Jobless Claims SA. Data is as of June 19, 2020.

Savings and Spending



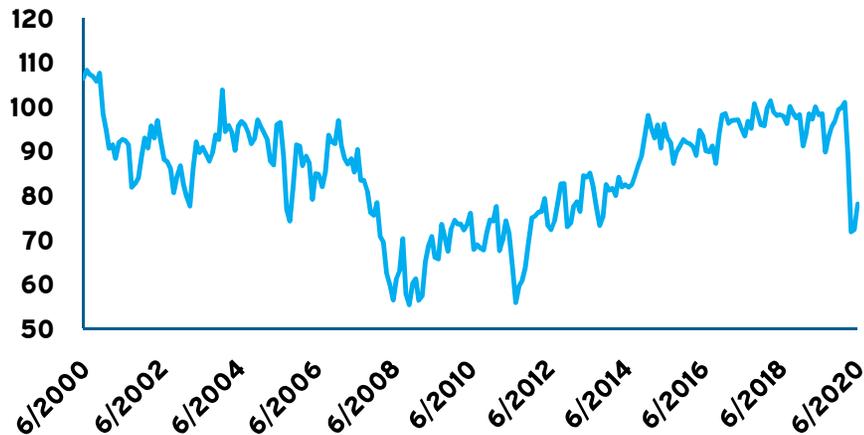
- Fiscal programs including stimulus checks, enhanced unemployment benefits, and loans to small businesses through the Paycheck Protection Program (PPP) have largely supported income levels through the shutdown.
- Despite the income support, the savings rate has increased at the expense of spending, driven by uncertainties related to the future of the job market and stimulus programs.

¹ Source: Bloomberg. Data is as of June 30, 2020.

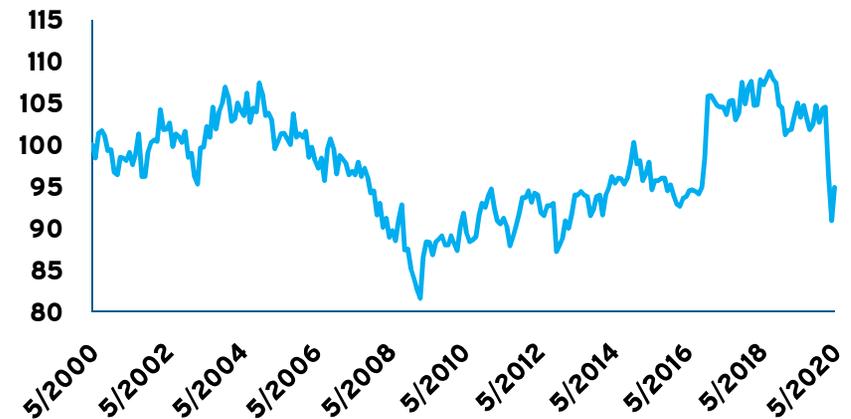
² Source: Bloomberg. Data is as of May 31, 2020.

Sentiment Indicators

University of Michigan Consumer Sentiment¹



Small Business Confidence²



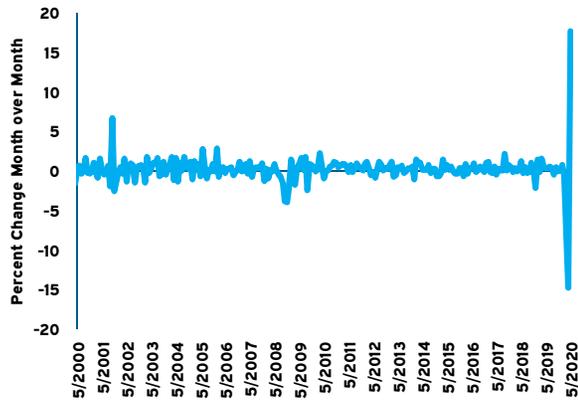
- A strong indicator of future economic activity are the attitudes of businesses and consumers today.
- Consumer spending comprises close to 70% of US GDP, making the attitudes of consumers an important driver of economic growth. Additionally, small businesses comprise a majority of the economy, making sentiment in that segment important too.
- Sentiment indicators have shown some improvements as the economy re-opens, but they remain well below prior levels.

¹ Source: Bloomberg. University of Michigan Consumer Sentiment Index. Data is as of June 30, 2020.

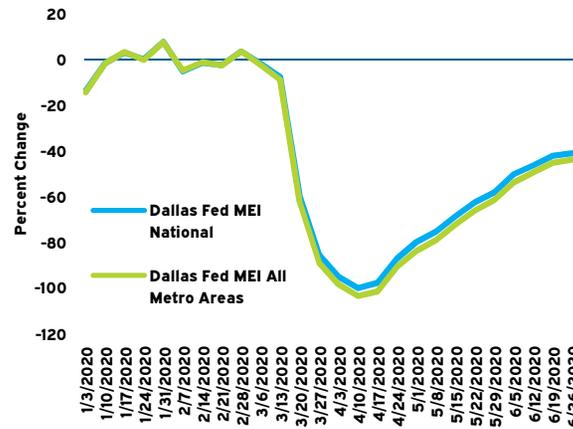
² Source: Bloomberg. NFIB Small Business Optimism Index. Data is as of May 30, 2020.

Some US Data has Improved

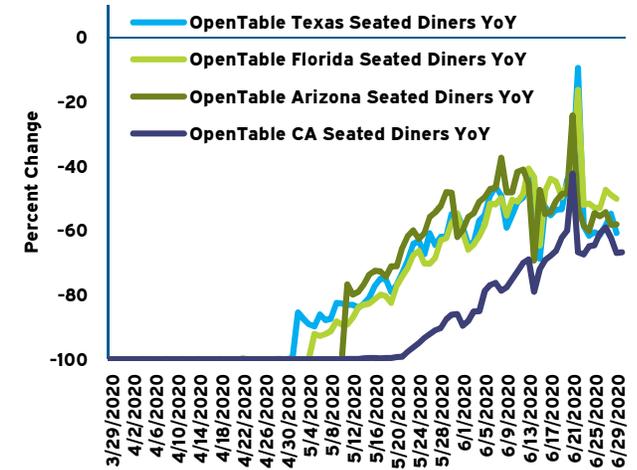
Retail Sales¹



Dallas Fed Mobility and Engagement Index²



OpenTable Seated Diners YoY % Change³



- There have been improvements in high frequency data, but overall levels remain well below prior readings.
- Generally, people have become more active as restrictions eased and stores reopened. Retail sales recovered from a record decline with a record increase, more than double the forecast.
- States that eased restrictions on restaurants saw initial improvements before declining, as in-store dining has been cited as a key contributor to increases in cases.

¹ Source: Bloomberg. Data is as of May 31, 2020 and represents the US Retail Sales SA MoM%

² Source: Bloomberg. Data is as of June 26, 2020 and represents the deviation from normal mobility behaviors induced by COVID-19 (formerly the "Social Distancing Index").

³ Source Bloomberg. Data is as of June 30, 2020 and represents some states that eased restaurant restrictions.

Government Re-Opening Recommendation¹

Phase One	Phase Two	Phase Three
<ul style="list-style-type: none"> • Vulnerable individuals continue to stay at home. • Avoid groups of more than 10 people if social distancing is not possible. • Minimize non-essential travel. • Work remotely if possible with restrictions in the office for those businesses that open. • Schools remain closed, but some larger venues can open with strict protocols. • Outpatient elective surgeries can resume. 	<ul style="list-style-type: none"> • Vulnerable individuals continue to stay at home. • Avoid groups of more than 50 people if social distancing is not possible. • Non-essential travel resumes. • Continue to work remotely if possible with restrictions in the office for those businesses that open. • Schools can reopen. • Inpatient elective surgeries can resume 	<ul style="list-style-type: none"> • Vulnerable individuals can return to public life with social distancing. • Workplaces can reopen without restrictions. • Larger venues can operate under reduced social distancing protocols.
<ul style="list-style-type: none"> • The Trump administration announced guidelines for re-opening the US economy. • Guidelines recommend states document a “downward trajectory” in new cases for two weeks before beginning a three-phase process to scale back distancing measures and reopen local economies. • States should also document an additional two-week period decline in instances between each of the three phases, and be prepared to reinstate social distancing measures should cases rebound. • The recent spike in cases in certain states, and the potential for similar increases elsewhere, remains a significant headwind to the re-opening plans in the US. 		

¹ Source: <https://www.whitehouse.gov/openingamerica/>

Looking Forward...

- There will be significant economic impact and a global recession.
 - How deep it will be and how long it will last depend on factors (below) that are unknowable at this time.
- The length of the virus and country responses will be key considerations.
 - As of now, it is not clear the end is in sight, particularly given the recent increases in cases in certain areas; however, individual countries are attempting to lay the groundwork to support a recoveries in their economies.
- Central banks and governments are pledging support, but will it be enough?
 - Market reactions to announced policies have been positive, but additional support will likely be required until the virus gets better contained.
- Expect heightened market volatility given the recent spike in cases and valuation levels.
 - This has been a consistent theme recently; volatility is likely to remain elevated for some time.
- It is important to retain a long-term focus.
 - History supports the argument that maintaining a long-term focus will ultimately prove beneficial for diversified portfolios.

Prior Drawdowns and Recoveries from 1926-2020¹

Period	Peak-to-Trough Decline of the S&P 500	Approximate Time to Recovery
Sept 1929 to June 1932	-85%	266 months
February 1937 to April 1942	-57%	48 months
May 1946 to February 1948	-25%	27 months
August 1956 to October 1957	-22%	11 months
December 1961 to June 1962	-28%	14 months
February 1966 to October 1966	-22%	7 months
November 1968 to May 1970	-36%	21 months
January 1973 to October 1974	-48%	69 months
September 1976 to March 1978	-19%	17 months
November 1980 to August 1982	-27%	3 months
August 1987 to December 1987	-32%	19 months
July 1990 to October 1990	-20%	4 months
July 1998 to August 1998	-19%	3 months
March 2000 to October 2002	-49%	56 months
October 2007 to March 2009	-57%	49 months
February 2020 to May 2020	-34%	TBD
Average	-36%	41 months
Average ex. Great Depression	-33%	25 months

- As markets continue to recover questions remain about whether the ultimate low has been seen.
- Markets are continuing to reprice amid the uncertain impact of the virus on companies and the broader economy, which means this drawdown is still being defined in the context of history.
- That said, financial markets have experienced material declines with some frequency, and while certain declines took a meaningful time to recover, in all cases they eventually did.

¹ Source: Goldman Sachs. Recent peak to trough declines are through June 30, 2020.

Implications for Clients

- Portfolios have generally experienced significant improvements from the March lows.
- Even though equity markets have recovered from their lows, it is important to remain vigilant and be prepared to rebalance if volatility increases again.
 - Before rebalancing, consider changes in liquidity needs given the potential for cash inflows to decline in some cases.
 - Also, consider the cost of rebalancing if investment liquidity declines.
- Diversification works. The latest decline was an example of a flight to quality leading to gains in very high quality bonds.

Performance YTD (through June 30, 2020)

S&P 500	ACWI (ex. US)	Aggregate Bond Index	Balanced Portfolio ¹
-3.1%	-11.2%	6.1%	-2.6%

- Meketa will continue to monitor the situation and communicate frequently.
 - The situation is fluid and the economic impact is uncertain at this stage.
- Please feel free to reach out with any questions.

¹ Source: InvestorForce. Balanced Portfolio represents 60% MSCI ACWI and 40% Bloomberg Barclays Global Aggregate.

Executive Summary

Executive Summary

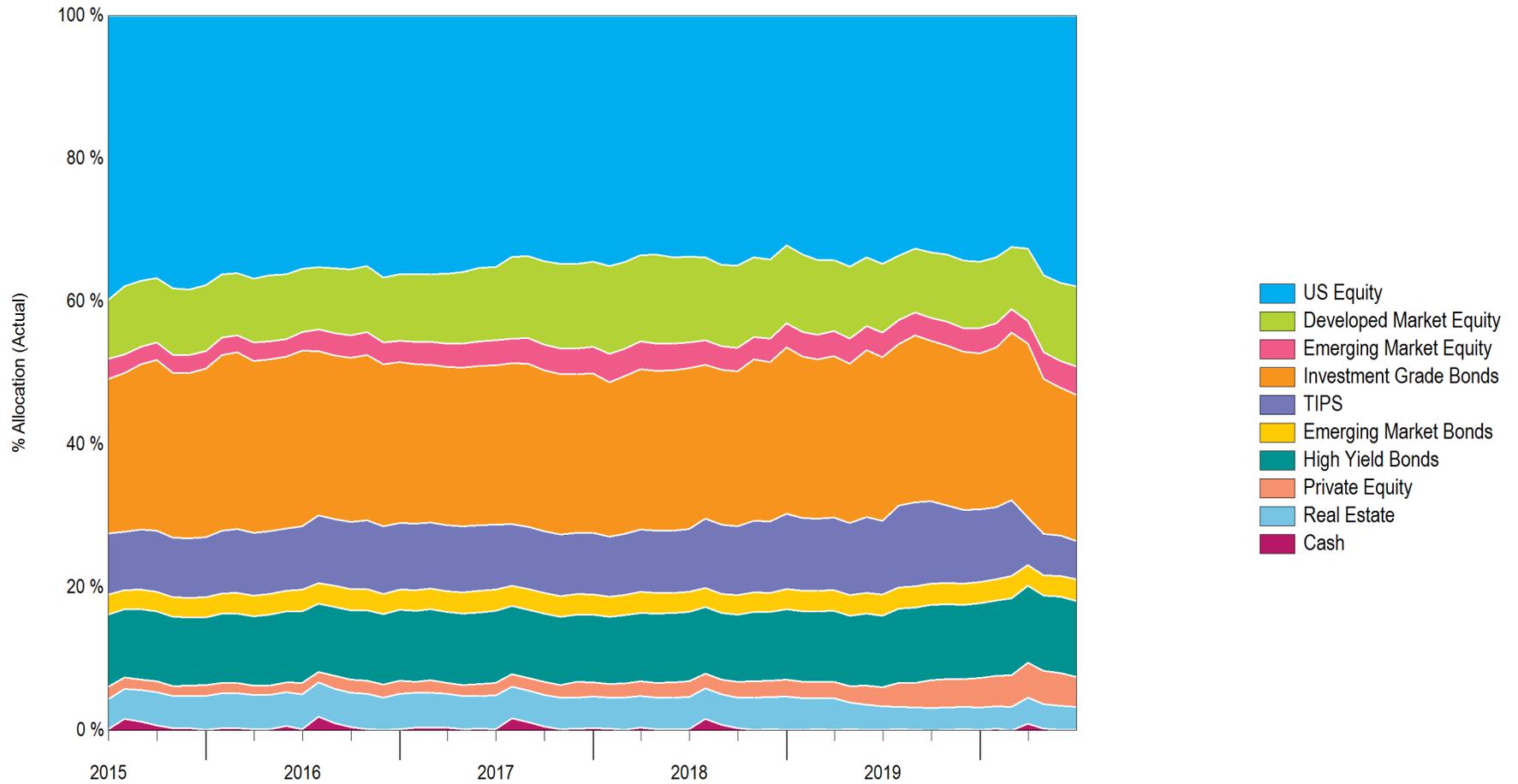
- The System returned 11.6% net of fees for Q2 2020, matching the return of the primary benchmark of 55% MSCI World/45% Barclay's Aggregate Index, finishing the quarter at \$177.7 million
- The largest detractors to the performance came from Fiduciary Large Cap and Frontier Capital, they have severely underperformed during 2020. Frontier did have a very positive Q2 return (+33.1%) but is still trailing its benchmark year to date .
- Most other asset class aggregates matched or outperformed their asset class benchmarks.
- Out of the total appropriation of approximately \$9 million, \$5.7 million was invested in emerging markets equity and \$3.4 million was placed in cash account for future benefit payments. Emerging markets was the best performing asset class in the month of July, rising over 7% month to date.
- We have finalized the RFP respondent review for the "defensive" index fund to replace Fiduciary Large Cap.

**Retirement System Summary
As of June 30, 2020**

Retirement System Summary

Allocation vs. Targets and Policy						
	Current Balance	Old Policy	Current Allocation	New Policy Step 1	New Policy Step 2	New Policy Range
US Equity	\$67,197,106	33%	38%	34%	38%	28% - 42%
Developed Market Equity	\$19,941,770	9%	11%	10%	12%	5% - 15%
Emerging Market Equity	\$7,022,829	3%	4%	8%	10%	1% - 12%
Investment Grade Bonds	\$36,333,762	22%	20%	18%	12%	10% - 25%
TIPS	\$9,553,489	10%	5%	2%	0%	0% - 10%
Emerging Market Bonds	\$5,359,881	3%	3%	3%	2%	1% - 5%
High Yield Bonds	\$18,977,855	10%	11%	7%	5%	5% - 12%
Private Equity	\$7,353,976	5%	4%	5%	5%	3% - 7%
Real Estate	\$5,722,260	5%	3%	7%	7%	2% - 10%
Infrastructure	--	0%	--	2%	5%	0% - 5%
Private Debt	--	0%	--	4%	4%	0% - 5%
Cash	\$196,259	0%	0%	0%	0%	0% - 5%
Total	\$177,659,187	100%	100%	100%	100%	

Asset Allocation History
5 Years Ending June 30, 2020



Asset Class Performance Summary											
	Market Value (\$)	% of Portfolio	QTD (%)	YTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	20 Yrs (%)	Inception (%)	Inception Date
Total Retirement System (net)	177,659,187	100.0	11.6	-2.6	2.8	5.0	5.5	7.6	6.0	7.5	Jul-88
55% MSCI World & 45% Barclays Aggregate			11.8	-0.1	6.0	6.4	6.0	7.4	5.0	7.0	Jul-88
45% MSCI World & 55% Barclays Aggregate			10.1	1.1	6.6	6.3	5.8	6.8	5.1	6.9	Jul-88
InvMetrics Public DB \$50mm-\$250mm Net Median			12.4	-2.2	3.7	5.9	5.8	7.6	5.6	5.7	Jul-88
Domestic Equity Assets (net)	67,197,106	37.8	21.7	-9.8	-2.2	5.7	7.2	12.2	5.2	7.4	Oct-06
Russell 3000			22.0	-3.5	6.5	10.0	10.0	13.7	6.1	8.5	Oct-06
International Developed Markets Equity Assets (net)	19,941,770	11.2	15.1	-10.9	-4.6	1.1	2.3	4.8	--	2.1	Oct-06
MSCI EAFE			14.9	-11.3	-5.1	0.8	2.1	5.7	2.9	2.4	Oct-06
International Emerging Markets Equity Assets (net)	7,022,829	4.0	21.4	-8.3	-1.5	3.2	3.9	--	--	4.1	Jan-15
MSCI Emerging Markets			18.1	-9.8	-3.4	1.9	2.9	3.3	6.6	3.1	Jan-15
Investment Grade Bonds Assets (net)	36,333,762	20.5	3.0	5.9	8.4	5.2	4.3	3.8	5.1	6.2	Jul-88
BBgBarc US Aggregate TR			2.9	6.1	8.7	5.3	4.3	3.8	5.1	6.3	Jul-88
High Yield Bond Assets (net)	18,977,855	10.7	9.1	-3.3	0.6	3.4	4.0	6.1	--	6.4	Sep-03
BBgBarc US High Yield TR			10.2	-3.8	0.0	3.3	4.8	6.7	7.0	7.4	Sep-03
TIPS Assets (net)	9,553,489	5.4	4.3	6.0	8.2	5.0	3.7	3.5	--	4.0	Oct-05
BBgBarc US TIPS TR			4.2	6.0	8.3	5.0	3.7	3.5	5.5	4.1	Oct-05
Emerging Market Debt Assets (net)	5,359,881	3.0	13.3	-3.9	-0.8	3.1	4.9	--	--	4.7	Jan-15
JP Morgan EMBI Global Diversified			12.3	-2.8	0.5	3.6	5.3	6.0	8.4	5.1	Jan-15
Open-Ended Real Estate (net)	5,664,919	3.2	-1.8	-0.5	3.2	6.5	7.8	11.8	7.0	8.0	Oct-95
NCREIF ODCE			-1.6	-0.6	2.2	5.7	7.3	10.8	7.8	8.8	Oct-95
Total Closed End Real Estate (net)	57,341	0.0									Jan-13
Private Equity Assets (net)	7,353,976	4.1									Oct-06
Cash (net)	196,259	0.1									

Trailing Performance													
	Market Value (\$)	% of Portfolio	% of Sector	QTD (%)	YTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	20 Yrs (%)	Inception (%)	Inception Date	
Total Retirement System	177,659,187	100.0	--	11.6	-2.5	3.0	5.2	5.6	7.7	6.0	7.5	Jul-88	
<i>55% MSCI World & 45% Barclays Aggregate</i>				11.8	-0.1	6.0	6.4	6.0	7.4	5.0	7.0	Jul-88	
<i>45% MSCI World & 55% Barclays Aggregate</i>				10.1	1.1	6.6	6.3	5.8	6.8	5.1	6.9	Jul-88	
<i>InvMetrics Public DB \$50mm-\$250mm Net Median</i>				12.4	-2.2	3.7	5.9	5.8	7.6	5.6	5.7	Jul-88	
Domestic Equity Assets	67,197,106	37.8	37.8	21.7	-9.7	-2.0	5.9	7.4	12.2	5.2	7.4	Oct-06	
<i>Russell 3000</i>				22.0	-3.5	6.5	10.0	10.0	13.7	6.1	8.5	Oct-06	
RhumbLine S&P 500 Index	28,060,124	15.8	41.8	20.5	-3.1	7.4	10.7	10.7	13.9	6.0	6.5	Mar-99	
<i>S&P 500</i>				20.5	-3.1	7.5	10.7	10.7	14.0	5.9	6.4	Mar-99	
<i>eV US Passive S&P 500 Equity Net Median</i>				20.5	-3.1	7.5	10.7	10.7	13.9	5.8	6.3	Mar-99	
Fiduciary Large Cap Equity	23,011,855	13.0	34.2	15.5	-11.5	-6.1	5.0	6.5	--	--	9.9	Sep-12	
<i>Russell 3000</i>				22.0	-3.5	6.5	10.0	10.0	13.7	6.1	12.7	Sep-12	
<i>eV US Large Cap Equity Net Median</i>				19.9	-5.7	3.8	8.1	8.5	12.5	6.9	11.2	Sep-12	
Frontier Capital Appreciation	16,125,128	9.1	24.0	33.1	-14.6	-6.3	1.7	4.2	--	--	9.2	Feb-13	
<i>Russell 2500 Growth</i>				32.9	2.0	9.2	12.1	9.6	14.4	6.4	12.6	Feb-13	
<i>eV US Small-Mid Cap Growth Equity Net Median</i>				33.0	6.4	12.1	14.5	11.0	14.3	8.1	12.7	Feb-13	

Domestic Equity June 30, 2020 market values are based on manager returns

Total Retirement System | As of June 30, 2020

	Market Value (\$)	% of Portfolio	% of Sector	QTD (%)	YTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	20 Yrs (%)	Inception (%)	Inception Date
International Developed Markets Equity Assets	19,941,770	11.2	11.2	15.1	-10.9	-4.6	1.1	2.3	4.8	--	2.1	Oct-06
<i>MSCI EAFE</i>				14.9	-11.3	-5.1	0.8	2.1	5.7	2.9	2.4	Oct-06
Rhumbline MSCI EAFE Index	19,941,770	11.2	100.0	14.9	-11.1	-4.9	1.0	2.2	--	--	1.5	Aug-14
<i>MSCI EAFE</i>				14.9	-11.3	-5.1	0.8	2.1	5.7	2.9	1.3	Aug-14
<i>eV EAFE All Cap Equity Net Median</i>				16.1	-10.4	-4.1	0.7	2.2	7.2	4.4	2.5	Aug-14
International Emerging Markets Equity Assets	7,022,829	4.0	4.0	21.4	-8.3	-1.5	3.2	3.9	--	--	4.1	Jan-15
<i>MSCI Emerging Markets</i>				18.1	-9.8	-3.4	1.9	2.9	3.3	6.6	3.1	Jan-15
DFA Emerging Markets	3,676,806	2.1	52.4	20.8	-13.4	-8.3	-0.8	1.7	--	--	2.0	Jan-15
<i>MSCI Emerging Markets</i>				18.1	-9.8	-3.4	1.9	2.9	3.3	6.6	3.1	Jan-15
<i>eV Emg Mkts All Cap Equity Net Median</i>				18.9	-10.0	-3.6	1.7	3.4	4.3	7.8	3.5	Jan-15
Driehaus Emerging Market Equity	3,346,023	1.9	47.6	22.3	-3.4	5.1	6.9	6.0	--	--	6.2	Jan-15
<i>MSCI Emerging Markets</i>				18.1	-9.8	-3.4	1.9	2.9	3.3	6.6	3.1	Jan-15
<i>eV Emg Mkts All Cap Equity Net Median</i>				18.9	-10.0	-3.6	1.7	3.4	4.3	7.8	3.5	Jan-15
Investment Grade Bonds Assets	36,333,762	20.5	20.5	3.0	5.9	8.5	5.3	4.3	3.8	5.1	6.2	Jul-88
<i>BBgBarc US Aggregate TR</i>				2.9	6.1	8.7	5.3	4.3	3.8	5.1	6.3	Jul-88
SSgA U.S. Aggregate Bond Index	36,333,762	20.5	100.0	3.0	6.1	8.7	5.3	4.3	3.8	--	4.9	May-01
<i>BBgBarc US Aggregate TR</i>				2.9	6.1	8.7	5.3	4.3	3.8	5.1	4.8	May-01
<i>eV US Core Fixed Inc Net Median</i>				4.4	6.1	8.6	5.3	4.4	4.1	5.3	5.0	May-01

June 30, 2020 market values are based on manager returns

Total Retirement System | As of June 30, 2020

	Market Value (\$)	% of Portfolio	% of Sector	QTD (%)	YTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	20 Yrs (%)	Inception (%)	Inception Date
High Yield Bond Assets	18,977,855	10.7	10.7	9.2	-3.1	1.1	3.9	4.4	6.2	--	6.5	Sep-03
<i>BBgBarc US High Yield TR</i>				10.2	-3.8	0.0	3.3	4.8	6.7	7.0	7.4	Sep-03
Shenkman Capital	18,977,855	10.7	100.0	9.2	-3.1	1.1	3.9	4.4	6.2	--	6.4	Apr-06
<i>BBgBarc US High Yield TR</i>				10.2	-3.8	0.0	3.3	4.8	6.7	7.0	6.9	Apr-06
<i>eV US High Yield Fixed Inc Net Median</i>				9.2	-3.9	-0.5	2.8	4.1	6.2	6.4	6.3	Apr-06
TIPS Assets	9,553,489	5.4	5.4	4.3	6.0	8.3	5.0	3.7	3.5	--	4.0	Oct-05
<i>BBgBarc US TIPS TR</i>				4.2	6.0	8.3	5.0	3.7	3.5	5.5	4.1	Oct-05
SSgA TIPS Index-NL	9,553,489	5.4	100.0	4.3	6.0	8.3	5.0	3.7	3.5	--	4.0	Oct-05
<i>BBgBarc US TIPS TR</i>				4.2	6.0	8.3	5.0	3.7	3.5	5.5	4.1	Oct-05
<i>eV US TIPS / Inflation Fixed Inc Net Median</i>				5.1	5.0	7.4	4.9	3.6	3.4	5.6	4.1	Oct-05
Emerging Market Debt Assets	5,359,881	3.0	3.0	13.3	-3.9	-0.8	3.1	4.9	--	--	4.7	Jan-15
<i>JP Morgan EMBI Global Diversified</i>				12.3	-2.8	0.5	3.6	5.3	6.0	8.4	5.1	Jan-15
Payden Emerging Market Bond	5,359,881	3.0	100.0	13.3	-3.9	-0.8	3.1	4.9	--	--	4.7	Jan-15
<i>JP Morgan EMBI Global Diversified</i>				12.3	-2.8	0.5	3.6	5.3	6.0	8.4	5.1	Jan-15
Open-Ended Real Estate	5,664,919	3.2	3.2	-1.8	-0.5	3.2	6.5	7.8	11.8	7.0	8.0	Oct-95
<i>NCREIF ODCE</i>				-1.6	-0.6	2.2	5.7	7.3	10.8	7.8	8.8	Oct-95
Clarion Partners	5,664,919	3.2	100.0	-1.8	-0.5	3.2	6.5	7.8	11.8	--	7.1	Oct-02
<i>NCREIF ODCE</i>				-1.6	-0.6	2.2	5.7	7.3	10.8	7.8	7.8	Oct-02
<i>US Real Estate Equity Median</i>				--	--	--	--	--	--	--	--	Oct-02

TIPS and Emerging Market Debt June 30, 2020 market values are based on manager returns

	Market Value (\$)	% of Portfolio	% of Sector	QTD (%)	YTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	20 Yrs (%)	Inception (%)	Inception Date
Total Closed End Real Estate	57,341	0.0	0.0									Jan-13
Colony Realty Partners IV <i>US Real Estate Equity Median</i>	24,261	0.0	42.3									Jan-13 Jan-13
Rockwood Capital Real Estate Partners Fund XI, L.P.	33,080	0.0	57.7									Dec-19
Private Equity Assets	7,353,976	4.1	4.1									Oct-06
North American Strategic Partners 2006	509,767	0.3	6.9									Oct-06
Ironsides Partnership Fund IV	1,949,933	1.1	26.5									May-16
Ironsides Direct Investment Fund IV	2,535,276	1.4	34.5									Jun-16
Ironsides Partnership Fund V, L.P.	247,184	0.1	3.4									Mar-20
Ironsides Direct Investment Fund V, L.P.	1,732,077	1.0	23.6									Jul-19
HarbourVest 2019 Global Fund	379,739	0.2	5.2									Dec-19
Cash	196,259	0.1	0.1									

Colony Realty Partners market value is based on March 31, 2020 data

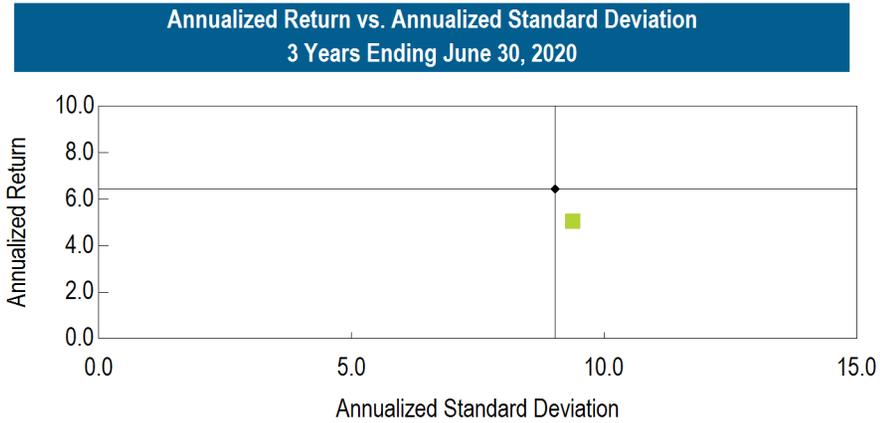
Private Equity market values are as of March 31, 2020 and adjusted for subsequent flows

	Calendar Year Performance									
	2019 (%)	2018 (%)	2017 (%)	2016 (%)	2015 (%)	2014 (%)	2013 (%)	2012 (%)	2011 (%)	2010 (%)
Total Retirement System	17.6	-4.4	13.1	8.7	-0.2	6.3	14.0	10.9	2.4	12.3
<i>55% MSCI World & 45% Barclays Aggregate</i>	19.1	-4.6	13.6	5.5	0.0	5.5	13.0	10.7	0.7	10.0
<i>45% MSCI World & 55% Barclays Aggregate</i>	17.2	-3.8	11.7	5.0	0.2	5.6	10.1	9.5	2.0	9.5
Domestic Equity Assets	27.9	-6.7	20.3	14.6	-1.6	13.1	33.1	15.3	0.0	18.8
<i>Russell 3000</i>	31.0	-5.2	21.1	12.7	0.5	12.6	33.6	16.4	1.0	16.9
RhumbLine S&P 500 Index	31.4	-4.4	21.8	11.9	1.4	13.6	32.2	16.0	2.1	15.0
<i>S&P 500</i>	31.5	-4.4	21.8	12.0	1.4	13.7	32.4	16.0	2.1	15.1
Fiduciary Large Cap Equity (net)	23.8	-3.7	19.2	13.8	-2.4	12.4	30.5	--	--	--
<i>Russell 3000</i>	31.0	-5.2	21.1	12.7	0.5	12.6	33.6	16.4	1.0	16.9
Frontier Capital Appreciation (net)	28.9	-13.9	19.1	20.5	-6.5	12.4	--	--	--	--
<i>Russell 2500 Growth</i>	32.7	-7.5	24.5	9.7	-0.2	7.1	40.6	16.1	-1.6	28.9
International Developed Markets Equity Assets	22.3	-13.5	24.9	1.4	-0.8	-8.7	21.2	15.0	-14.1	10.6
<i>MSCI EAFE</i>	22.0	-13.8	25.0	1.0	-0.8	-4.9	22.8	17.3	-12.1	7.8
Rhumbline MSCI EAFE Index (net)	22.3	-13.5	24.9	1.4	-0.8	--	--	--	--	--
<i>MSCI EAFE</i>	22.0	-13.8	25.0	1.0	-0.8	-4.9	22.8	17.3	-12.1	7.8

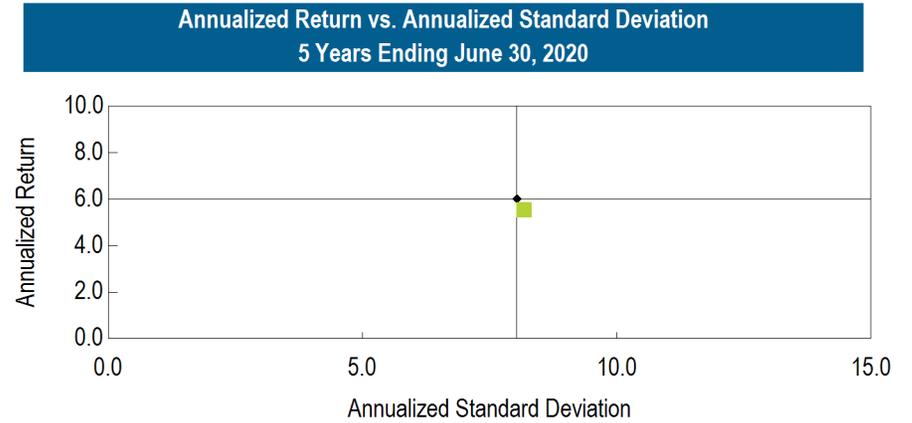
	2019 (%)	2018 (%)	2017 (%)	2016 (%)	2015 (%)	2014 (%)	2013 (%)	2012 (%)	2011 (%)	2010 (%)
International Emerging Markets Equity Assets	20.7	-15.4	39.7	9.4	-12.7	--	--	--	--	--
<i>MSCI Emerging Markets</i>	18.4	-14.6	37.3	11.2	-14.9	-2.2	-2.6	18.2	-18.4	18.9
DFA Emerging Markets (net)	16.0	-15.2	36.6	12.4	-14.9	--	--	--	--	--
<i>MSCI Emerging Markets</i>	18.4	-14.6	37.3	11.2	-14.9	-2.2	-2.6	18.2	-18.4	18.9
Driehaus Emerging Market Equity (net)	25.3	-15.6	43.0	6.5	-10.6	--	--	--	--	--
<i>MSCI Emerging Markets</i>	18.4	-14.6	37.3	11.2	-14.9	-2.2	-2.6	18.2	-18.4	18.9
Investment Grade Bonds Assets	8.7	0.0	3.6	2.6	0.6	6.0	-2.0	4.3	7.8	6.6
<i>BBgBarc US Aggregate TR</i>	8.7	0.0	3.5	2.6	0.5	6.0	-2.0	4.2	7.8	6.5
SSgA U.S. Aggregate Bond Index	8.7	0.0	3.6	2.6	0.6	6.0	-2.0	4.3	7.8	6.6
<i>BBgBarc US Aggregate TR</i>	8.7	0.0	3.5	2.6	0.5	6.0	-2.0	4.2	7.8	6.5
High Yield Bond Assets	14.5	-1.3	7.1	12.7	-2.3	2.9	6.4	12.4	6.0	12.8
<i>BBgBarc US High Yield TR</i>	14.3	-2.1	7.5	17.1	-4.5	2.5	7.4	15.8	5.0	15.1
Shenkman Capital	14.5	-1.3	7.2	12.7	-2.3	2.9	6.4	12.4	6.0	12.8
<i>BBgBarc US High Yield TR</i>	14.3	-2.1	7.5	17.1	-4.5	2.5	7.4	15.8	5.0	15.1
TIPS Assets	8.4	-1.3	3.0	4.7	-1.4	3.6	-8.6	6.9	13.5	6.3
<i>BBgBarc US TIPS TR</i>	8.4	-1.3	3.0	4.7	-1.4	3.6	-8.6	7.0	13.6	6.3
SSgA TIPS Index-NL	8.4	-1.3	3.0	4.7	-1.4	3.6	-8.6	6.9	13.5	6.3
<i>BBgBarc US TIPS TR</i>	8.4	-1.3	3.0	4.7	-1.4	3.6	-8.6	7.0	13.6	6.3

Total Retirement System | As of June 30, 2020

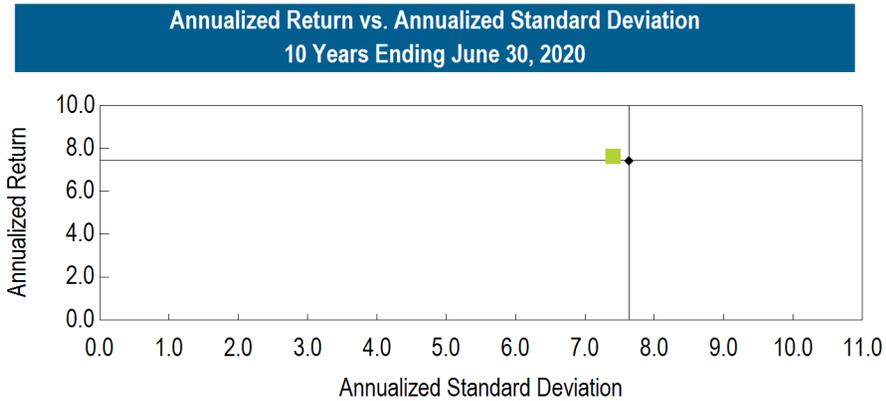
	2019 (%)	2018 (%)	2017 (%)	2016 (%)	2015 (%)	2014 (%)	2013 (%)	2012 (%)	2011 (%)	2010 (%)
Emerging Market Debt Assets	16.5	-7.0	12.0	11.5	-0.8	--	--	--	--	--
<i>JP Morgan EMBI Global Diversified</i>	15.0	-4.3	10.3	10.2	1.2	7.4	-5.3	17.4	7.3	12.2
Payden Emerging Market Bond (net)	16.5	-7.0	12.0	11.5	-0.8	--	--	--	--	--
<i>JP Morgan EMBI Global Diversified</i>	15.0	-4.3	10.3	10.2	1.2	7.4	-5.3	17.4	7.3	12.2
Open-Ended Real Estate	7.3	8.6	7.9	9.1	15.7	13.2	12.8	10.9	18.7	19.2
<i>NCREIF ODCE</i>	5.3	8.3	7.6	8.8	15.0	12.5	13.9	10.9	16.0	16.4
Clarion Partners	7.3	8.6	7.9	9.1	15.7	13.2	12.8	10.9	18.7	19.2
<i>NCREIF ODCE</i>	5.3	8.3	7.6	8.8	15.0	12.5	13.9	10.9	16.0	16.4
Total Closed End Real Estate										
Colony Realty Partners IV										
Rockwood Capital Real Estate Partners Fund XI, L.P. (net)										
Private Equity Assets										
North American Strategic Partners 2006 (net)										
Ironsides Partnership Fund IV (net)										
Ironsides Direct Investment Fund IV (net)										
Ironsides Partnership Fund V, L.P. (net)										
Ironsides Direct Investment Fund V, L.P. (net)										
HarbourVest 2019 Global Fund (net)										
Cash										



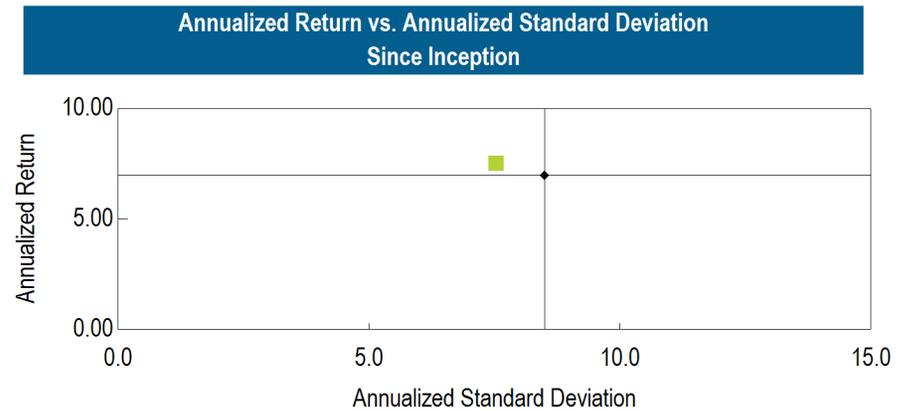
- Total Retirement System
- ◆ 55% MSCI World & 45% Barclays Aggregate



- Total Retirement System
- ◆ 55% MSCI World & 45% Barclays Aggregate

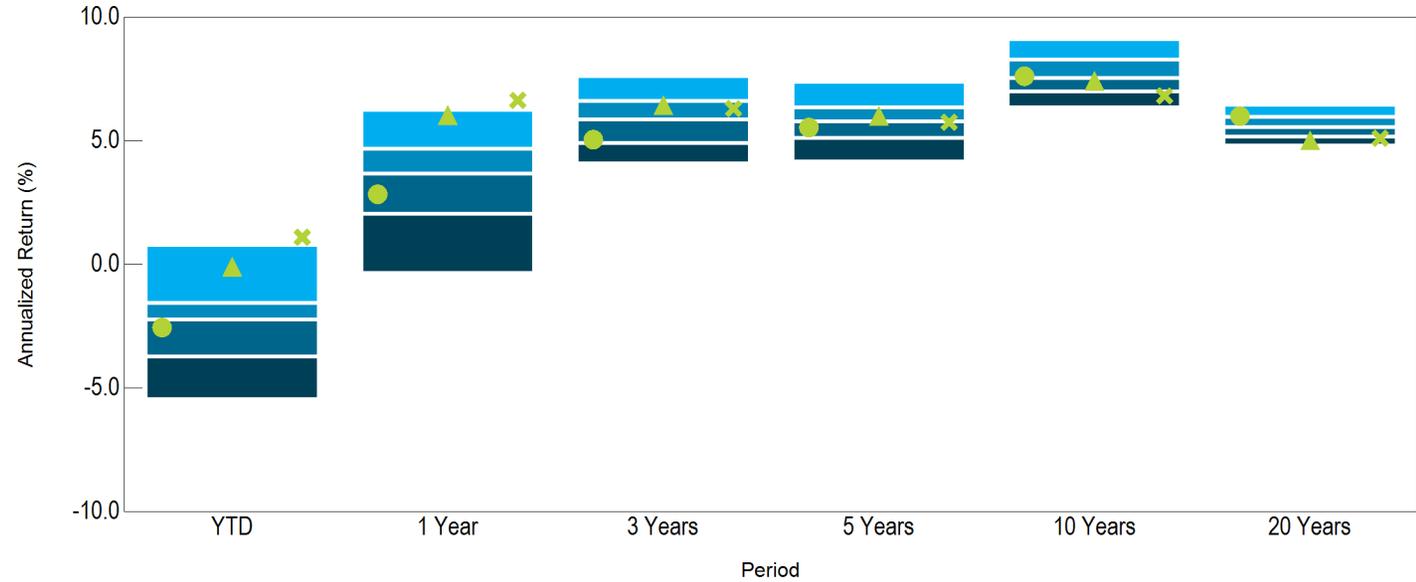


- Total Retirement System
- ◆ 55% MSCI World & 45% Barclays Aggregate



- Total Retirement System
- ◆ 55% MSCI World & 45% Barclays Aggregate

**InvMetrics Public DB \$50mm-\$250mm Net Return Comparison
Ending June 30, 2020**



	Return (Rank)		1 Year		3 Years		5 Years		10 Years		20 Years	
5th Percentile	0.8	(56)	6.2	(66)	7.6	(72)	7.4	(62)	9.1	(47)	6.4	(24)
25th Percentile	-1.5	(8)	4.7	(9)	6.6	(28)	6.4	(42)	8.3	(58)	6.0	(90)
Median	-2.2	(3)	3.7	(4)	5.9	(32)	5.8	(53)	7.6	(82)	5.6	(87)
75th Percentile	-3.7		2.1		4.9		5.1		7.0		5.2	
95th Percentile	-5.4		-0.3		4.1		4.2		6.4		4.8	
# of Portfolios	75		75		72		68		57		22	
● Total Retirement System	-2.6	(56)	2.8	(66)	5.0	(72)	5.5	(62)	7.6	(47)	6.0	(24)
▲ 55% MSCI World & 45% Barclays Aggregate	-0.1	(8)	6.0	(9)	6.4	(28)	6.0	(42)	7.4	(58)	5.0	(90)
✕ 45% MSCI World & 55% Barclays Aggregate	1.1	(3)	6.6	(4)	6.3	(32)	5.8	(53)	6.8	(82)	5.1	(87)

Statistics Summary

5 Years Ending June 30, 2020

	Anlzd Return	Anlzd Standard Deviation	Information Ratio	Beta	Sharpe Ratio	Tracking Error
Total Retirement System	5.5%	8.2%	-0.3	1.0	0.5	1.4%
55% MSCI World & 45% Barclays Aggregate	6.0%	8.0%	--	1.0	0.6	0.0%
Equity Assets	5.9%	15.3%	-1.5	1.0	0.3	2.8%
Russell 3000	10.0%	15.4%	--	1.0	0.6	0.0%
Domestic Equity Assets	7.2%	16.2%	-1.1	1.0	0.4	2.5%
Russell 3000	10.0%	15.4%	--	1.0	0.6	0.0%
RhumbLine S&P 500 Index	10.7%	14.7%	-0.7	1.0	0.6	0.0%
S&P 500	10.7%	14.8%	--	1.0	0.7	0.0%
Fiduciary Large Cap Equity	6.5%	13.8%	-0.8	0.9	0.4	4.3%
Russell 3000	10.0%	15.4%	--	1.0	0.6	0.0%
Frontier Capital Appreciation	3.8%	22.6%	-0.8	1.1	0.1	6.9%
Russell 2500 Growth	9.6%	19.7%	--	1.0	0.4	0.0%
International Developed Markets Equity Assets	2.3%	14.3%	0.9	1.0	0.1	0.3%
MSCI EAFE	2.1%	14.4%	--	1.0	0.1	0.0%
Rhumblin MSCI EAFE Index	2.2%	14.3%	0.7	1.0	0.1	0.3%
MSCI EAFE	2.1%	14.4%	--	1.0	0.1	0.0%
International Emerging Markets Equity Assets	3.9%	17.0%	0.3	0.9	0.2	3.1%
MSCI Emerging Markets	2.9%	17.9%	--	1.0	0.1	0.0%

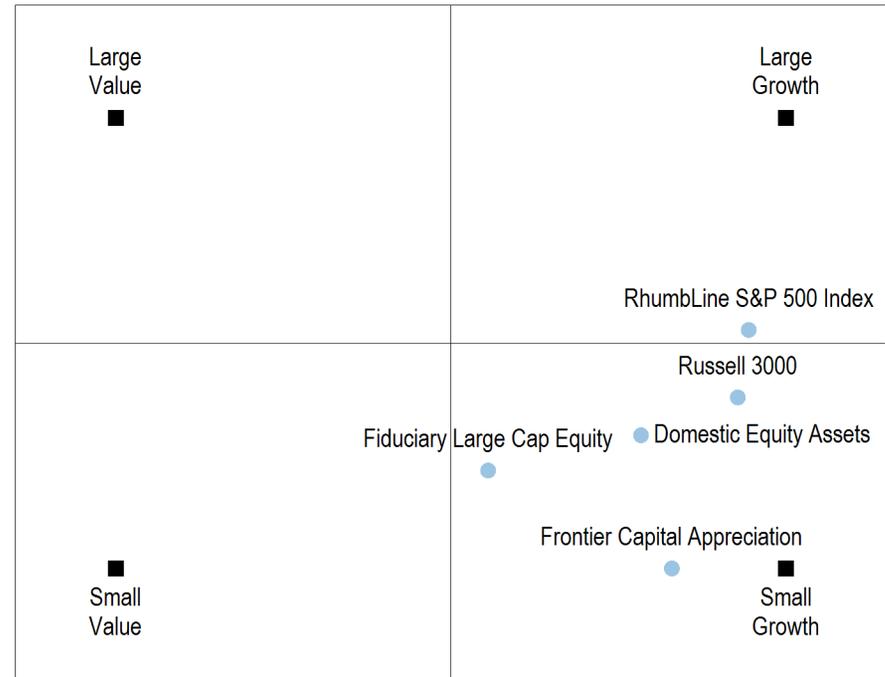
	Anlzd Return	Anlzd Standard Deviation	Information Ratio	Beta	Sharpe Ratio	Tracking Error
DFA Emerging Markets	1.7%	18.5%	-0.3	1.0	0.0	3.4%
MSCI Emerging Markets	2.9%	17.9%	--	1.0	0.1	0.0%
Driehaus Emerging Market Equity	6.0%	15.9%	0.7	0.9	0.3	4.7%
MSCI Emerging Markets	2.9%	17.9%	--	1.0	0.1	0.0%
Investment Grade Bonds Assets	4.3%	3.1%	-0.3	1.0	1.0	0.2%
BBgBarc US Aggregate TR	4.3%	3.1%	--	1.0	1.0	0.0%
SSgA U.S. Aggregate Bond Index	4.3%	3.1%	0.0	1.0	1.0	0.1%
BBgBarc US Aggregate TR	4.3%	3.1%	--	1.0	1.0	0.0%
High Yield Bond Assets	4.0%	7.0%	-0.6	0.9	0.4	1.2%
BBgBarc US High Yield TR	4.8%	7.9%	--	1.0	0.5	0.0%
Shenkman Capital	4.0%	7.0%	-0.7	0.9	0.4	1.2%
BBgBarc US High Yield TR	4.8%	7.9%	--	1.0	0.5	0.0%
TIPS Assets	3.7%	3.5%	-0.8	1.0	0.7	0.0%
BBgBarc US TIPS TR	3.7%	3.5%	--	1.0	0.7	0.0%
SSgA TIPS Index-NL	3.7%	3.5%	-0.8	1.0	0.7	0.1%
BBgBarc US TIPS TR	3.7%	3.5%	--	1.0	0.7	0.0%
Emerging Market Debt Assets	4.9%	10.1%	-0.2	1.1	0.4	2.0%
JP Morgan EMBI Global Diversified	5.3%	8.9%	--	1.0	0.5	0.0%
Payden Emerging Market Bond	4.9%	10.1%	-0.2	1.1	0.4	2.0%
JP Morgan EMBI Global Diversified	5.3%	8.9%	--	1.0	0.5	0.0%

	Anlzd Return	Anlzd Standard Deviation	Information Ratio	Beta	Sharpe Ratio	Tracking Error
Open-Ended Real Estate	7.8%	3.8%	0.6	1.0	1.8	0.9%
NCREIF ODCE	7.3%	3.6%	--	1.0	1.7	0.0%
Clarion Partners	7.8%	3.8%	0.6	1.0	1.8	0.9%
NCREIF ODCE	7.3%	3.6%	--	1.0	1.7	0.0%
Total Closed End Real Estate	-3.5%	21.9%	-0.5	0.9	-0.2	21.6%
NCREIF ODCE	7.3%	3.6%	--	1.0	1.7	0.0%
Colony Realty Partners IV	-2.8%	22.9%	-0.4	1.0	-0.2	22.6%
NCREIF ODCE	7.3%	3.6%	--	1.0	1.7	0.0%
Comerica Short Term Fund	0.4%	0.2%	-2.2	-0.1	-3.4	0.3%
91 Day T-Bills	1.1%	0.2%	--	1.0	0.0	0.0%

Retirement System Detail

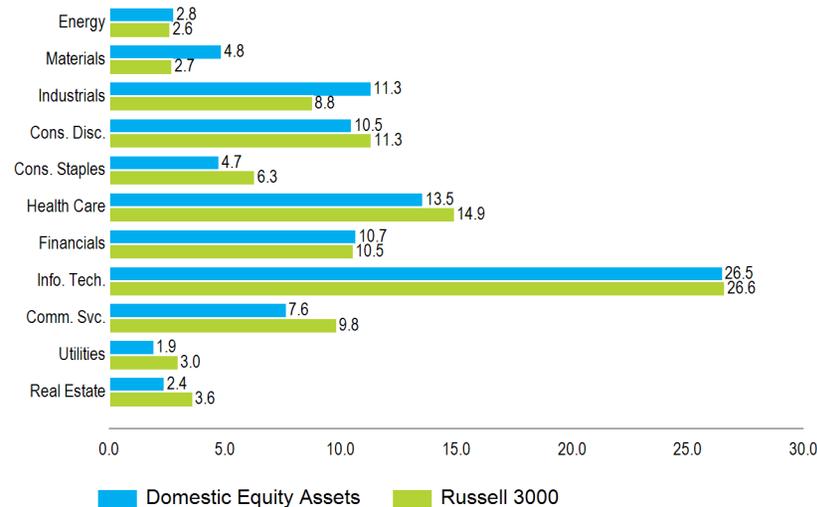
Asset Allocation on June 30, 2020		
	Actual	Actual
Fiduciary Large Cap Equity	\$23,011,855	34.2%
Frontier Capital Appreciation	\$16,125,128	24.0%
RhumbLine S&P 500 Index	\$28,060,124	41.8%
Total	\$67,197,106	100.0%

Domestic Equity Assets Style Map
3 Years Ending June 30, 2020



Domestic Equity Assets Characteristics			
	Portfolio Q2-20	Index Q2-20	Portfolio Q1-20
Market Value			
Market Value (\$M)	67.2	--	52.8
Number Of Holdings	627	3009	625
Characteristics			
Weighted Avg. Market Cap. (\$B)	241.9	309.4	145.8
Median Market Cap (\$B)	15.2	1.4	13.4
P/E Ratio	21.6	22.4	14.7
Yield	1.5	1.7	2.1
EPS Growth - 5 Yrs.	13.0	13.4	11.8
Price to Book	3.7	4.0	3.1
Beta (holdings; domestic)	1.2	1.0	1.1

Sector Allocation (%) vs Russell 3000



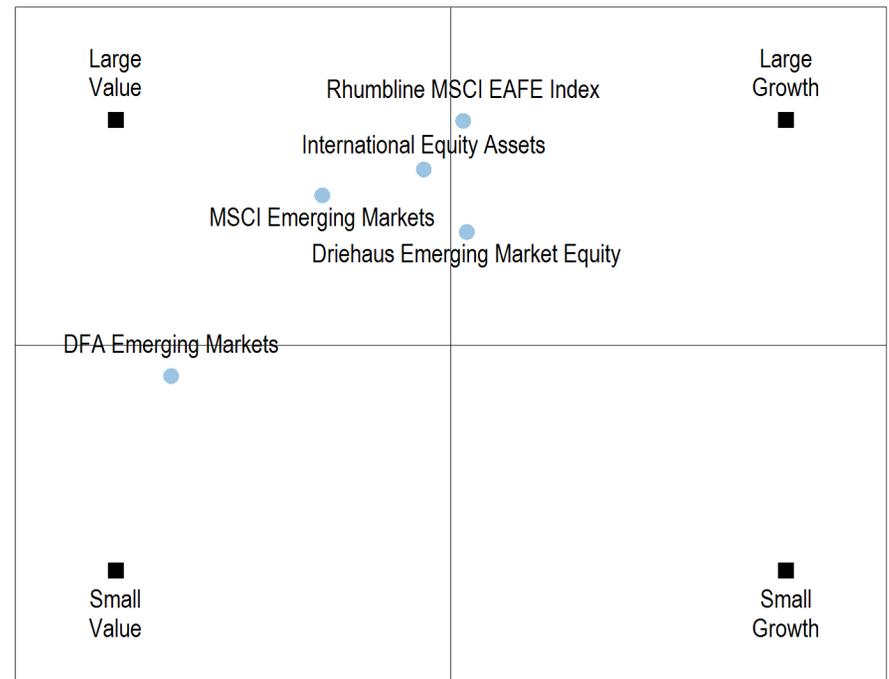
Top 10 Holdings

MICROSOFT	3.8%
APPLE	3.7%
CASH - USD	3.3%
AMAZON.COM	2.8%
FACEBOOK CLASS A	1.3%
ALPHABET A	1.0%
PAN AMERICAN SILVER(NAS)	1.0%
ALPHABET 'C'	1.0%
JOHNSON & JOHNSON	0.9%
BERKSHIRE HATHAWAY 'B'	0.9%
Total	19.8%

Asset Allocation on June 30, 2020

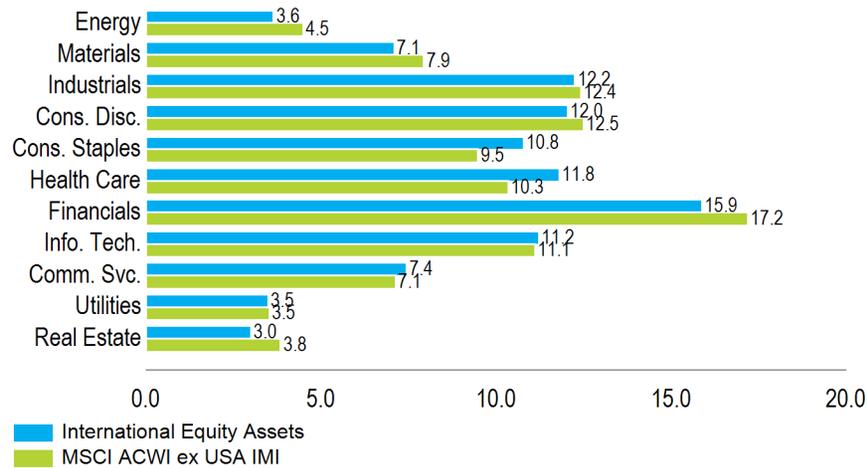
	Actual	Actual
DFA Emerging Markets	\$3,676,806	13.6%
Driehaus Emerging Market Equity	\$3,346,023	12.4%
Rhumblin MSCI EAFE Index	\$19,941,770	74.0%
Total	\$26,964,599	100.0%

International Equity Assets Style Map 3 Years Ending June 30, 2020



International Equity Characteristics			
	Portfolio Q2-20	Index Q2-20	Portfolio Q1-20
Market Value			
Market Value (\$M)	27.0	--	21.5
Number Of Holdings	6244	6439	4732
Characteristics			
Weighted Avg. Market Cap. (\$B)	75.3	69.5	96.3
Median Market Cap (\$B)	0.9	1.5	0.3
P/E Ratio	16.9	16.2	13.6
Yield	2.8	2.8	2.7
EPS Growth - 5 Yrs.	7.6	8.3	12.3
Price to Book	2.8	2.7	2.8
Beta (holdings; domestic)	1.0	1.0	1.0

Sector Allocation (%) vs MSCI ACWI ex USA IMI



Top 10 Holdings

NESTLE 'N'	1.9%
TENCENT HOLDINGS	1.7%
ROCHE HOLDING	1.4%
ALIBABA GROUP HOLDING ADR 1:8	1.2%
NOVARTIS 'R'	1.1%
ASML HOLDING	1.0%
SAMSUNG ELECTRONICS	0.9%
TAIWAN SEMICON.SPN.ADR 1:5	0.9%
ASTRAZENECA	0.8%
SAP	0.8%
Total	11.5%

Country Allocation Report

As of 6/30/2020

Region	% of Total	% of Bench	% Diff
North America ex U.S.	0.1%	6.5%	-6.5%
United States	2.0%	0.0%	2.0%
Europe Ex U.K.	36.2%	30.8%	5.4%
United Kingdom	10.3%	9.5%	0.7%
Pacific Basin Ex Japan	12.8%	7.8%	5.0%
Japan	19.0%	17.3%	1.6%
Emerging Markets	19.1%	27.4%	-8.3%
Other	0.6%	0.6%	0.0%
Total	100.0%	100.0%	0.0%

International Equity Country Allocation

vs MSCI ACWI ex USA IMI

Country	% of Total	% of Bench	% Diff
ARGENTINA	0.0%	0.1%	-0.1%
AUSTRALIA	5.0%	4.6%	0.4%
AUSTRIA	0.1%	0.2%	0.0%
BAHRAIN	0.0%	0.0%	0.0%
BANGLADESH	0.0%	0.0%	0.0%
BELGIUM	0.7%	0.7%	0.0%
BRAZIL	1.5%	1.5%	0.0%
CANADA	0.1%	6.5%	-6.5%
CHILE	0.2%	0.2%	0.0%
CHINA	4.3%	10.3%	-6.0%
COLOMBIA	0.0%	0.1%	0.0%
CROATIA	0.0%	0.0%	0.0%
CZECH REPUBLIC	0.0%	0.0%	0.0%
DENMARK	1.7%	1.5%	0.3%
EGYPT	0.1%	0.0%	0.0%
ESTONIA	0.0%	0.0%	0.0%
FINLAND	0.7%	0.7%	0.0%
FRANCE	8.0%	6.5%	1.6%
GERMANY	6.9%	5.7%	1.1%
GREECE	0.0%	0.1%	0.0%
HONG KONG	6.6%	2.1%	4.5%
HUNGARY	0.1%	0.1%	0.1%
INDIA	2.6%	2.3%	0.3%
INDONESIA	0.5%	0.4%	0.0%

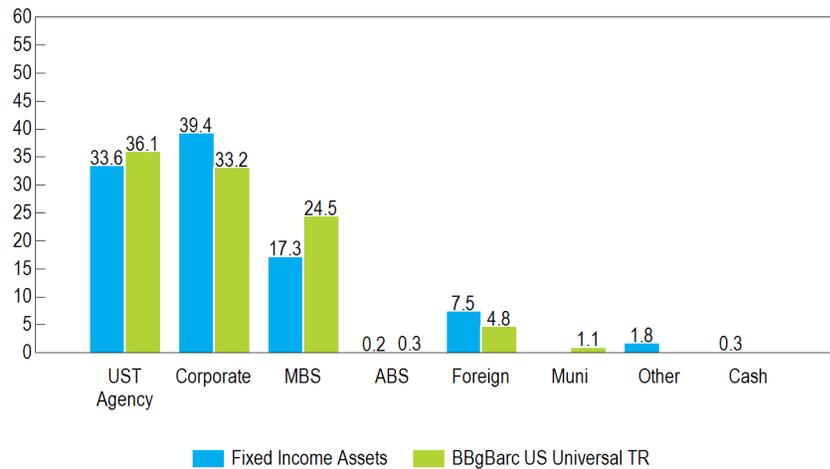
Country	% of Total	% of Bench	% Diff
IRELAND	0.3%	0.4%	-0.1%
ISRAEL	0.3%	0.5%	-0.2%
ITALY	1.7%	1.6%	0.1%
JAPAN	19.0%	17.3%	1.6%
JORDAN	0.0%	0.0%	0.0%
KAZAKHSTAN	0.0%	0.0%	0.0%
KENYA	0.0%	0.0%	0.0%
KOREA	3.0%	3.4%	-0.4%
KUWAIT	0.0%	0.0%	0.0%
LEBANON	0.0%	0.0%	0.0%
LITHUANIA	0.0%	0.0%	0.0%
LUXEMBOURG	0.0%	0.0%	0.0%
MALAYSIA	0.4%	0.5%	-0.1%
MAURITIUS	0.0%	0.0%	0.0%
MEXICO	0.5%	0.5%	0.0%
MOROCCO	0.0%	0.0%	0.0%
NETHERLANDS	3.7%	2.7%	1.0%
NEW ZEALAND	0.2%	0.3%	0.0%
NIGERIA	0.0%	0.0%	0.0%
NORWAY	0.4%	0.5%	-0.1%
OMAN	0.0%	0.0%	0.0%
OTHER	0.3%	0.0%	0.3%
PAKISTAN	0.0%	0.0%	0.0%
PERU	0.0%	0.1%	0.0%
PHILIPPINES	0.1%	0.2%	-0.1%
POLAND	0.3%	0.2%	0.1%
PORTUGAL	0.1%	0.1%	0.0%

Country	% of Total	% of Bench	% Diff
QATAR	0.0%	0.2%	-0.2%
ROMANIA	0.0%	0.0%	0.0%
RUSSIA	0.5%	0.8%	-0.4%
SAUDI ARABIA	0.1%	0.7%	-0.6%
SERBIA	0.0%	0.0%	0.0%
SINGAPORE	1.0%	0.8%	0.1%
SLOVENIA	0.0%	0.0%	0.0%
SOUTH AFRICA	0.7%	1.0%	-0.3%
SPAIN	1.8%	1.5%	0.2%
SRI LANKA	0.0%	0.0%	0.0%
SWEDEN	2.3%	2.4%	-0.1%
SWITZERLAND	7.7%	6.3%	1.4%
TAIWAN	3.6%	3.8%	-0.2%
THAILAND	0.4%	0.7%	-0.3%
TUNISIA	0.0%	0.0%	0.0%
TURKEY	0.1%	0.2%	0.0%
UNITED ARAB EMIRATES	0.0%	0.1%	-0.1%
UNITED KINGDOM	10.3%	9.5%	0.7%
UNITED STATES	2.0%	0.0%	2.0%
VIETNAM	0.0%	0.0%	0.0%
Total	100.0%	100.0%	0.0%

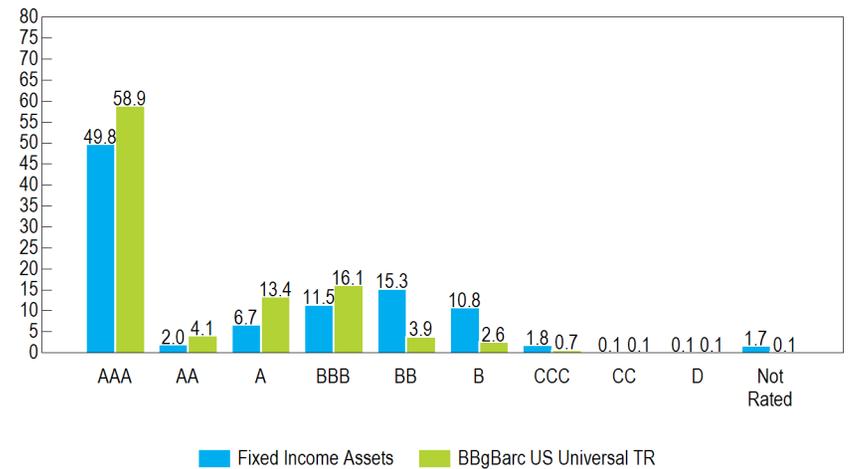
Asset Allocation on June 30, 2020		
	Actual	Actual
Payden Emerging Market Bond	\$5,359,881	7.6%
Shenkman Capital	\$18,977,855	27.0%
SSgA TIPS Index-NL	\$9,553,489	13.6%
SSgA U.S. Aggregate Bond Index	\$36,333,762	51.7%
Total	\$70,224,987	100.0%

Fixed Income Characteristics vs. BBgBarc US Universal TR			
	Portfolio Q2-20	Index Q2-20	Portfolio Q1-20
Fixed Income Characteristics			
Yield to Maturity	2.9	1.9	3.4
Average Duration	5.4	6.5	5.4
Average Quality	A	AA	A
Weighted Average Maturity	8.0	7.9	7.6

Sector Allocation



Credit Quality Allocation



Portfolio Reviews

RhumbLine S&P 500 Index | As of June 30, 2020

Account Information

Account Name	RhumbLine S&P 500 Index
Account Structure	Commingled Fund
Investment Style	Passive
Inception Date	3/01/99
Account Type	US Equity
Benchmark	S&P 500
Universe	eV US Passive S&P 500 Equity Net

Portfolio Performance Summary

	QTD (%)	YTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	Inception (%)	Inception Date
RhumbLine S&P 500 Index	20.5	-3.1	7.4	10.7	10.7	13.9	6.5	Mar-99
S&P 500	20.5	-3.1	7.5	10.7	10.7	14.0	6.4	Mar-99

Top 10 Holdings

MICROSOFT	6.0%
APPLE	5.7%
AMAZON.COM	4.5%
FACEBOOK CLASS A	2.1%
ALPHABET A	1.6%
ALPHABET 'C'	1.6%
JOHNSON & JOHNSON	1.4%
BERKSHIRE HATHAWAY 'B'	1.3%
VISA 'A'	1.3%
ISHARES CORE S&P 500 ETF	1.2%
Total	26.8%

RhumbLine S&P 500 Index Equity Characteristics

	vs S&P 500		
	Portfolio Q2-20	Index Q2-20	Portfolio Q1-20
Market Value			
Market Value (\$M)	28.06	--	20.70
Number Of Holdings	506	505	506
Characteristics			
Weighted Avg. Market Cap. (\$B)	364.46	370.73	263.95
Median Market Cap (\$B)	21.41	21.33	17.61
P/E Ratio	22.78	22.85	17.14
Yield	1.85	1.81	2.34
EPS Growth - 5 Yrs.	13.43	13.49	12.75
Price to Book	4.15	4.16	3.72
Beta (holdings; domestic)	0.98	0.98	0.98
Sector Distribution			
Energy	2.77	2.72	2.62
Materials	2.48	2.47	2.42
Industrials	7.87	7.94	8.17
Consumer Discretionary	10.68	11.33	9.72
Consumer Staples	6.88	7.59	7.77
Health Care	14.47	14.16	15.33
Financials	11.19	10.33	11.37
Information Technology	27.19	26.94	25.35
Communication Services	10.68	10.88	10.68
Utilities	3.01	2.92	3.56
Real Estate	2.78	2.74	2.98

Fiduciary Large Cap Equity | As of June 30, 2020

Account Information

Account Name	Fiduciary Large Cap Equity
Account Structure	Mutual Fund
Investment Style	Active
Inception Date	9/01/12
Account Type	US Equity
Benchmark	Russell 3000
Universe	eV US Large Cap Equity Net

Fund Characteristics as of March 31, 2020

Versus Russell 3000

Sharpe Ratio (3 Year)	-0.05
Average Market Cap (\$mm)	49,796.37
Price/Earnings	14.34
Price/Book	2.32
Price/Sales	1.40
Price/Cash Flow	8.00
Dividend Yield	2.44
Number of Equity Holdings	30
R-Squared (3 Year)	0.93
Alpha (3 Year)	-0.20%

Portfolio Performance Summary

	QTD (%)	YTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	Inception (%)	Inception Date
Fiduciary Large Cap Equity	15.5	-11.5	-6.1	5.0	6.5	--	9.9	Sep-12
Russell 3000	22.0	-3.5	6.5	10.0	10.0	13.7	12.7	Sep-12

Top Holdings as of March 31, 2020

BERKSHIRE HATHAWAY INC CLASS B	7.16%
UNITEDHEALTH GROUP INC	5.98%
DOLLAR GENERAL CORP	4.59%
HONEYWELL INTERNATIONAL INC	4.18%
QUEST DIAGNOSTICS INC	4.11%
MASCO CORP	4.09%
BOOKING HOLDINGS INC	3.86%
CHUBB LTD	3.54%
UNILEVER PLC ADR	3.40%
JPMORGAN CHASE & CO	3.28%

Sector Allocation as of March 31, 2020

BASIC MATERIALS	2.32%
COMMUNICATION SERVICES	6.23%
CONSUMER CYCLICAL	7.26%
CONSUMER DEFENSIVE	17.74%
ENERGY	1.27%
FINANCIAL SERVICES	20.83%
HEALTHCARE	16.58%
INDUSTRIALS	23.13%
REAL ESTATE	0.00%
TECHNOLOGY	4.65%
UTILITIES	0.00%

Frontier Capital Appreciation | As of June 30, 2020

Account Information

Account Name	Frontier Capital Appreciation
Account Structure	Commingled Fund
Investment Style	Active
Inception Date	2/01/13
Account Type	US Equity
Benchmark	Russell 2500 Growth
Universe	eV US Small-Mid Cap Growth Equity Net

Portfolio Performance Summary

	QTD (%)	YTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	Inception (%)	Inception Date
Frontier Capital Appreciation	32.9	-14.9	-7.1	0.9	3.8	--	8.9	Feb-13
Russell 2500 Growth	32.9	2.0	9.2	12.1	9.6	14.4	12.6	Feb-13

Top 10 Holdings

CASH - USD	9.2%
PAN AMERICAN SILVER(NAS)	2.8%
INSULET	2.2%
TUTOR PERINI	2.2%
MONOLITHIC PWR.SYS.	2.2%
FMC	1.8%
TREX	1.8%
COOPER COS.	1.7%
CREE	1.6%
MACOM TECH.SLTN.HDG.	1.5%
Total	27.1%

Frontier Capital Appreciation Characteristics

	Portfolio Q2-20	Index Q2-20	Portfolio Q1-20
Market Value			
Market Value (\$M)	16.1	--	12.1
Number Of Holdings	141	1265	133
Characteristics			
Weighted Avg. Market Cap. (\$B)	5.9	5.0	5.1
Median Market Cap (\$B)	2.8	1.1	2.2
P/E Ratio	18.3	30.0	13.5
Yield	0.9	0.5	1.3
EPS Growth - 5 Yrs.	12.2	13.4	11.6
Price to Book	3.0	5.6	2.5
Beta (holdings; domestic)	1.5	1.3	1.4
Sector Distribution			
Energy	2.8	0.1	3.1
Materials	9.0	3.3	8.5
Industrials	17.3	11.4	16.8
Consumer Discretionary	10.1	11.4	7.7
Consumer Staples	1.0	3.0	0.6
Health Care	11.9	30.0	13.2
Financials	9.7	4.4	8.0
Information Technology	25.3	29.5	22.7
Communication Services	2.3	2.8	2.7
Utilities	0.0	1.2	0.0
Real Estate	1.6	2.9	1.2

Account Information

Account Name	Rhumblin MSCI EAFE Index
Account Structure	Commingled Fund
Investment Style	Passive
Inception Date	8/01/14
Account Type	Non-US Stock Developed
Benchmark	MSCI EAFE
Universe	eV EAFE All Cap Equity Net

Portfolio Performance Summary

	QTD (%)	YTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	Inception (%)	Inception Date
Rhumblin MSCI EAFE Index	14.9	-11.1	-4.9	1.0	2.2	--	1.5	Aug-14
MSCI EAFE	14.9	-11.3	-5.1	0.8	2.1	5.7	1.3	Aug-14

Top 10 Holdings

NESTLE 'N'	2.5%
ROCHE HOLDING	1.8%
NOVARTIS 'R'	1.4%
ASML HOLDING	1.1%
ASTRAZENECA	1.0%
SAP	1.0%
LVMH	0.9%
TOYOTA MOTOR	0.9%
NOVO NORDISK 'B'	0.9%
SANOFI	0.9%
Total	12.5%

Rhumblin MSCI EAFE Index Characteristics

	Portfolio Q2-20	Index Q2-20	Portfolio Q1-20
Market Value			
Market Value (\$M)	19.9	--	16.5
Number Of Holdings	920	902	12
Characteristics			
Weighted Avg. Market Cap. (\$B)	60.5	60.7	18.6
Median Market Cap (\$B)	9.5	9.5	7.8
P/E Ratio	17.2	17.2	17.4
Yield	2.9	2.9	2.1
EPS Growth - 5 Yrs.	6.0	6.1	7.4
Price to Book	2.7	2.7	2.8
Beta (holdings; domestic)	1.0	1.0	1.2

Sector Distribution

Energy	3.3	3.4	0.0
Materials	7.1	7.3	0.0
Industrials	14.4	14.5	3.3
Consumer Discretionary	11.2	11.3	3.2
Consumer Staples	11.9	12.0	19.0
Health Care	14.2	14.5	17.2
Financials	15.8	16.1	0.0
Information Technology	8.1	8.3	51.8
Communication Services	5.3	5.4	0.0
Utilities	4.0	4.0	0.0
Real Estate	3.1	3.1	5.6

DFA Emerging Markets | As of June 30, 2020

Account Information

Account Name	DFA Emerging Markets
Account Structure	Mutual Fund
Investment Style	Active
Inception Date	1/01/15
Account Type	Non-US Stock Emerging
Benchmark	MSCI Emerging Markets
Universe	eV Emg Mkts All Cap Equity Net

Portfolio Performance Summary

	QTD (%)	YTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	Inception (%)	Inception Date
DFA Emerging Markets	20.8	-13.4	-8.3	-0.8	1.7	--	2.0	Jan-15
MSCI Emerging Markets	18.1	-9.8	-3.4	1.9	2.9	3.3	3.1	Jan-15

Top 10 Holdings

TENCENT HOLDINGS	4.7%
SAMSUNG ELECTRONICS	4.2%
ALIBABA GROUP HOLDING ADR 1:8	2.1%
TAIWAN SEMICON.MNFG.	1.9%
TAIWAN SEMICON.SPN.ADR 1:5	1.8%
PING AN INSURANCE (GROUP) OF CHINA 'H'	1.3%
CASH - USD	1.2%
CHINA CON.BANK 'H'	1.1%
RELIANCE INDUSTRIES	1.0%
VALE ON	0.9%
Total	20.1%

DFA Emerging Markets Characteristics

	Portfolio Q2-20	Index Q2-20	Portfolio Q1-20
Market Value			
Market Value (\$M)	3.7	--	2.2
Number Of Holdings	5295	1385	4684
Characteristics			
Weighted Avg. Market Cap. (\$B)	80.1	130.7	66.4
Median Market Cap (\$B)	0.5	5.4	0.3
P/E Ratio	13.3	15.6	10.4
Yield	3.1	2.7	3.8
EPS Growth - 5 Yrs.	10.1	12.0	9.6
Price to Book	2.5	2.9	2.2
Beta (holdings; domestic)	1.1	1.1	1.1
Sector Distribution			
Energy	5.8	6.0	5.8
Materials	9.7	6.8	9.2
Industrials	7.3	4.6	7.4
Consumer Discretionary	11.4	17.5	10.5
Consumer Staples	7.1	6.3	7.2
Health Care	4.0	4.1	3.7
Financials	16.1	19.4	17.4
Information Technology	19.1	16.8	20.4
Communication Services	10.6	13.5	10.3
Utilities	3.1	2.3	3.3
Real Estate	4.5	2.6	4.7

Account Information

Account Name	Driehaus Emerging Market Equity
Account Structure	Commingled Fund
Investment Style	Active
Inception Date	1/01/15
Account Type	Non-US Stock Emerging
Benchmark	MSCI Emerging Markets
Universe	eV Emg Mkts All Cap Equity Net

Portfolio Performance Summary

	QTD (%)	YTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	Inception (%)	Inception Date
Driehaus Emerging Market Equity	22.3	-3.4	5.1	6.9	6.0	--	6.2	Jan-15
MSCI Emerging Markets	18.1	-9.8	-3.4	1.9	2.9	3.3	3.1	Jan-15

Top 10 Holdings

TENCENT HOLDINGS	8.8%
ALIBABA GROUP HOLDING ADR 1:8	7.7%
TAIWAN SEMICON.SPN.ADR 1:5	6.0%
SAMSUNG ELECTRONICS	3.2%
B3 BRASIL BOLSA BALCAO ON	2.4%
SK HYNIX	2.0%
LUXSHARE PRECISION (SEC) INDUSTRY 'A'	1.7%
SILERGY	1.5%
JD COM ADR 1:2	1.5%
WUXI BIO	1.5%
Total	36.2%

Driehaus Emerging Market Equity Characteristics

	Portfolio Q2-20	Index Q2-20	Portfolio Q1-20
Market Value			
Market Value (\$M)	3.3	--	2.7
Number Of Holdings	94	1385	91
Characteristics			
Weighted Avg. Market Cap. (\$B)	173.3	130.7	124.5
Median Market Cap (\$B)	19.7	5.4	16.3
P/E Ratio	25.1	15.6	19.5
Yield	1.5	2.7	1.9
EPS Growth - 5 Yrs.	15.4	12.0	15.1
Price to Book	4.5	2.9	3.6
Beta (holdings; domestic)	1.1	1.1	1.0
Sector Distribution			
Energy	3.3	6.0	4.6
Materials	3.8	6.8	4.9
Industrials	4.0	4.6	4.6
Consumer Discretionary	18.2	17.5	14.7
Consumer Staples	7.6	6.3	9.1
Health Care	5.5	4.1	6.6
Financials	15.9	19.4	20.6
Information Technology	21.8	16.8	19.2
Communication Services	17.6	13.5	14.9
Utilities	0.5	2.3	0.3
Real Estate	0.6	2.6	0.6

Account Information

Account Name	SSgA U.S. Aggregate Bond Index
Account Structure	Commingled Fund
Investment Style	Passive
Inception Date	5/01/01
Account Type	US Fixed Income Investment Grade
Benchmark	BBgBarc US Aggregate TR
Universe	eV US Core Fixed Inc Net

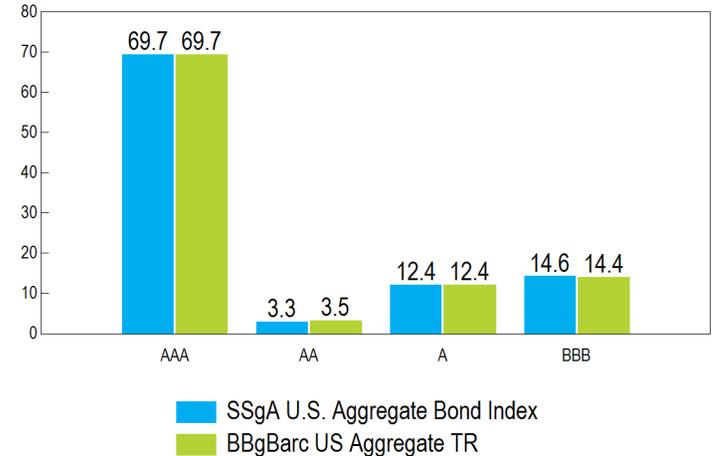
Portfolio Performance Summary

	QTD (%)	YTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	Inception (%)	Inception Date
SSgA U.S. Aggregate Bond Index	3.0	6.1	8.7	5.3	4.3	3.8	4.9	May-01
BBgBarc US Aggregate TR	2.9	6.1	8.7	5.3	4.3	3.8	4.8	May-01

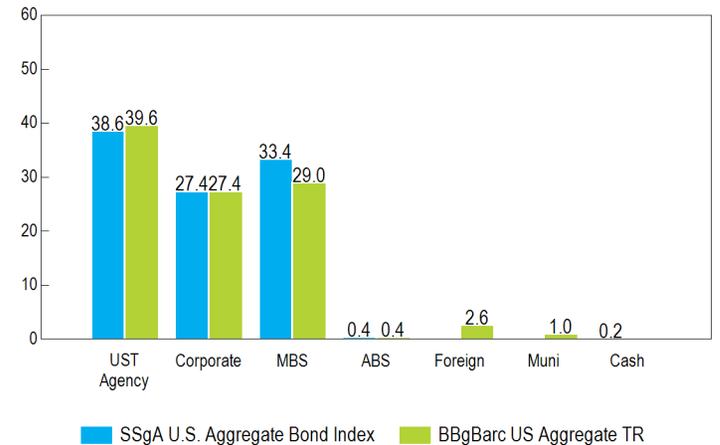
SSgA U.S. Aggregate Bond Index Characteristics vs. BBgBarc US Aggregate TR

	Portfolio Q2-20	Index Q2-20	Portfolio Q1-20
Fixed Income Characteristics			
Yield to Maturity	1.3	1.3	1.6
Average Duration	6.1	6.7	5.7
Average Quality	AA	AA	AA
Weighted Average Maturity	8.1	8.1	7.7

Credit Quality Allocation



Sector Allocation



Account Information

Account Name	Shenkman Capital
Account Structure	Commingled Fund
Investment Style	Active
Inception Date	4/01/06
Account Type	US Fixed Income High Yield
Benchmark	BBgBarc US High Yield TR
Universe	eV US High Yield Fixed Inc Net

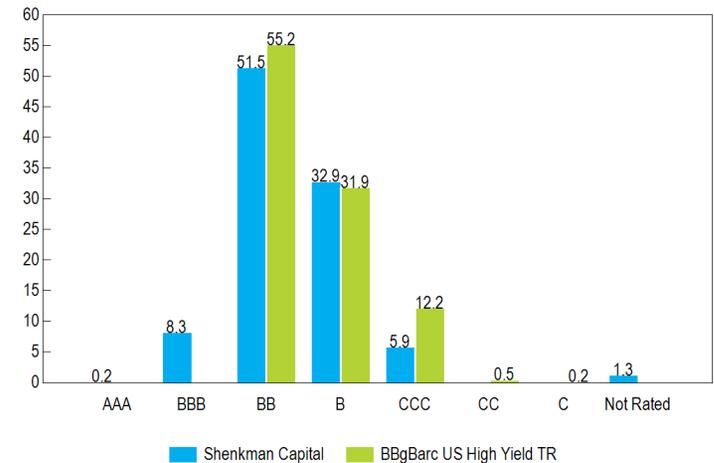
Portfolio Performance Summary

	QTD (%)	YTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	Inception (%)	Inception Date
Shenkman Capital	9.1	-3.3	0.6	3.4	4.0	6.0	6.3	Apr-06
BBgBarc US High Yield TR	10.2	-3.8	0.0	3.3	4.8	6.7	6.9	Apr-06

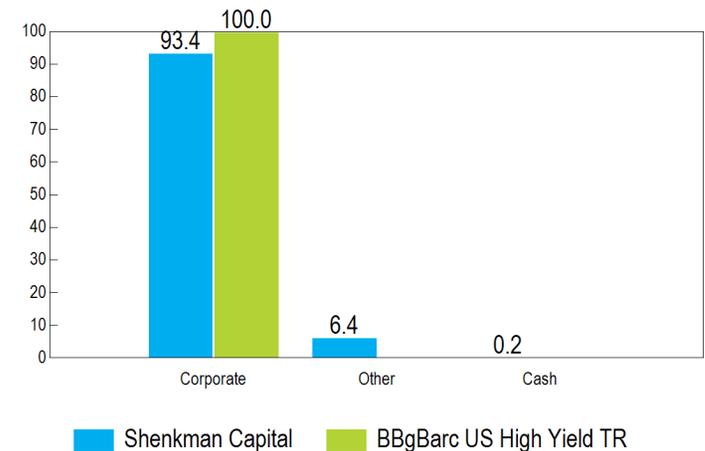
Shenkman Capital Characteristics vs. BBgBarc US High Yield TR

	Portfolio Q2-20	Index Q2-20	Portfolio Q1-20
Fixed Income Characteristics			
Yield to Maturity	6.0	7.2	8.1
Average Duration	3.9	4.7	3.4
Average Quality	BB	B	BB
Weighted Average Maturity	6.5	6.3	5.8

Credit Quality Allocation



Sector Allocation



SSgA TIPS Index-NL | As of June 30, 2020

Account Information

Account Name	SSgA TIPS Index-NL
Account Structure	Commingled Fund
Investment Style	Passive
Inception Date	10/01/05
Account Type	US Inflation Protected Fixed
Benchmark	BBgBarc US TIPS TR
Universe	eV US TIPS / Inflation Fixed Inc Net

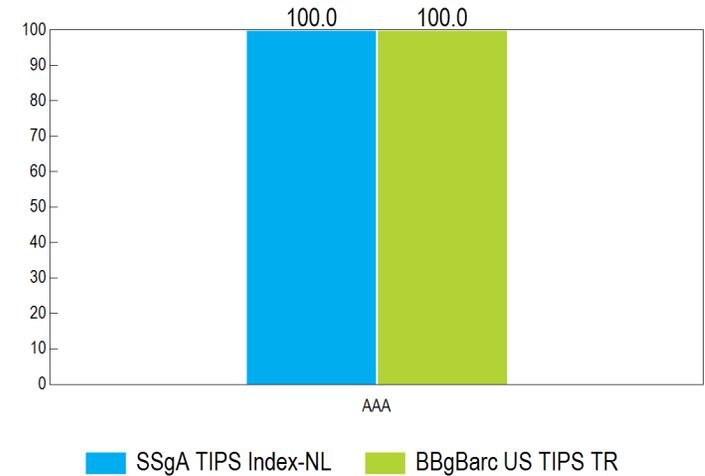
Portfolio Performance Summary

	QTD (%)	YTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	Inception (%)	Inception Date
SSgA TIPS Index-NL	4.3	6.0	8.2	5.0	3.7	3.5	4.0	Oct-05
BBgBarc US TIPS TR	4.2	6.0	8.3	5.0	3.7	3.5	4.1	Oct-05

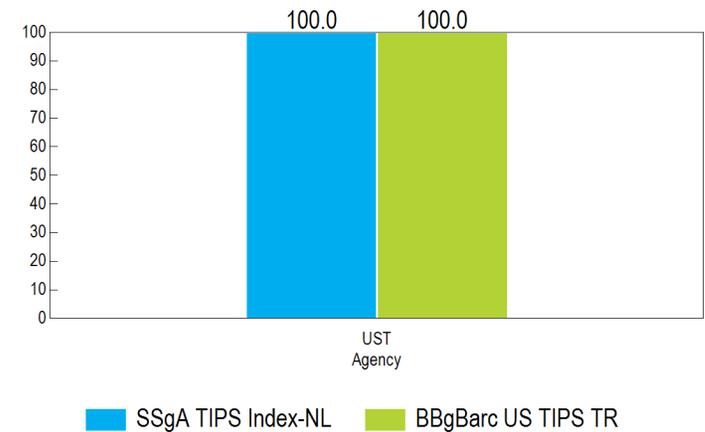
SSgA TIPS Index-NL Characteristics vs. BBgBarc US TIPS TR

	Portfolio Q2-20	Index Q2-20	Portfolio Q1-20
Fixed Income Characteristics			
Yield to Maturity	0.7	-0.7	0.9
Average Duration	4.4	7.7	6.7
Average Quality	AAA	AAA	AAA
Weighted Average Maturity	8.2	8.2	8.4

Credit Quality Allocation



Sector Allocation



Account Information

Account Name	Payden Emerging Market Bond
Account Structure	Mutual Fund
Investment Style	Active
Inception Date	1/01/15
Account Type	International Emerging Market Debt
Benchmark	JP Morgan EMBI Global Diversified
Universe	

Portfolio Performance Summary

	QTD (%)	YTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	Inception (%)	Inception Date
Payden Emerging Market Bond	13.3	-3.9	-0.8	3.1	4.9	--	4.7	Jan-15
JP Morgan EMBI Global Diversified	12.3	-2.8	0.5	3.6	5.3	6.0	5.1	Jan-15

Fund Characteristics as of May 31, 2020

Versus JP Morgan EMBI Global Diversified

Sharpe Ratio (3 Year)	0.00
Average Duration	7.45
Average Coupon	6.25%
Average Effective Maturity	11.88
R-Squared (3 Year)	0.97
Alpha (3 Year)	-0.08%
Beta (3 Year)	1.14

Payden Emerging Market Bond Characteristics vs. JP Morgan EMBI Global Diversified

	Portfolio Q2-20	Index Q2-20	Portfolio Q1-20
Fixed Income Characteristics			
Yield to Maturity	6.7	5.2	7.2
Average Duration	7.5	7.9	7.3
Average Quality	BB	BB	BB
Weighted Average Maturity	11.9	12.7	12.1

Fixed Income Sectors as of May 31, 2020

GOVERNMENT	64.58%
MUNICIPAL	0.00%
CORPORATE	15.57%
SECURITIZED	0.00%
CASH & EQUIVALENTS	1.54%
DERIVATIVE	18.31%

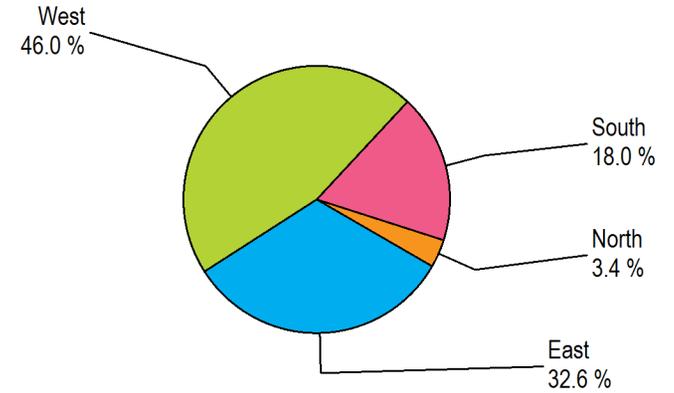
Credit Quality as of June 30, 2020

AAA	0.00%
AA	4.00%
A	6.00%
BBB	26.00%
BB	24.00%
B	32.00%
Below B	6.00%
Not Rated	2.00%

Account Information

Account Name	Clarion Partners
Account Structure	Commingled Fund
Investment Style	Active
Inception Date	10/01/02
Account Type	Real Estate
Benchmark	NCREIF ODCE
Universe	US Real Estate Equity

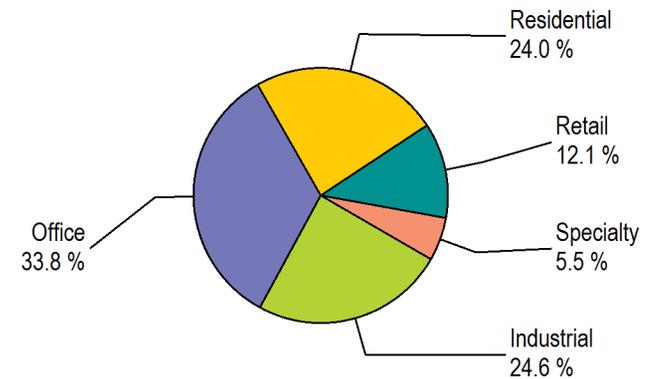
Geographic Diversification



Portfolio Performance Summary

	QTD (%)	YTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	Inception (%)	Inception Date
Clarion Partners	-1.8	-0.5	3.2	6.5	7.8	11.8	7.1	Oct-02
NCREIF ODCE	-1.6	-0.6	2.2	5.7	7.3	10.8	7.8	Oct-02

Property Type Allocation



Account Information

Account Name	Colony Realty Partners IV
Account Structure	Other
Investment Style	Active
Inception Date	1/01/13
Account Type	Real Estate
Benchmark	NCREIF ODCE
Universe	US Real Estate Equity

Colony Realty Partners IV no longer has any funds invested in properties. While there is a residual balance in the Fund, it no longer has control over any real estate.

Non-Marketable Securities Overview						
As of June 30, 2020						
Account	Vintage Year	Commitment	Cumulative Takedown	Cumulative Distributions	Value (RV)	IRR (%)
North American Strategic Partners 2006	2006	\$4,539,998	\$4,409,509	\$2,529,279	\$509,767	6.6%
Ironsides Partnership Fund IV	2015	\$2,500,000	\$1,343,006	\$0	\$1,949,933	23.3%
Ironsides Direct Investment Fund IV	2015	\$2,500,000	\$2,419,534	\$658,317	\$2,535,276	10.1%
Ironsides Partnership Fund V, L.P.	2020	\$2,000,000	\$296,552	\$0	\$247,184	--
Ironsides Direct Investment Fund V, L.P.	2019	\$2,000,000	\$2,289,730	\$107,139	\$1,732,077	--
HarbourVest 2019 Global Fund	2019	\$4,000,000	\$420,000	\$0	\$379,739	--
Total Account		\$17,539,998	\$11,178,330	\$1,763,823	\$7,353,976	

IRRs for investments less than 2 years are not shown.

Annual Investment Expense Analysis				
As Of June 30, 2020				
Name	Fee Schedule	Market Value	Estimated Fee Value	Estimated Fee
Equity Assets		\$94,161,706		
Domestic Equity Assets		\$67,197,106		
RhumbLine S&P 500 Index	0.07% of First 25.0 Mil, 0.05% of Next 25.0 Mil, 0.04% Thereafter	\$28,060,124	\$19,030	0.07%
Fiduciary Large Cap Equity	0.66% of Assets	\$23,011,855	\$151,878	0.66%
Frontier Capital Appreciation	0.79% of Assets	\$16,125,128	\$127,389	0.79%
International Equity Assets		\$26,964,599		
International Developed Markets Equity Assets		\$19,941,770		
Rhumblin MSCI EAFE Index	0.08% of First 25.0 Mil, 0.07% of Next 25.0 Mil, 0.05% Thereafter	\$19,941,770	\$15,953	0.08%
International Emerging Markets Equity Assets		\$7,022,829		
DFA Emerging Markets	0.52% of Assets	\$3,676,806	\$19,119	0.52%
Driehaus Emerging Market Equity	0.90% of Assets	\$3,346,023	\$30,114	0.90%
Fixed Income Assets		\$70,224,987		
Investment Grade Bonds Assets		\$36,333,762		
SSgA U.S. Aggregate Bond Index	0.04% of Assets	\$36,333,762	\$14,534	0.04%
High Yield Bond Assets		\$18,977,855		
Shenkman Capital	0.45% of Assets	\$18,977,855	\$85,400	0.45%
TIPS Assets		\$9,553,489		
SSgA TIPS Index-NL	0.04% of Assets	\$9,553,489	\$3,821	0.04%
Emerging Market Debt Assets		\$5,359,881		
Payden Emerging Market Bond	0.69% of Assets	\$5,359,881	\$36,983	0.69%

Name	Fee Schedule	Market Value	Estimated Fee Value	Estimated Fee
Real Estate Assets		\$5,722,260		
Open-Ended Real Estate		\$5,664,919		
Clarion Partners	1.10% of Assets	\$5,664,919	\$62,314	1.10%
Total Closed End Real Estate		\$57,341		
Colony Realty Partners IV	1.5% management fee based on committed equity during the investment period and invested equity thereafter	\$24,261		
Rockwood Capital Real Estate Partners Fund XI, L.P.		\$33,080		
Private Equity Assets		\$7,353,976		
North American Strategic Partners 2006	0.8% on drawn and undrawn capital less investments sold or written off 5% carried interest, 8% preferred return	\$509,767		
Ironsides Partnership Fund IV	0% Management fee, 8% Preferred Return, 5% Carried Interest	\$1,949,933		
Ironsides Direct Investment Fund IV	0.5% Management fee, 8% Preferred Return, 15% Carried Interest	\$2,535,276		
Ironsides Partnership Fund V, L.P.		\$247,184		
Ironsides Direct Investment Fund V, L.P.	0.5% Management fee, 8% preferred return, 15% carried interest	\$1,732,077		
HarbourVest 2019 Global Fund	0.69% average annual management fee; 8.0% preferred return on secondary and direct investments and with corresponding carried interest of 12.5% on secondary and direct investments	\$379,739		
Cash		\$196,259		
Comerica Short Term Fund		\$196,259		
Total		\$177,659,187	\$566,536	0.32%

Current Issues

Index Fund RFP Summary

Background

- Recently, the System increased its target allocation to equity asset classes to help increase long-term expected return.
 - However, equity valuations within the US remain elevated relative to historical averages.
- To increase expected while still mitigating downside risk, the Broad authorized Meketa to issue an RFP for defensive index strategies.
 - The ideal strategy will generally perform in line with the US equity market during up markets while protecting in down markets for a reasonable cost.

RFP Respondents

Manager	Headquarters	Strategy	Overall Rating
Northern Trust.	Chicago, Illinois	US Quality Low Volatility (QLV)	Highly Advantageous
Rhumblin	Boston, Massachusetts	FTSE Russell 1000 HEDI Moderate	Highly Advantageous
Comerica / World Asset	Detroit, Michigan	S&P 500 Low Vol Index	Advantageous
Wells Fargo / Analytic	Los Angeles, California	Factor Enhanced U.S. Large Cap Defensive Equity	Advantageous
Milliman	Chicago, Illinois	S&P 500 Managed Risk Index 2.0	Not Advantageous
QMA	Newark, New Jersey	US Market Participation Strategy	Not Advantageous
Credit Suisse	New York, New York	Global Risk Allocation Strategy	N/A
T Rowe Price	Baltimore, Maryland	US Structured Research Equity	N/A
SouthPeak	Sydney, Australia	Smoother Equity Fund	N/A

Disqualified Responses

Manager	Reason
Credit Suisse	Not responsive (global mandate)
SouthPeak	Did not meet minimum criteria (firm AUM too low)
T Rowe Price	Not responsive (not transparent or systematic, does not target volatility reduction)

Strategy Availability

Manager	Strategy	Vehicles
Comerica / World Asset	S&P 500 Low Vol	Commingled
Milliman	S&P 500 Managed Risk Index 2.0	ETF
Northern Trust.	US Quality Low Volatility (QLV)	SMA, Commingled
QMA	US Market Participation Strategy	Commingled
Rhumblin	FTSE Russell 1000 HEDI Moderate	SMA
Wells Fargo / Analytic	Factor Enhanced U.S. Large Cap Defensive Equity	Commingled

Northern Trust.

Rating Criteria	Rating	Rationale
Overall	Highly Advantageous	
Organization	Advantageous	<ul style="list-style-type: none"> Northern Trust is a publicly traded, multi-line financial services firm based in Chicago, IL with custody, asset management, brokerage, and wealth management subsidiaries. The firm manages \$914 billion in assets under management across a mix of strategies and asset classes with approximately \$690 million managed in the proposed US Quality Low Volatility strategy..
Team	Highly Advantageous	<ul style="list-style-type: none"> The strategy is managed by quantitative strategies team led by Michael Hunstad. The team consists of a full complement of investment professionals with dedicated portfolio management, research, trading, and risk management teams. The team is based in Chicago and works on strategies across multiple geographies.
Investment Philosophy	Highly Advantageous	<ul style="list-style-type: none"> Northern seeks to quantitatively create a basket of securities where each security exhibits low volatility characteristics along with quality, which consists of management efficiency, profitability, and cash flow generation signals. Northern's approach to factor definitions stresses multidimensionality; the team uses multiple means to measure actor exposure and is careful to make sure factor approaches are appropriate for a given region and sector.
Investment Process	Advantageous	<ul style="list-style-type: none"> The team begins their investment process by taking the base universe and ranking all constituents on the strategy's quality metrics (management efficiency, profitability, and cash flow), eliminating the lowest scoring quintile. With the remaining securities, the team constructs a minimum variance portfolio that balances return against risk while taking into account estimated transactions costs. The resulting portfolio is checked for low volatility and quality factor exposures. The strategy is expected to reduce portfolio volatility by approximate 20% with a tracking error of 3%-5%.
Performance	Highly Advantageous	<ul style="list-style-type: none"> Substantial volatility reduction without sacrificing upside market capture; has a strong information ratio.
Fees	Advantageous	<ul style="list-style-type: none"> Commingled Fund: 15 basis point management fee with administrative expense capped at 2 basis points. No minimums. SMA: Northern offers an SMA but the starting fee tier (50 basis point management) is uneconomic.

RhumbLine

Rating Criteria	Rating	Rationale
Overall	Highly Advantageous	
Organization	Highly Advantageous	<ul style="list-style-type: none"> RhumbLine is a 100% employee-owned firm established in 1992 to concentrate solely on managing passively managed strategies. It is a majority women-/minority-owned firm (53%). RhumbLine has made a dedicated effort to remove conflicts of interest from its business model – it does not engage in ancillary businesses such as securities lending.
Team	Advantageous	<ul style="list-style-type: none"> The investment team is led by Alex Ryer. Mr. Ryer has spent his entire career in passive management, starting his career at SSGA in 2000, working for RhumbLine as a portfolio manager from 2003-2005, and then following up with stints at both Northern Trust and BlackRock in quantitative research before returning to RhumbLine in 2016. He is supported by portfolio managers Julie Lind and Jeff Kusmierz, each with over 15 years and 10 years of experience with the company, respectively. Investment team turnover has been extremely low, with the departure of former CIO Norm Meltz (retirement) in 2017, representing the first significant departure in a decade.
Investment Philosophy	Advantageous	<ul style="list-style-type: none"> RhumbLine's tracking approach is determined by a number of factors including mandate size, benchmark, client restrictions, and trading cost. The firm will continuously evaluate reductions in tracking error versus trading cost, at times incurring additional tracking error to avoid absolute losses. The FTSE Russell HEDI index seeks to systematically select securities with lower volatility than the overall US equity market while still having favorable "quality" metrics such as leverage and earnings stability.
Investment Process	Highly Advantageous	<ul style="list-style-type: none"> The process begins with the selection of a parent index, such as the Russell 1000, to provide a universe of stocks to choose from. All stocks in the parent index are ranked using on a score that is 50% based on its volatility (trailing-one and -five year periods) and 50% based on its quality (leverage, earnings volatility, return on assets).. The index then assigns underweights and overweights for individual securities based on their volatility/quality score as well as targeted tracking error (3%-5% TE for this proposed strategy). Additional investment constraints are also applied at (e.g., no negative absolute weights (i.e. no shorting), stock liquidity).
Performance	Highly Advantageous	<ul style="list-style-type: none"> Substantial volatility reduction without sacrificing upside market capture; has a strong information ratio. Manages to have low tracking error along with high Sharpe ratio and high information ratio – unusual combination.
Fees	Highly Advantageous	<ul style="list-style-type: none"> SMA: 5.0 basis point all-in fee consisting of 2.5 Basis point management and licensing fees. SMAs are typically limited to a minimum size of \$10 million. RhumbLine is considering launching a commingled fund for the strategy but it is not imminent.

Comerica (World Asset Management)

Rating Criteria	Rating	Rationale
Overall	Advantageous	
Organization	Advantageous	<ul style="list-style-type: none"> World Asset Management is an asset management subsidiary of publicly traded banking firm Comerica, the Retirement System's current custodian. World predominantly manages passive equity and fixed income strategies along with customized investment mandates. Its assets under management total approximately \$11 billion.
Team	Advantageous	<ul style="list-style-type: none"> World has three main investment professionals operating in a team capacity but with areas of specialization (two in domestic equity and one in non-US equity). They are supported by a five-member operations team as well as a client facing team and management.
Investment Philosophy	Advantageous	<ul style="list-style-type: none"> World fully replicates the S&P 500 Low Volatility index, limiting trading to try to reduce the impact of transaction costs on tracking error. The S&P 500 Low Volatility index uses past volatility (trailing one-year) as a guide for future volatility and weights toward the lowest volatility stocks within the universe.
Investment Process	Not Advantageous ¹	<ul style="list-style-type: none"> S&P supplies index data to World who then fully replicates the exposures. The S&P 500 Low Volatility index is generated by ranking all securities in the S&P 500 by their trailing volatility over the previous year, selecting the 20% lowest volatility securities, then reweighting among constituents by the inverse of volatility (i.e., give the largest weight to the least volatile constituents).
Performance	Advantageous	<ul style="list-style-type: none"> High volatility reduction but protection is offset by weakness in up trending markets; information ratio is low and upside and downside capture are very similar. High tracking error.
Fees	Advantageous	<ul style="list-style-type: none"> Commingled: 10 basis points with \$10,000 minimum.

¹ Rating applies to the construction of S&P 500 Low Volatility index and its suitability for the System's portfolio. It is not a reflection of World's investment capabilities.

Wells Fargo (Analytic Investors)

Rating Criteria	Rating	Rationale
Overall	Advantageous	
Organization	Advantageous	<ul style="list-style-type: none"> Analytic is a quantitative investment boutique within Wells Fargo Asset Management, a subsidiary itself of Wells Fargo bank. The firm generally operates independently from an investment perspective and manages its own institutional relationships. Analytic was founded in 1970 as an options forecasting firm and was subsequently purchased by United Asset Management (later Old Mutual) in 1985. Feeling that Analytic was receiving insufficient marketing support, Analytic completed an earn-out with Old Mutual and returned to full employee ownership in 2012. In 2016, Wells Fargo acquired Analytic as a means of extending its quantitative investment capabilities while Analytic sought retail and high net worth marketing support.
Team	Highly Advantageous	<ul style="list-style-type: none"> While Analytic takes a team-based approach to strategy implementation with six portfolio managers, investment efforts are led by President/Portfolio Manager, Harindra de Silva. Mr. de Silva is recognized as a pioneer in low volatility investing and his research dates back to the mid 1990s. Supporting the group of portfolio managers is a broader pool of roughly a dozen Research Analysts, all of whom are steeped in strong academic pedigree.
Investment Philosophy	Highly Advantageous	<ul style="list-style-type: none"> Analytic believes that, due to a number of behavioral and institutional constraints among investors, that there are systematic risk exposures that can provide a return premium above that of the market cap weighted index while maintaining the lower cost structure of index investing. Analytic focuses on five factors well established in academic literature: size, value, momentum, quality, and low volatility.
Investment Process	Advantageous	<ul style="list-style-type: none"> Analytic begins with a set of assumptions concerning its targeted risk factors in terms of their Sharpe ratios, correlations with each other, and correlations with the broader market based on Analytic's research for its other, active equity strategies. Using their assumptions and holding each factor's Sharpe ratio constant, Analytic forecasts each factor's expected return and analyzes each stock in the underlying investment universe for its exposure to each risk factor and then generates a return forecast by combining their factor returns with each stock's factor exposures. Analytic combines each stock's expected return and expected risk to generate the expected Sharpe ratio for every security in the portfolio and then ranks them based on their contribution to the overall portfolio's Sharpe ratio. Analytic removes the lowest ranked stocks until one of two conditions is satisfied: 1) only 80% of the underlying investable universe remains or 2) predicted tracking error rises to 3% or above.
Performance	Not Advantageous	<ul style="list-style-type: none"> Tightest tracking error of respondents but correspondingly low volatility reduction. In general, returns have been challenged by the strategy's exposure to the value factor.
Fees	Advantageous	<ul style="list-style-type: none"> Commingled: 15 basis points flat fee.

Milliman

Rating Criteria	Rating	Rationale
Overall	Not Advantageous	
Organization	Advantageous	<ul style="list-style-type: none"> Milliman Financial Risk Management is an asset management and risk advisory subsidiary of Milliman, a global employee-owned actuarial and consulting firm. Milliman FRM has \$136.4 billion in assets under managements spread across asset management, hedging, and investment consulting products.
Team	Advantageous	<ul style="list-style-type: none"> The core management team for the ETF has been stable since the vehicle's creation in 2017, consisting of Blake Graves, Charles Lowery, and Louis Ng. Mr. Graves has the longest tenure at Milliman (14 years) but all three individuals are well tenured (13-14 years of industry experience) and have appropriate educational backgrounds. Two additional supporting team members have been added in the last year.
Investment Philosophy	Advantageous	<ul style="list-style-type: none"> Given the structure of an ETF, the vehicle generally seeks to track the underlying target index subject to market liquidity and costs. The objective of the risk managed index is to use a combination of index equity positions combined with a bond allocation and synthetic put to control drawdown risk and target 22% volatility over time.
Investment Process	Advantageous	<ul style="list-style-type: none"> Milliman uses a standardized risk control model to calculate the variance of S&P 500, and the fixed income indices, S&P U.S. Treasury Bond Current 5-Year Index and S&P U.S. Treasury Bill 0-3 Month Index and the covariance between the indexes. The weights of each underlying component are adjusted on a daily basis to match the strategy's target volatility level subject to a daily constraint. Ultimately, as market volatility rises the strategy will reduce equity exposure and equity exposure will rise as market exposure declines.
Performance	Not Advantageous	<ul style="list-style-type: none"> Extreme volatility reduction but lack of longer track record makes drawing conclusions about performance difficult. Strategy protected well during 2020 COVID-19 drawdown but performed poorly in the 2019 calendar year.
Fees	Not Advantageous	<ul style="list-style-type: none"> ETF: 0.35% total expense Not clear how ETF vehicle would be traded logistically/operationally.

QMA

Rating Criteria	Rating	Rationale
Overall	Not Advantageous	
Organization	Advantageous	<ul style="list-style-type: none"> QMA is a subsidiary of Prudential Financial, the publicly traded global insurance and multi-line financials services firm. Founded in 1975 within Prudential, QMA specializes in quantitative equity and multi-asset strategies. Total firm asset are \$90.8 billion with majority (67.7%) managed within institutional mutual funds. The remainder is evenly split between commingled funds and separate accounts.
Team	Advantageous	<ul style="list-style-type: none"> The strategy team is well tenured, with portfolio manager Devang Gambhirwala having managed the strategy since inception in 1992 and portfolio managers Marcus Perl and Joel Kallman having joined the team in 2012 and 2014, respectively. The only significant team turnover was the retirement of Ted Lockwood in 2018; Mr. Lockwood worked with Mr. Gambhirwala on the strategy for a number of years.
Investment Philosophy	Highly Advantageous	<ul style="list-style-type: none"> The MPS strategy seeks to achieve equity-like returns with lower volatility than the market by pairing equity options with a long fixed income portfolio and by periodically “resetting” the portfolio’s option exposures when prices have moved significantly up or down. The QMA approach ultimately results in a contrarian set of equity exposures – gaining more exposure as markets move downward while decreasing exposure as markets run up.
Investment Process	Not Advantageous	<ul style="list-style-type: none"> Roughly 20% of the portfolio is used to initiate an “at-the-money” long call option portfolio on US equity, typically with a delta of 0.6. As equity performance moves up and down, the delta of the options portfolio changes. The team generally “resets” portfolio if delta is less than 0.4 by adding upside exposure or by decreasing downside exposure if delta is more than 0.8. While the strategy is fairly mechanistic, there is scope for the portfolio management team to delay or accelerate option portfolio resets. The team specifically notes that during the global financial crisis and during the COVID-19 downturn that resets were delayed beyond delta of 0.4. The remainder of the portfolio consists of Treasuries and Treasury futures, functioning as a store of value and a means to manage the overall duration of the combined portfolio.
Performance	Not Advantageous	<ul style="list-style-type: none"> Extreme volatility reduction and has the lowest Beta (0.5) of the respondents. High tracking error option with weaker long-term performance – has largely similar upside and downside capture and negative information ratio.
Fees	Not Advantageous	<ul style="list-style-type: none"> Commingled Fund: 30 basis points on first \$50 million SMA: 30 basis points on first \$50 million

Manager Trailing Performance (Gross of Fees)
As of March 31, 2020

Manager	Q1 2020	1 Year (%)	3 Year (%)	5 Year (%)	10 Year (%)
Comerica / World Asset	-18.9	- 8.5	5.1	6.9	NA
Milliman	-9.7	2.5	NA	NA	NA
Northern Trust.	-18.2	-5.5	6.9	8.1	12.2
QMA	-4.0	8.1	7.2	5.6	7.9
Rhumblin	-17.7	- 4.4	7.9	8.8	12.4
Wells Fargo / Analytic	-21.6	- 11.4	3.1	5.2	10.2
<i>Russell 1000</i>	-20.2	- 8.0	4.6	6.2	10.4

Manager Trailing 5 Year Risk Statistics (Gross of Fees)
As of March 31, 2020

Manager	Standard Deviation	Beta	Tracking Error	Sharpe	Info. Ratio	Upside Capture	Downside Capture
Comerica / World Asset	12.1	0.73	7.4	0.48	0.09	73.8	69.2
Northern Trust.	12.1	0.84	4.0	0.58	0.48	89.1	79.8
QMA	7.8	0.50	7.8	0.58	-0.08	57.5	56.3
Rhumblin	12.4	0.86	3.4	0.62	0.77	95.3	82.7
Wells Fargo / Analytic	12.9	0.91	2.8	0.32	-0.35	86.3	91.9

Summary

- A total of 9 managers submitted responses to this search. Based upon our review and evaluation of each respondent, Meketa Investment Group has rated two as “Highly Advantageous.” Two were ranked as “Advantageous,” and two managers were ranked as “Not Advantageous.” Three manager’s proposals were not suitable.
- We recommend the Board chooses to interview the “Highly Advantageous” managers at a subsequent meeting.

**July 2020
Appropriation Memo**

MEMORANDUM

TO: Retirement Board, Marlborough Retirement System
FROM: Henry Jaung, Steve MacLellan Meketa Investment Group
DATE: June 30, 2020
RE: Annual Appropriation Investment

Based on May 2020 ending market values, subsequent cash flows, and estimated performance thereafter, Meketa Investment Group recommends the System's annual appropriation be invested as shown in the table below:

Proposed Cash Flows	
Driehaus EM Equity	\$2,600,000
Dimensional EM Equity	\$3,100,000
Cash	\$3,367,157

This recommendation is appropriate given the System's transitional asset allocation targets ("Step 1" of the 2020 asset allocation study) while providing three months of projected net cash outflows.

If you have any questions, please call us at (781) 471-3500.

cc: Margaret Shea, Administrator

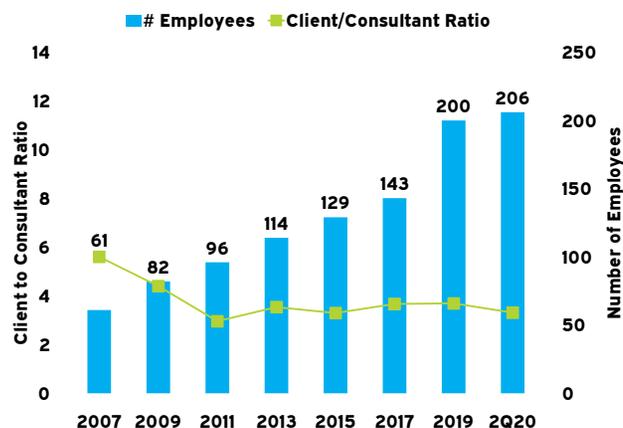
HJ/SM/BC/KF

Appendices

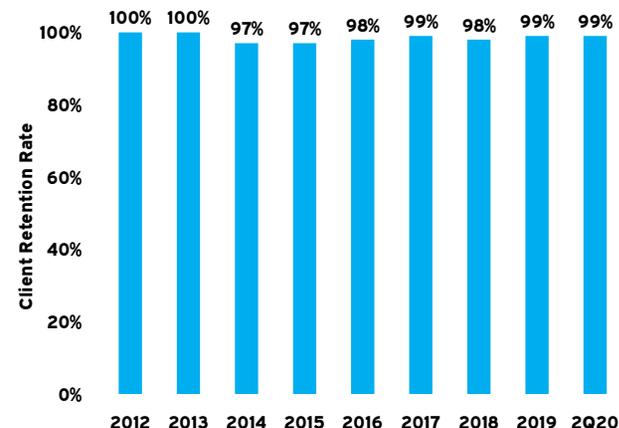
**Meketa Investment Group
Corporate Update**

- Staff of 206, including 141 investment professionals and 41 CFA Charterholders
- 215 clients, with over 300 funds throughout the United States
- Significant investment in staff and resources
- Offices in Boston, Chicago, Miami, New York, Portland (OR), San Diego, and London
- We advise on \$1.4 trillion in client assets
 - Over \$125 billion in assets committed to alternative investments
 - Private Equity
 - Infrastructure
 - Natural Resources
 - Real Estate
 - Hedge Funds
 - Commodities

Client to Consultant Ratio¹



Client Retention Rate²



Meketa Investment Group is proud to work for over 5 million American families everyday.

¹ On March 15, 2019, 31 employees joined the firm as part of the merger of Meketa Investment Group and Pension Consulting Alliance.

² Client Retention Rate is one minus the number of clients lost divided by the number of clients at prior year-end.

Asset Classes Followed Intensively by Meketa Investment Group

Domestic Equities	International Equities	Private Equity	Real Assets	Fixed Income	Hedge Funds
<ul style="list-style-type: none"> - Passive - Enhanced Index - Large Cap - Midcap - Small Cap - Microcap - 130/30 	<ul style="list-style-type: none"> - Large Cap Developed - Small Cap Developed - Emerging Markets - Frontier Markets 	<ul style="list-style-type: none"> - Buyouts - Venture Capital - Private Debt - Special Situations - Secondaries - Fund of Funds 	<ul style="list-style-type: none"> - Public REITs - Core Real Estate - Value Added Real Estate - Opportunistic Real Estate - Infrastructure - Timber - Natural Resources - Commodities 	<ul style="list-style-type: none"> - Short-Term - Core - Core Plus - TIPS - High Yield - Bank Loans - Distressed - Global - Emerging Markets 	<ul style="list-style-type: none"> - Long/Short Equity - Event Driven - Relative Value - Fixed Income Arbitrage - Multi Strategy - Market Neutral - Global Macro - Fund of Funds - Portable Alpha

Disclaimer, Glossary, and Notes

WE HAVE PREPARED THIS REPORT (THIS "REPORT") FOR THE SOLE BENEFIT OF THE INTENDED RECIPIENT (THE "RECIPIENT").

SIGNIFICANT EVENTS MAY OCCUR (OR HAVE OCCURRED) AFTER THE DATE OF THIS REPORT AND THAT IT IS NOT OUR FUNCTION OR RESPONSIBILITY TO UPDATE THIS REPORT. ANY OPINIONS OR RECOMMENDATIONS PRESENTED HEREIN REPRESENT OUR GOOD FAITH VIEWS AS OF THE DATE OF THIS REPORT AND ARE SUBJECT TO CHANGE AT ANY TIME. ALL INVESTMENTS INVOLVE RISK. THERE CAN BE NO GUARANTEE THAT THE STRATEGIES, TACTICS, AND METHODS DISCUSSED HERE WILL BE SUCCESSFUL.

INFORMATION USED TO PREPARE THIS REPORT WAS OBTAINED FROM INVESTMENT MANAGERS, CUSTODIANS, AND OTHER EXTERNAL SOURCES. WHILE WE HAVE EXERCISED REASONABLE CARE IN PREPARING THIS REPORT, WE CANNOT GUARANTEE THE ACCURACY OF ALL SOURCE INFORMATION CONTAINED HEREIN.

CERTAIN INFORMATION CONTAINED IN THIS REPORT MAY CONSTITUTE "FORWARD - LOOKING STATEMENTS," WHICH CAN BE IDENTIFIED BY THE USE OF TERMINOLOGY SUCH AS "MAY," "WILL," "SHOULD," "EXPECT," "AIM," "ANTICIPATE," "TARGET," "PROJECT," "ESTIMATE," "INTEND," "CONTINUE" OR "BELIEVE," OR THE NEGATIVES THEREOF OR OTHER VARIATIONS THEREON OR COMPARABLE TERMINOLOGY. ANY FORWARD-LOOKING STATEMENTS, FORECASTS, PROJECTIONS, VALUATIONS, OR RESULTS IN THIS PRESENTATION ARE BASED UPON CURRENT ASSUMPTIONS. CHANGES TO ANY ASSUMPTIONS MAY HAVE A MATERIAL IMPACT ON FORWARD - LOOKING STATEMENTS, FORECASTS, PROJECTIONS, VALUATIONS, OR RESULTS. ACTUAL RESULTS MAY THEREFORE BE MATERIALLY DIFFERENT FROM ANY FORECASTS, PROJECTIONS, VALUATIONS, OR RESULTS IN THIS PRESENTATION.

PERFORMANCE DATA CONTAINED HEREIN REPRESENT PAST PERFORMANCE. PAST PERFORMANCE IS NO GUARANTEE OF FUTURE RESULTS.

Credit Risk: Refers to the risk that the issuer of a fixed income security may default (i.e., the issuer will be unable to make timely principal and/or interest payments on the security).

Duration: Measure of the sensitivity of the price of a bond to a change in its yield to maturity. Duration summarizes, in a single number, the characteristics that cause bond prices to change in response to a change in interest rates. For example, the price of a bond with a duration of three years will rise by approximately 3% for each 1% decrease in its yield to maturity. Conversely, the price will decrease 3% for each 1% increase in the bond's yield. Price changes for two different bonds can be compared using duration. A bond with a duration of six years will exhibit twice the percentage price change of a bond with a three-year duration. The actual calculation of a bond's duration is somewhat complicated, but the idea behind the calculation is straightforward. The first step is to measure the time interval until receipt for each cash flow (coupon and principal payments) from a bond. The second step is to compute a weighted average of these time intervals. Each time interval is measured by the present value of that cash flow. This weighted average is the duration of the bond measured in years.

Information Ratio: This statistic is a measure of the consistency of a portfolio's performance relative to a benchmark. It is calculated by subtracting the benchmark return from the portfolio return (excess return), and dividing the resulting excess return by the standard deviation (volatility) of this excess return. A positive information ratio indicates outperformance versus the benchmark, and the higher the information ratio, the more consistent the outperformance.

Jensen's Alpha: A measure of the average return of a portfolio or investment in excess of what is predicted by its beta or "market" risk. $\text{Portfolio Return} - [\text{Risk Free Rate} + \text{Beta} * (\text{market return} - \text{Risk Free Rate})]$.

Market Capitalization: For a firm, market capitalization is the total market value of outstanding common stock. For a portfolio, market capitalization is the sum of the capitalization of each company weighted by the ratio of holdings in that company to total portfolio holdings; thus it is a weighted-average capitalization. Meketa Investment Group considers the largest 65% of the broad domestic equity market as large capitalization, the next 25% of the market as medium capitalization, and the smallest 10% of stocks as small capitalization.

Market Weighted: Stocks in many indices are weighted based on the total market capitalization of the issue. Thus, the individual returns of higher market-capitalization issues will more heavily influence an index's return than the returns of the smaller market-capitalization issues in the index.

Maturity: The date on which a loan, bond, mortgage, or other debt/security becomes due and is to be paid off.

Prepayment Risk: The risk that prepayments will increase (homeowners will prepay all or part of their mortgage) when mortgage interest rates decline; hence, investors' monies will be returned to them in a lower interest rate environment. Also, the risk that prepayments will slow down when mortgage interest rates rise; hence, investors will not have as much money as previously anticipated in a higher interest rate environment. A prepayment is any payment in excess of the scheduled mortgage payment.

Price-Book Value (P/B) Ratio: The current market price of a stock divided by its book value per share. Meketa Investment Group calculates P/B as the current price divided by Compustat's quarterly common equity. Common equity includes common stock, capital surplus, retained earnings, and treasury stock adjusted for both common and nonredeemable preferred stock. Similar to high P/E stocks, stocks with high P/B's tend to be riskier investments.

Price-Earnings (P/E) Ratio: A stock's market price divided by its current or estimated future earnings. Lower P/E ratios often characterize stocks in low growth or mature industries, stocks in groups that have fallen out of favor, or stocks of established blue chip companies with long records of stable earnings and regular dividends. Sometimes a company that has good fundamentals may be viewed unfavorably by the market if it is an industry that is temporarily out of favor. Or a business may have experienced financial problems causing investors to be skeptical about its future. Either of these situations would result in lower relative P/E ratios. Some stocks exhibit above-average sales and earnings growth or expectations for above average growth. Consequently, investors are willing to pay more for these companies' earnings, which results in elevated P/E ratios. In other words, investors will pay more for shares of companies whose profits, in their opinion, are expected to increase faster than average. Because future events are in no way assured, high P/E stocks tend to be riskier and more volatile investments. Meketa Investment Group calculates P/E as the current price divided by the I/B/E/S consensus of twelve-month forecast earnings per share.

Quality Rating: The rank assigned a security by such rating services as Fitch, Moody's, and Standard & Poor's. The rating may be determined by such factors as (1) the likelihood of fulfillment of dividend, income, and principal payment of obligations; (2) the nature and provisions of the issue; and (3) the security's relative position in the event of liquidation of the company. Bonds assigned the top four grades (AAA, AA, A, BBB) are considered investment grade because they are eligible bank investments as determined by the controller of the currency.

Sharpe Ratio: A commonly used measure of risk-adjusted return. It is calculated by subtracting the risk free return (usually three-month Treasury bill) from the portfolio return and dividing the resulting excess return by the portfolio's total risk level (standard deviation). The result is a measure of return per unit of total risk taken. The higher the Sharpe ratio, the better the fund's historical risk adjusted performance.

STIF Account: Short-term investment fund at a custodian bank that invests in cash-equivalent instruments. It is generally used to safely invest the excess cash held by portfolio managers.

Standard Deviation: A measure of the total risk of an asset or a portfolio. Standard deviation measures the dispersion of a set of numbers around a central point (e.g., the average return). If the standard deviation is small, the distribution is concentrated within a narrow range of values. For a normal distribution, about two thirds of the observations will fall within one standard deviation of the mean, and 95% of the observations will fall within two standard deviations of the mean.

Style: The description of the type of approach and strategy utilized by an investment manager to manage funds. For example, the style for equities is determined by portfolio characteristics such as price-to-book value, price-to-earnings ratio, and dividend yield. Equity styles include growth, value, and core.

Tracking Error: A divergence between the price behavior of a position or a portfolio and the price behavior of a benchmark, as defined by the difference in standard deviation.

Yield to Maturity: The yield, or return, provided by a bond to its maturity date; determined by a mathematical process, usually requiring the use of a “basis book.” For example, a 5% bond pays \$5 a year interest on each \$100 par value. To figure its current yield, divide \$5 by \$95—the market price of the bond—and you get 5.26%. Assume that the same bond is due to mature in five years. On the maturity date, the issuer is pledged to pay \$100 for the bond that can be bought now for \$95. In other words, the bond is selling at a discount of 5% below par value. To figure yield to maturity, a simple and approximate method is to divide 5% by the five years to maturity, which equals 1% pro rata yearly. Add that 1% to the 5.26% current yield, and the yield to maturity is roughly 6.26%.

$$\frac{5\% \text{ (discount)}}{5 \text{ (yrs. to maturity)}} = 1\% \text{ pro rata, plus } 5.26\% \text{ (current yield)} = 6.26\% \text{ (yield to maturity)}$$

Yield to Worst: The lowest potential yield that can be received on a bond without the issuer actually defaulting. The yield to worst is calculated by making worst-case scenario assumptions on the issue by calculating the returns that would be received if provisions, including prepayment, call, or sinking fund, are used by the issuer.

NCREIF Property Index (NPI): Measures unleveraged investment performance of a very large pool of individual commercial real estate properties acquired in the private market by tax-exempt institutional investors for investment purposes only. The NPI index is capitalization-weighted for a quarterly time series composite total rate of return.

NCREIF Fund Index - Open End Diversified Core Equity (NFI-ODCE): Measures the investment performance of 28 open-end commingled funds pursuing a core investment strategy that reflects funds' leverage and cash positions. The NFI-ODCE index is equal-weighted and is reported gross and net of fees for a quarterly time series composite total rate of return.

Sources: Investment Terminology, International Foundation of Employee Benefit Plans, 1999.
The Handbook of Fixed Income Securities, Fabozzi, Frank J., 1991

The Russell Indices®, TM, SM are trademarks/service marks of the Frank Russell Company.

Throughout this report, numbers may not sum due to rounding.

Returns for periods greater than one year are annualized throughout this report.

Values shown are in millions of dollars, unless noted otherwise.