Callan

NATIONAL INSTITUTE ON
Retirement Security
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Webinar | July 20, 2020

Setting Expectations for the Capital Markets in a Post-COVID Environment

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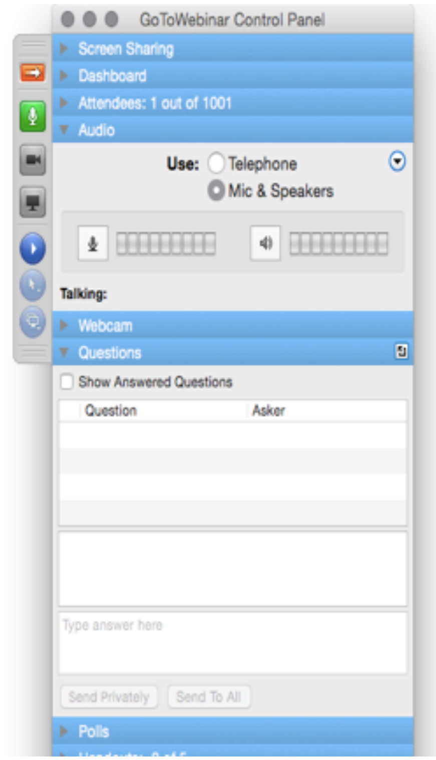

Speakers

Dan Doonan
Executive Director
National Institute on Retirement Security

James Callahan
President
Callan

Jay Kloepfer
Executive Vice President
Director of Capital Market Research
Callan

Agenda

- **Current market conditions**
- **Why does Callan create capital market assumptions?**
- **2020 assumptions – process and current base case**
  - Economic outlook
  - Asset class outlook
    - *Equity*
    - *Fixed income*
    - *Alternative investments*
  - Forecast parameters
    - *Returns*
    - *Risk*
    - *Correlation*
- **Where do we go from here? Time horizon and strategic planning versus tactics**

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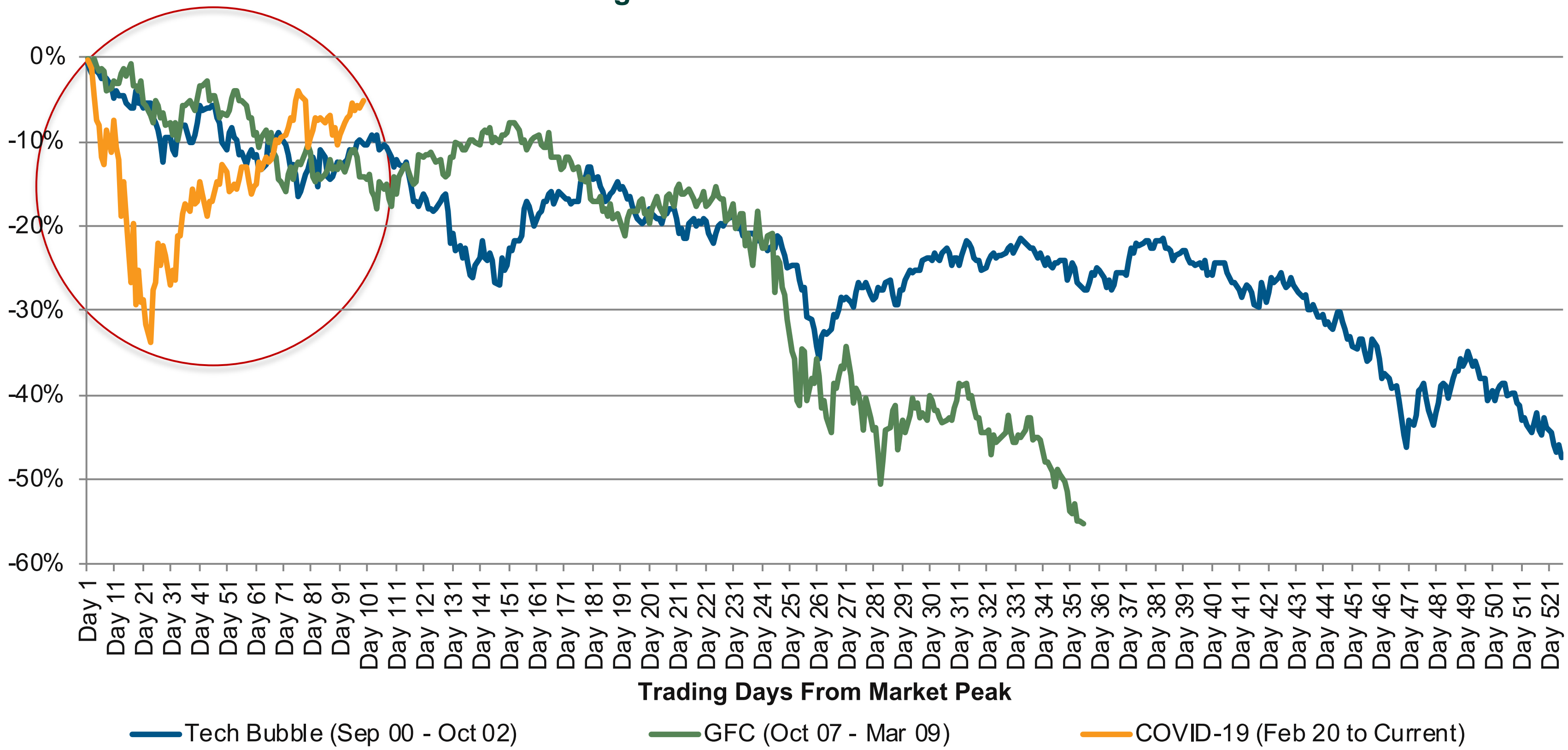
Current Market Conditions

Equity Market Sees a V-Shaped Recovery

A 'Global Hurricane' in the form of a pandemic

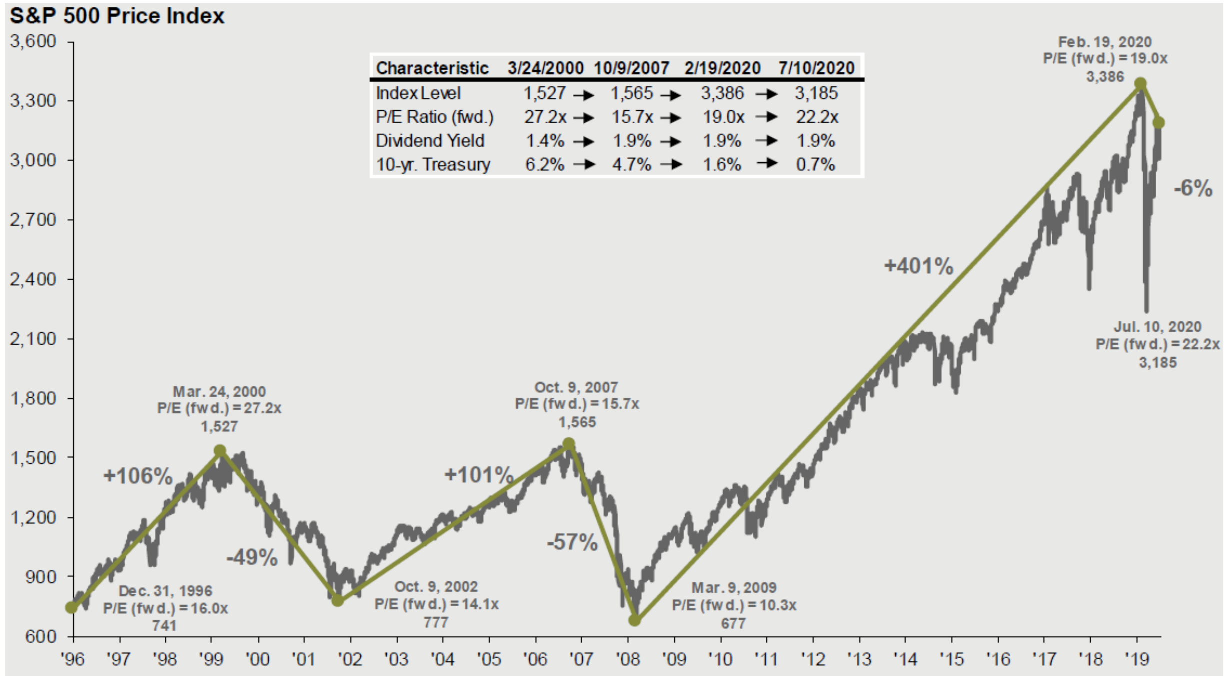
The sharpest and fastest equity market decline ever: 16 trading days to reach bear market; -33% after just 23 days

S&P 500 Index Cumulative Returns
Market Peak-to-Trough for Recent Corrections vs.
Current Path of COVID-19 Correction Through 7/10/20



Impact on the Financial Markets

Equities



Source: Compustat, FactSet, Federal Reserve, Standard & Poor's, J.P. Morgan Asset Management.
Dividend yield is calculated as consensus estimates of dividends for the next 12 months, divided by most recent price, as provided by Compustat. Forward price to earnings ratio is a bottom-up calculation based on the most recent S&P 500 Index price, divided by consensus estimates for earnings in the next 12 months (NTM), and is provided by FactSet Market Aggregates. Returns are cumulative and based on S&P 500 Index price movement only, and do not include the reinvestment of dividends. Past performance is not indicative of future returns.
Guide to the Markets – U.S. Data are as of July 10, 2020.

J.P.Morgan Asset Management

- Over the longer term the S&P 500 has experienced far more dramatic declines
  - The market continues to recover and is now only down 6% from its February 19 record high
  - Fall from the Tech Bubble was -49%
  - Downdraft during the Global Financial Crisis was -57%
- Forward P/E is 22.2
  - Not as high as at the peak of the Tech Bubble but measurably higher than at the beginning of the Global Financial Crisis

Source: Source: Compustat, FactSet, Federal Reserve, Standard & Poor's, J.P. Morgan Asset Management

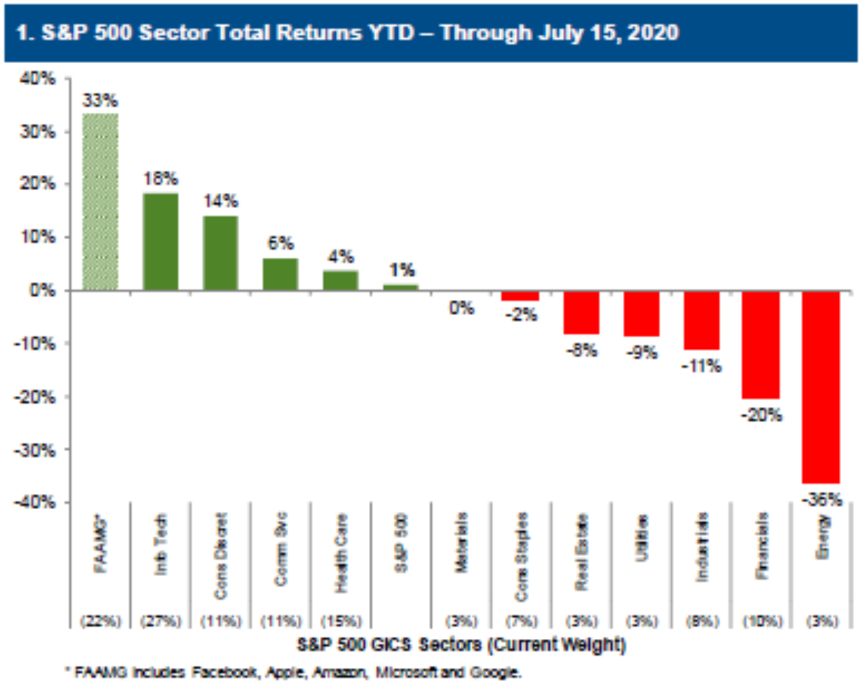
Swift Recovery in the Stock Market – Did Investors Get Ahead of Themselves?

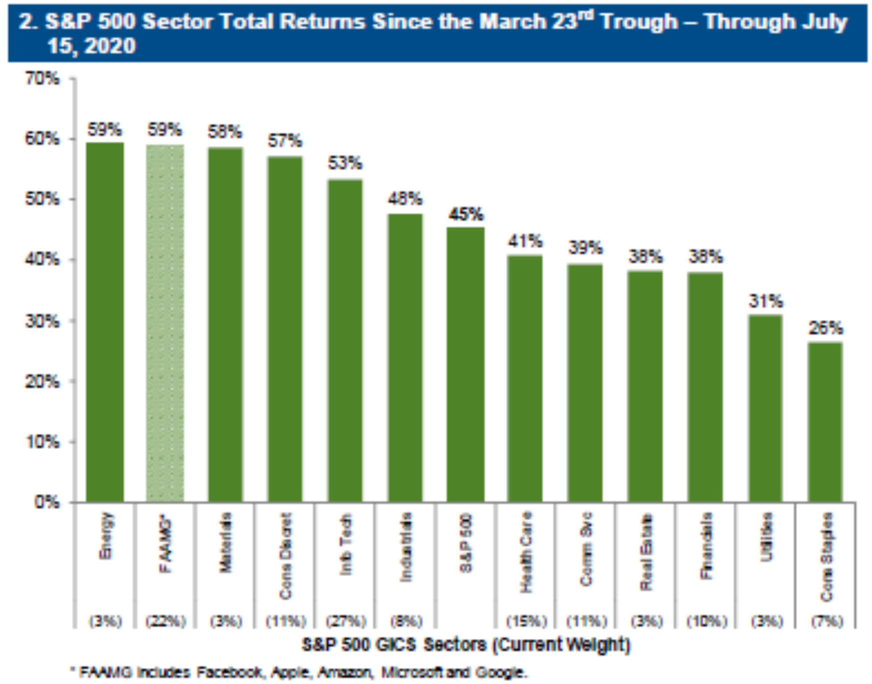
Stock market is not the economy

As of July 17– US stock market recouped its loss year-to-date. How can that be?

- Supreme confidence in efficacy of monetary and fiscal policy
  - Zero interest rates, the array of Fed program support, and fiscal stimulus, both here and around the globe, provide strong support for equity returns
  - Imbalances between performance of growth and value remain
  - Non-U.S. stocks are still down year-to-date
    - *Developed markets: -7.1%*
    - *Emerging markets: -3.0%*
    - *ACWI ex-US: -6.1%*
- Investment grade bonds generated strong performance as rates were slashed
  - Credit took a hit in March, with spreads widening and liquidity drying up
    - *Liquidity and confidence returned in April, credit now generating positive year-to-date returns through mid July*
- Below-investment grade (high yield) took a bigger hit in March, still down -1.8% year-to-date
- Real estate, private equity data lag
  - Real estate will suffer drop in income, as shuttered companies struggle to pay rent, vacancies rise
  - Exacerbate existing trends driving property type uses – office, retail in particular
- Names and sectors driving the stock market have not seen the revenue declines and layoffs that have decimated transportation, airlines, retail, consumer services and durable goods
  - Apple, Alphabet (Google), Microsoft, Facebook, Amazon are up 35% in Q2, and made up 30% of the S&P 500 return, even though they make up 20% of market cap

Broad Recovery Since March, But Concentrated Performance Year-to-Date





S&P 500 suffered a 34% peak-to-trough drawdown through March 23, but has since rallied 45%, leaving it up 1% for the year.

Growth sectors such as Information Technology have significantly outperformed year-to-date as low interest rates and a scarcity of growth has increased the premium for these stocks. Traditional cyclical sectors such as Financials, Energy and Industrials are lagging.

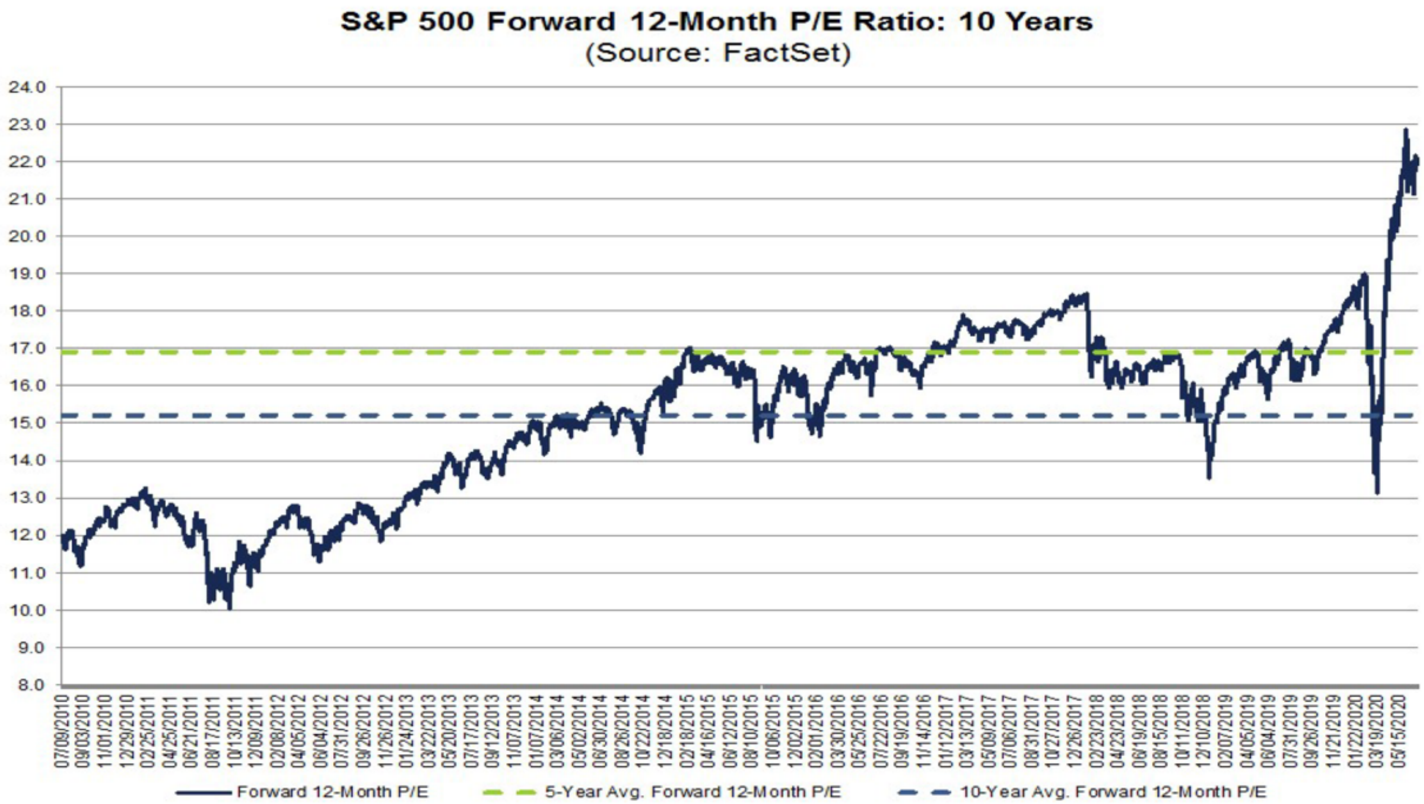
All sectors have generated sizable returns since the March trough in a broader based market rally

Top five stock are up 35% y-t-d, rest of the S&P 500 are down about 5%.

Source: Goldman Sachs Investment Strategy Group; Bloomberg

Equity Market Prospects

US Equity



- Stock market appears highly valued even given its forward-looking nature
- Current forward P/E is over 21
  - 5-year average is under 17
  - 10-year average is just over 15
  - Suggests markets are looking at earnings beyond a one-year timeframe

Source: Standard & Poor's, FactSet Earnings Insight,

Callan Periodic Table of Investment Returns

Annual Returns						Monthly Returns						
2014	2015	2016	2017	2018	2019	Jan 2020	Feb 2020	Mar 2020	Apr 2020	May 2020	Jun 2020	YTD 2020
Real Estate 15.02%	Large Cap Equity 1.38%	Small Cap Equity 21.31%	Emerging Market Equity 37.28%	U.S. Fixed Income 0.01%	Large Cap Equity 31.49%	U.S. Fixed Income 1.92%	U.S. Fixed Income 1.80%	U.S. Fixed Income -0.59%	Small Cap Equity 13.74%	Small Cap Equity 6.51%	Emerging Market Equity 7.35%	U.S. Fixed Income 6.14%
Large Cap Equity 13.69%	U.S. Fixed Income 0.55%	High Yield 17.13%	Dev ex-U.S. Equity 24.21%	High Yield -2.08%	Small Cap Equity 25.52%	Real Estate 0.84%	Global ex-U.S. Fixed Income -0.20%	Global ex-U.S. Fixed Income -3.22%	Large Cap Equity 12.82%	Large Cap Equity 4.76%	Small Cap Equity 3.53%	Global ex-U.S. Fixed Income 0.61%
U.S. Fixed Income 5.97%	Real Estate -0.79%	Large Cap Equity 11.96%	Large Cap Equity 21.83%	Global ex-U.S. Fixed Income -2.15%	Dev ex-U.S. Equity 22.49%	Global ex-U.S. Fixed Income 0.76%	High Yield -1.41%	High Yield -11.46%	Emerging Market Equity 9.16%	High Yield 4.41%	Dev ex-U.S. Equity 3.42%	Large Cap Equity -3.08%
Small Cap Equity 4.89%	Dev ex-U.S. Equity -3.04%	Emerging Market Equity 11.19%	Small Cap Equity 14.65%	Large Cap Equity -4.38%	Real Estate 21.91%	High Yield 0.03%	Emerging Market Equity -5.27%	Large Cap Equity -12.35%	Real Estate 7.06%	Dev ex-U.S. Equity 4.25%	Real Estate 2.57%	High Yield -3.80%
High Yield 2.45%	Small Cap Equity -4.41%	Real Estate 4.06%	Global ex-U.S. Fixed Income 10.51%	Real Estate -5.63%	Emerging Market Equity 18.44%	Large Cap Equity -0.04%	Large Cap Equity -8.23%	Dev ex-U.S. Equity -14.12%	Dev ex-U.S. Equity 6.97%	Emerging Market Equity 0.77%	Large Cap Equity 1.99%	Emerging Market Equity -9.78%
Emerging Market Equity -2.19%	High Yield -4.47%	Dev ex-U.S. Equity 2.75%	Real Estate 10.36%	Small Cap Equity -11.01%	High Yield 14.32%	Dev ex-U.S. Equity -1.94%	Real Estate -8.24%	Emerging Market Equity -15.40%	High Yield 4.51%	U.S. Fixed Income 0.47%	Global ex-U.S. Fixed Income 1.01%	Dev ex-U.S. Equity -11.49%
Global ex-U.S. Fixed Income -3.08%	Global ex-U.S. Fixed Income -6.02%	U.S. Fixed Income 2.65%	High Yield 7.50%	Dev ex-U.S. Equity -14.09%	U.S. Fixed Income 8.72%	Small Cap Equity -3.21%	Small Cap Equity -8.42%	Small Cap Equity -21.73%	Global ex-U.S. Fixed Income 2.04%	Global ex-U.S. Fixed Income 0.30%	High Yield 0.98%	Small Cap Equity -12.98%
Dev ex-U.S. Equity -4.32%	Emerging Market Equity -14.92%	Global ex-U.S. Fixed Income 1.49%	U.S. Fixed Income 3.54%	Emerging Market Equity -14.57%	Global ex-U.S. Fixed Income 5.09%	Emerging Market Equity -4.66%	Dev ex-U.S. Equity -8.88%	Real Estate -22.76%	U.S. Fixed Income 1.78%	Real Estate 0.23%	U.S. Fixed Income 0.63%	Real Estate -21.33%

Sources: Bloomberg Barclays Aggregate; Bloomberg Barclays Corp High Yield; Bloomberg Barclays Global Aggregate ex US; FTSE EPRA Nareit Developed; MSCI World ex USA; MSCI Emerging Markets; Russell 2000; S&P 500

Process Overview

Why Make Capital Market Projections?

Guiding objectives and process

Cornerstone of a prudent process is a long-term strategic investment plan

- Capital market projections are key elements — set reasonable return and risk expectations for the appropriate time horizon
- Projections represent our best thinking regarding the long-term (10-year) outlook, recognizing our median projections represent the midpoint of a range, rather than a specific number
- Develop results that are readily defensible both for individual asset classes and for total portfolios
- Be conscious of the level of change suggested in strategic allocations for long-term investors: DB plan sponsors, foundations, endowments, trusts, DC participants, families and individuals
- Reflect common sense and recent market developments, within reason

Callan's forecasts are informed by current market conditions, but are not built directly from them

- Balance recent, immediate performance and valuation against long-term equilibrium expectations

How are Capital Market Projections Constructed?

Guiding objectives and process

Underlying beliefs guide the development of the projections:

- An initial bias toward long-run averages
- A conservative bias
- An awareness of risk premiums
- A presumption that markets are ultimately clear and rational

Reflect our beliefs that long-term equilibrium relationships between the capital markets and lasting trends in global economic growth are key drivers to setting capital market expectations

Long-term compensated risk premiums represent “beta”—exposure to each broad market, whether traditional or “exotic,” with limited dependence on successful realization of alpha

The projection process is built around several key building blocks:

- Advanced modeling at the individual asset class level (e.g., a detailed bond model, an equity model)
- A path for interest rates and inflation
- A cohesive economic outlook
- A framework that encompasses Callan beliefs about the long-term operation and efficiencies of the capital markets

How are Capital Market Projections Constructed?

Projections are 10-year forward-looking, representing a medium to long-term planning horizon:
- Differs from the actuarial assumptions, which tend to reflect longer-term horizons of 30-40 years

Projections consist of return and two measures that contribute to portfolio volatility: standard deviation and correlation

Cover most broad asset classes and inflation
- Broad U.S. equity
  - *Large cap*
  - *Small/mid cap*
- Non-U.S. equity
  - *Developed markets*
  - *Emerging markets*
- U.S. fixed income
  - *Short duration*
  - *Broad market*
  - *TIPS*
  - *High yield*
  - *Long duration*
- Non-U.S. fixed income
- Real estate and other real assets
- Alternative investments
- Cash
- Inflation

How Does the Process Work?

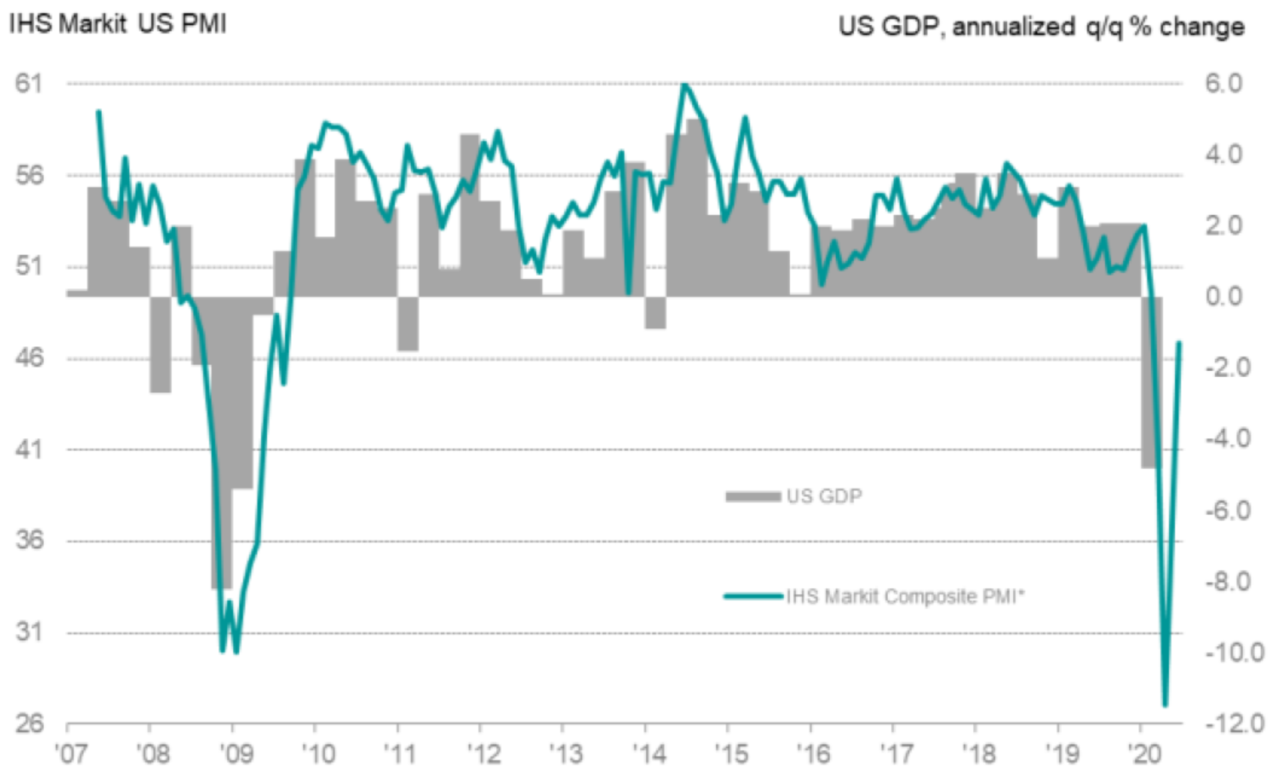
Start in summer, release assumptions at the beginning of the new year

- Data, thesis, and goals
  - Has our thesis changed?
  - Purpose of the assumptions: long-term strategic planning
    - *Impact of changes to assumptions on investor behavior*
  - What has changed in the capital markets in one year to warrant revision to long-term expectations?
- Agreement on inflation, path to future interest rates, targets for segments of the fixed income market
  - Bond model to test scenarios and develop range of expectations
- Equity: real returns, risk premia, relation to fixed income expectations, change in valuation (if compelling)
  - Model to incorporate income, appreciation, any valuation change
- Set path for 2020 – 2029
- Test and tune assumptions across range of reasonable asset mixes
  - Incorporate volatility to examine potential breadth of outcomes
- Would we change our 10-year assumptions during the course of the year?

Economic Dislocation and the Outlook

The Stock Market is Not the Economy

Economic Growth Seriously Impaired in Q2



*Manufacturing only pre-October 2009

- US Purchasing Managers' Index (US PMI) provides a good proxy for future GDP
- Initial decline in PMI mirrored by sharp decline in Q1 GDP; projections for Q2 US GDP at -35% annualized
- PMI has rebounded
  - Still forecasting negative growth but much closer to 0 than the May survey
  - Reflects data through June 23

Source: IHS Markit Flash U.S. Composite PMI™

Market Environment 2Q20: Global Economy

Following a brutal March and April, a handful of key economic measures rebounded in May and June, beating expectations and fueling optimism. However, most have yet to recoup the losses incurred and a high degree of uncertainty remains as to the path over the foreseeable future. Global fiscal and monetary stimulus was swift and massive, helping to bolster confidence and liquidity and fueling an appetite for riskier assets.

U.S.

1Q GDP contracted 5.0%, 2Q is expected to be far worse

- 2Q estimates vary and are fluid, but range from –30% to -40% (annualized)
- Initial 2Q GDP number to be released on July 30th

Some measures rebounded, but have not fully recovered:

- Retail sales grew a record 18% in May (-6% yoy)
- Durable goods orders up 16% in May (-18% yoy)
- Personal spending rose 8% in May (-9% yoy)
- Hotels, restaurants, airlines and many small businesses were among the hardest-hit

Unemployment (11.1% in June) remains elevated

- Jobless claims, around 1.5 million per week, have decelerated

Housing received a boost from relatively low mortgage rates

- Pending home sales up 44% in May (down 5% yoy)

Fed left rates close to 0% and expects to be on hold until at least 2022

Speed and size of stimulus programs unprecedented

- Stimulus programs approach $3 trillion (about 14% of GDP)
- Fed balance sheet roughly $7 trillion
- Fed budget deficit was $2.7 tn in the first 9 mos of FY 2020, $2 tn more than the same period last year (CBO estimates)

Overseas

Euro zone

- 1Q GDP contracted 3.8%, largest quarterly drop on record
- Economic activity showed improvement as Eurozone PMI for June rose to 47.3 (30.5 in May; 13.5 in April)
- European Commission support included €750 bn recovery fund plus €540 bn rescue package
- ECB expanded pandemic emergency purchase program to €1.35 trillion

U.K. GDP sank 20% in April, most ever

- Bank of England expanded its quantitative easing program; negative rates were under "active review"
- Brexit returned to the agenda as the deadline passed for an extension of the transition period, which expires on 12/31/2020

Japan's economy shrank 4.4% in April

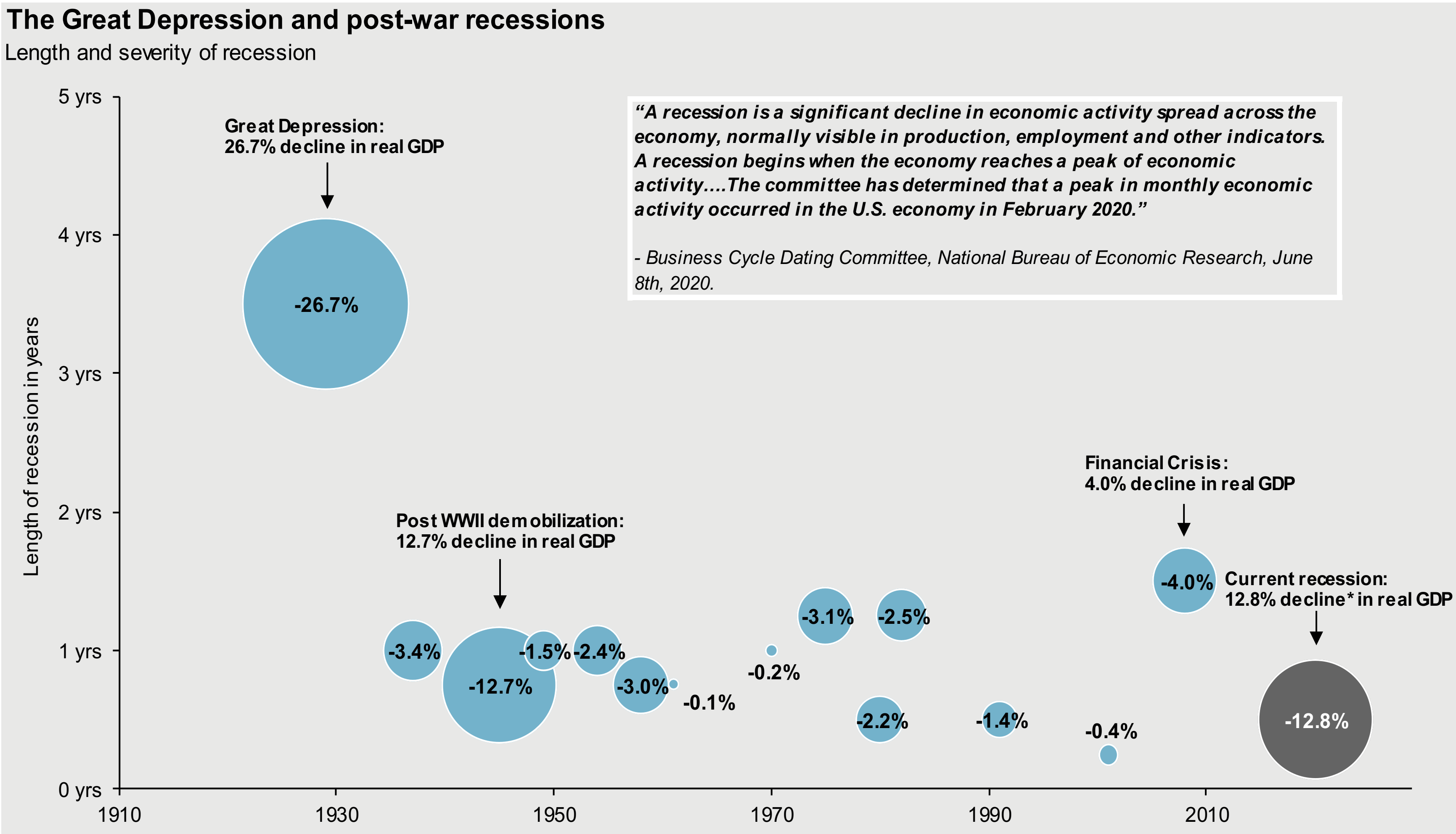
- Bank of Japan increased its stimulus from $700 billion to $1 trillion in June

China's GDP fell 6.8% in Q1, first contraction in 28 yrs

- Chinese government unveiled fiscal stimulus of US$506 bn, bringing budget deficit to a record high of 3.6% of GDP
- Growth is expected to be positive in 2Q
- Geopolitical concerns increased as the US moved to end its special treatment of Hong Kong after China announced the imposition of a national security law in Hong Kong

Size and Duration of U.S. economic recessions

Current recession rivals that of the Post-WW II demobilization; worst in half a century

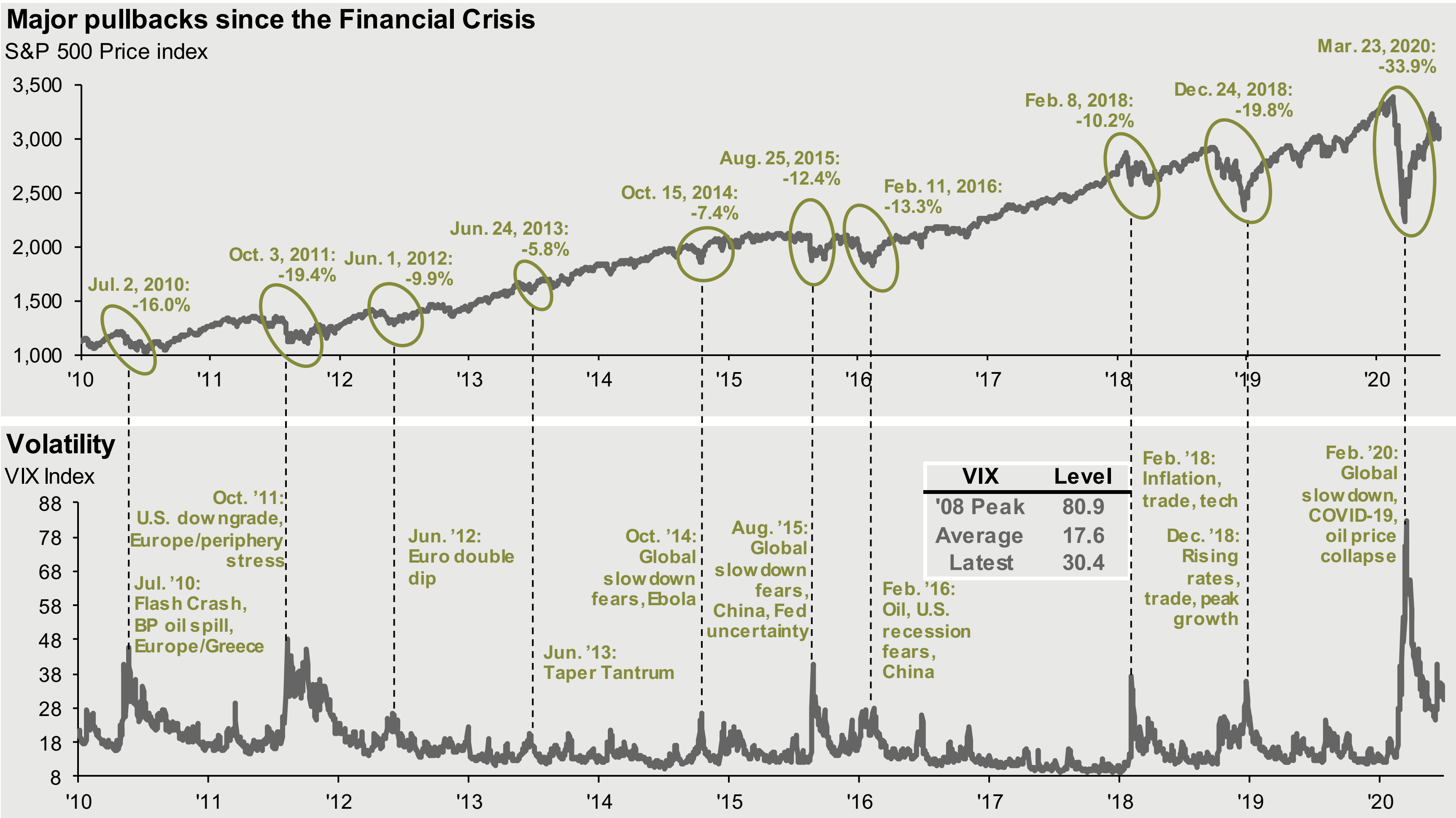


Source: BEA, NBER, J.P. Morgan Asset Management.
Bubble size reflects the severity of the recession, which is calculated as the decline in real GDP from the peak quarter to the trough quarter except in the case of the Great Depression, where it is calculated from the peak year (1929) to the trough year (1933), due to a lack of available quarterly data. *Current recession reflects JPMAM estimate of peak to trough decline for the recession beginning after February 2020 according to the NBER.

Guide to the Markets – U.S. Data are as of June 30, 2020.

Unprecedented Spike in Volatility

VIX reaches record high of 82.69

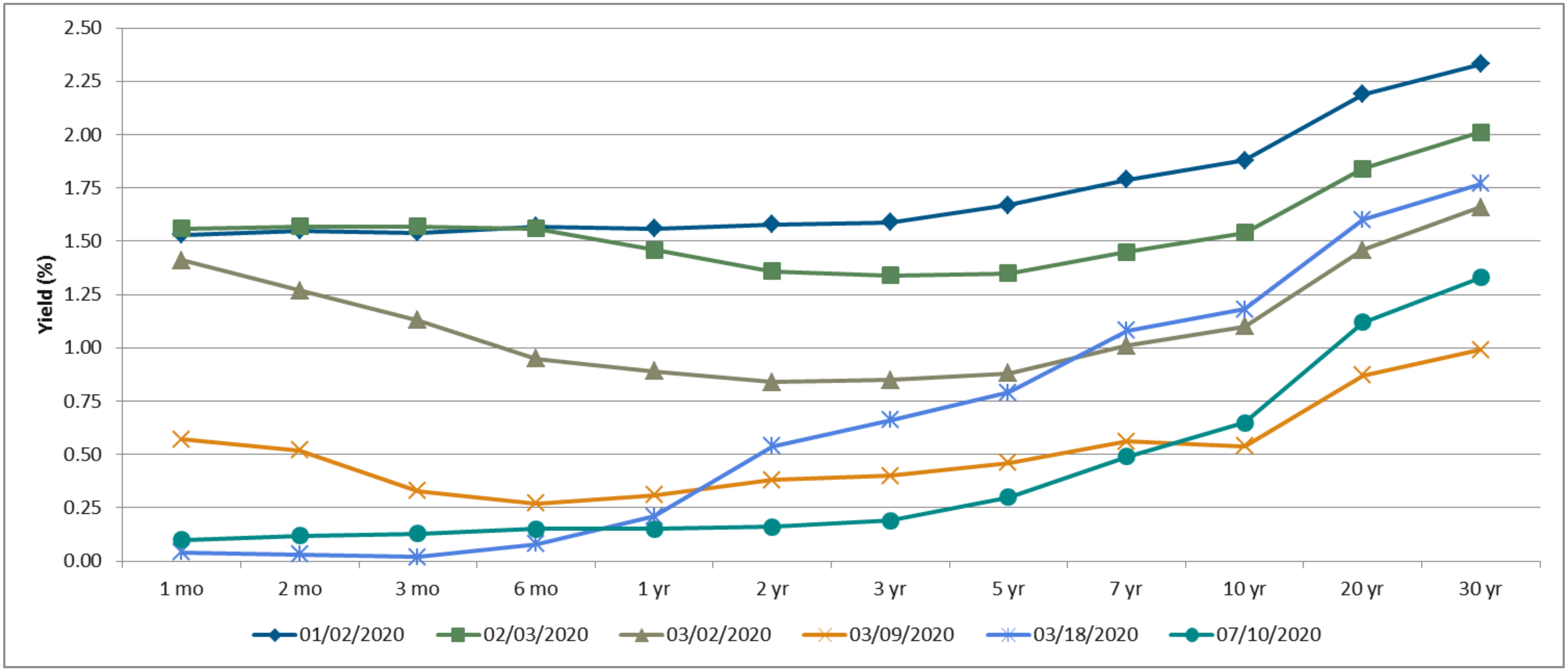


VIX	Level
'08 Peak	80.9
Average	17.6
Latest	30.4

Source: CBOE, FactSet, Standard & Poor's, J.P. Morgan Asset Management.
Drawdowns are calculated as the prior peak to the lowest point.
Guide to the Markets – U.S. Data are as of June 30, 2020.

US and Global Economic Conditions

Treasury yield curve shape shifting: a moving target

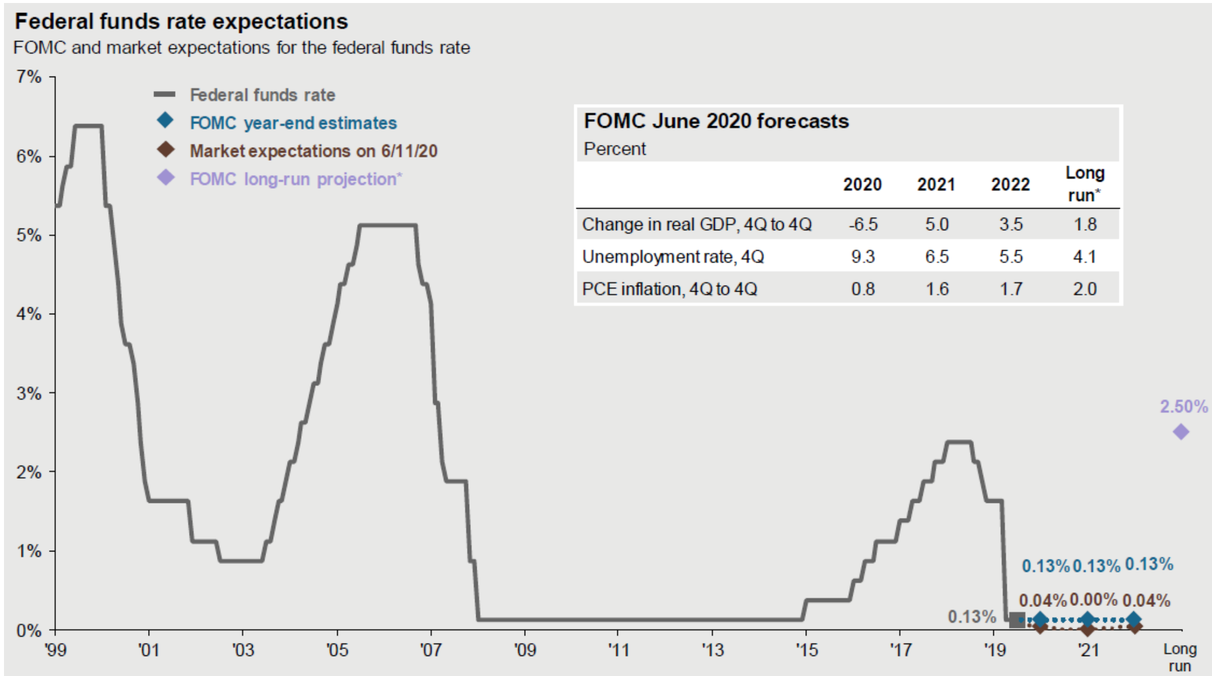


- The Treasury yield curve contains an implicit broad economic forecast
  - Steeper yield curves (long-term rates higher than short-term rates) suggest stronger anticipated growth
- The shape of the Treasury yield curve has varied quickly and substantially since the beginning of 2020
  - Curve shifted down dramatically early in crisis
  - Current yield curve still low on the short end and upward sloping but not steep

Source: U.S. Department of Treasury

Government Intervention

Monetary Policy



Source: Bloomberg, FactSet, Federal Reserve, J.P. Morgan Asset Management.
Market expectations are the federal funds rates priced into the fed futures market as of the following date of the June 2020 FOMC meeting and are through December 2022. *Long-run projections are the rates of growth, unemployment and inflation to which a policymaker expects the economy to converge over the next five to six years in absence of further shocks and under appropriate monetary policy.
Guide to the Markets – U.S. Data are as of July 6, 2020.

J.P.Morgan
Asset Management

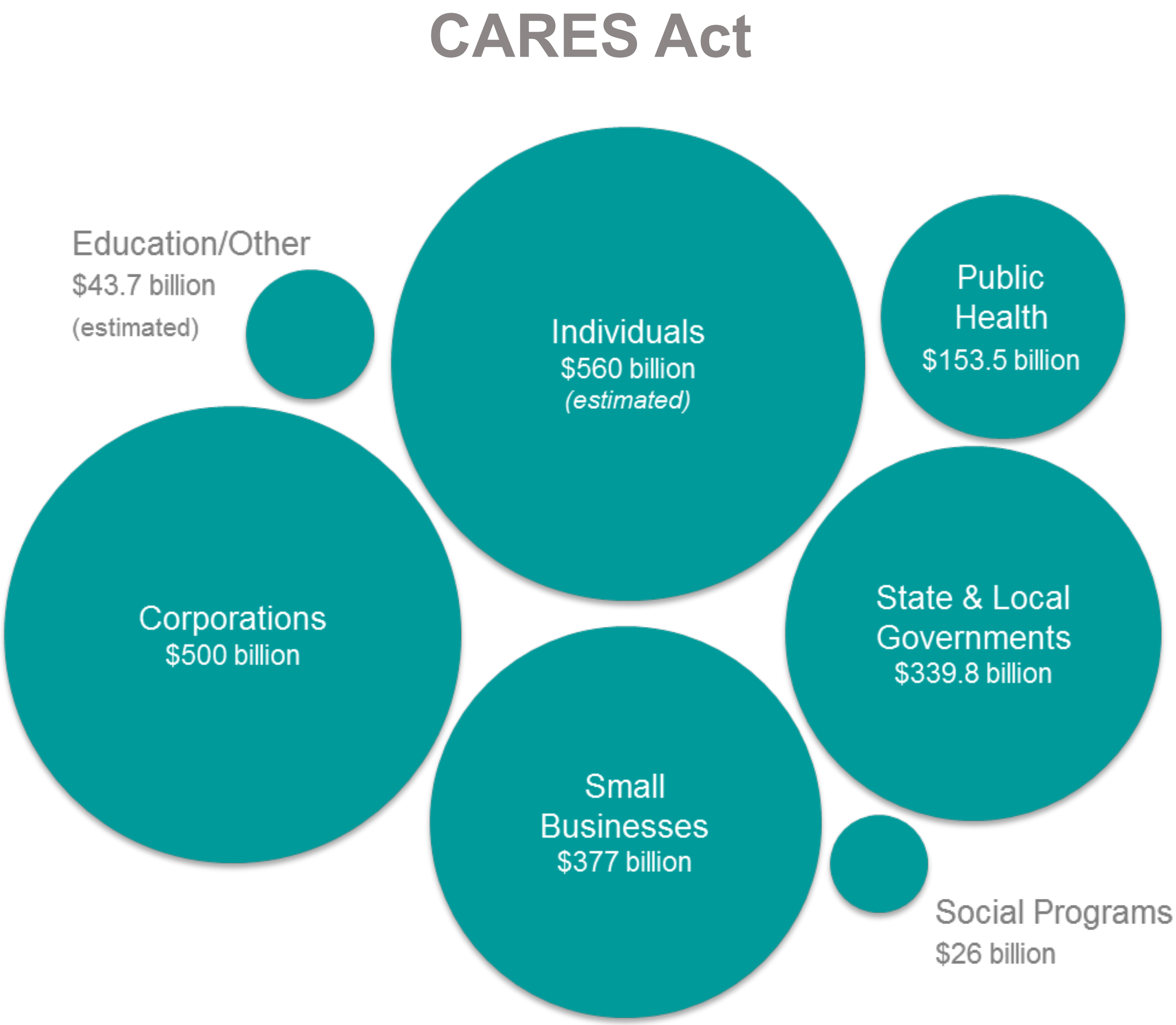
- The Federal Reserve Open Market Committee voted to continue 0% Fed Funds Rate at June meeting
- Median FOMC member forecast expect to continue the zero interest rate policy for years
- Markets do not expect the Fed to raise the rate in the near future

Source: Federal Reserve, J.P. Morgan Guide to the Markets U.S.

Government Intervention

US Fiscal Policy

- "Phase I" $8 billion
  - Medical treatments and testing
- "Phase II" $104 billion
  - Expanded worker benefits
  - Food assistance
- CARES Act ("Phase III") $2 Trillion
  - Equates to roughly 10% of GDP
  - Expanded Unemployment Benefits
  - Cash Distributions of up to $1,200
  - Student Loan Relief
  - Federally-Backed Home Loan Forbearance
  - Defined Contribution Plan Liquidity
  - Airline industry relief
  - Small business loans, grants and loan relief
- "Phase IV" $484 billion
  - Additional small business loans
  - Funding for testing and hospitals
- What's next?
  - State and local government
  - Extend UI benefits? Additional cash?
  - What other industries? Health care?



Source: The National Law Review, https://www.natlawreview.com/article/president-trump-signs-law-coronavirus-aid-relief-and-economic-security-cares-act, NPR.org

Our Advice to Investors

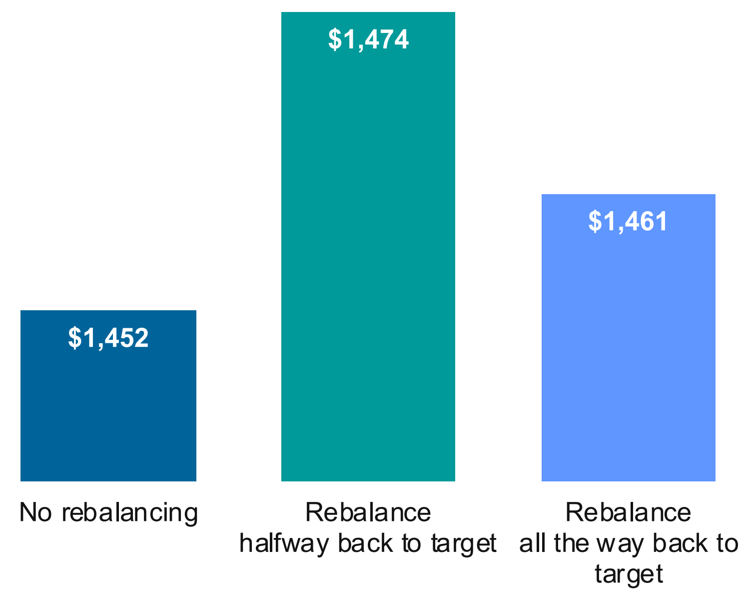
It's early innings: remain true to your investment discipline

- People are still in shock and assessing their situations. The situation is unprecedented.
- Investors are asking: Did we do something wrong?
- This event may serve to be a test of investors' risk tolerance.

Our counsel to investors: follow your disciplined process

- Reevaluate liquidity. Benefit payments or spending, and capital calls.
- Rebalance
- Look for impairments or unexpected performance in your portfolio
- Watch for opportunities inside your portfolio and across the capital markets
- Conduct scenario analysis and stress testing

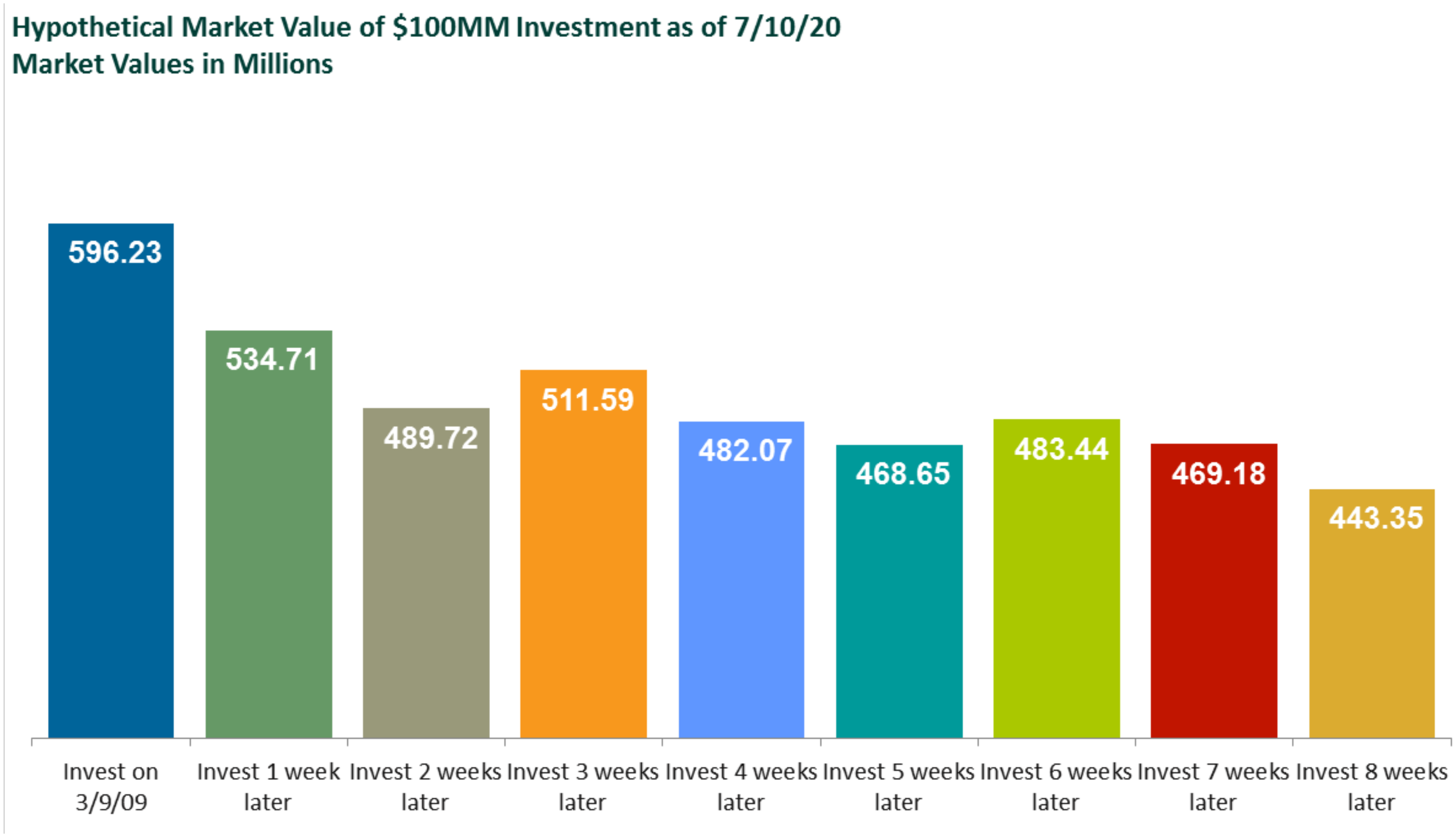
Growth of $100mm invested in 60% S&P 500 / 40% Bloomberg Aggregate Portfolio
Market values in millions
January 1, 1989 – April 9, 2020



Source: Callan LLC

Market Timing is Hard

Ultimate goal: Make it out to the other side of this crisis



- Finding the right entry point and the tradeoff of staying on the sidelines
- Difficulty of Timing the Market: Late Entry Point
  - Since it is not realistic to miss the best trading days, which are spread out over many years, consider the opportunity cost of staying on the sidelines following a large downturn.
  - Picking the right entry point can be difficult and the early days of a recovery matter a lot.

Source: Standard & Poor's, Callan LLC

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Detailed 2020 Expectations and Resulting Portfolio Returns and Risks

What's the Impact of the Pandemic Situation on Capital Market Expectations?

Short answer – None at this point

Long answer – remind ourselves of the purpose of capital market expectations

- Long-term strategic assumptions
- Shape portfolios to honor investors' tolerance for risk
- Create range of scenarios for expected 10-year outcomes – always include at least one recession
- If we alter our assumptions, are we then suggesting changes in portfolio design?
- Specific scenario analysis more useful: shape of recovery

What we're paying attention to …

- Extent to which this shock becomes a financial crisis, and the shape of global economic recoveries
- The stock market is not the economy, and V-shaped equity recovery may be ahead of itself
- Return of zero interest rate policy and the role of fixed income

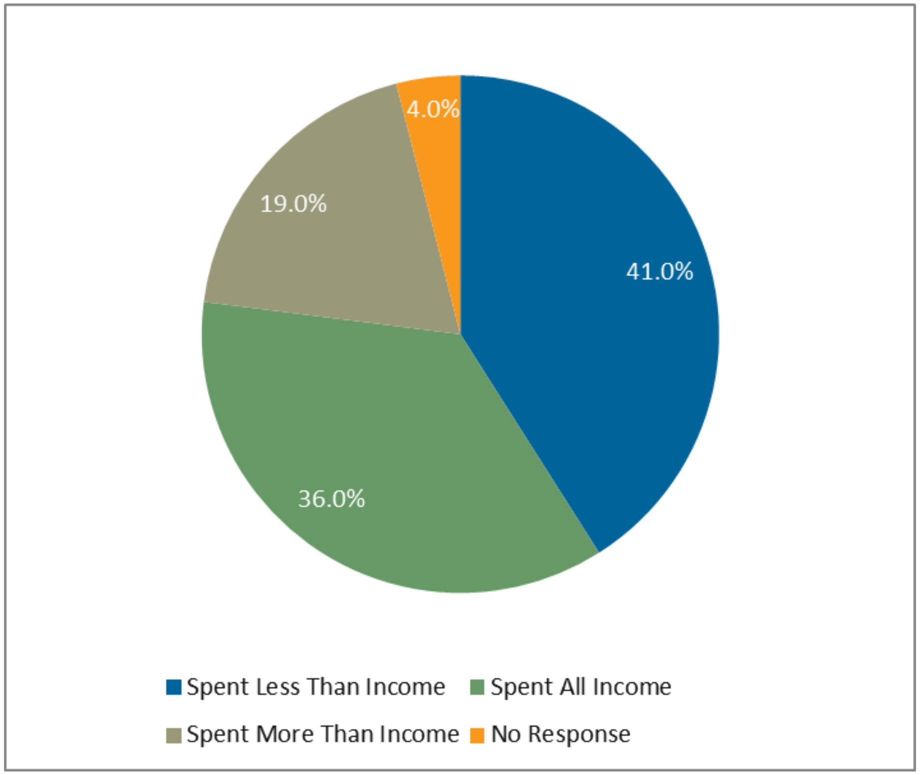
How might revisions take shape…

- Can see equity markets finish 2020 down 5% to 10%, bonds up 5-6%, economy moving toward recovery
- At least a year until we regain US and global GDP levels, likely into 2022, same for employment
- Equity returns supportable at 6-7% over 10 years, but that suggests a high premium over a more subdued outlook for fixed income
  - Equity looks rich, but the stimulus efforts are certainly friendlier to future equity returns than to fixed income

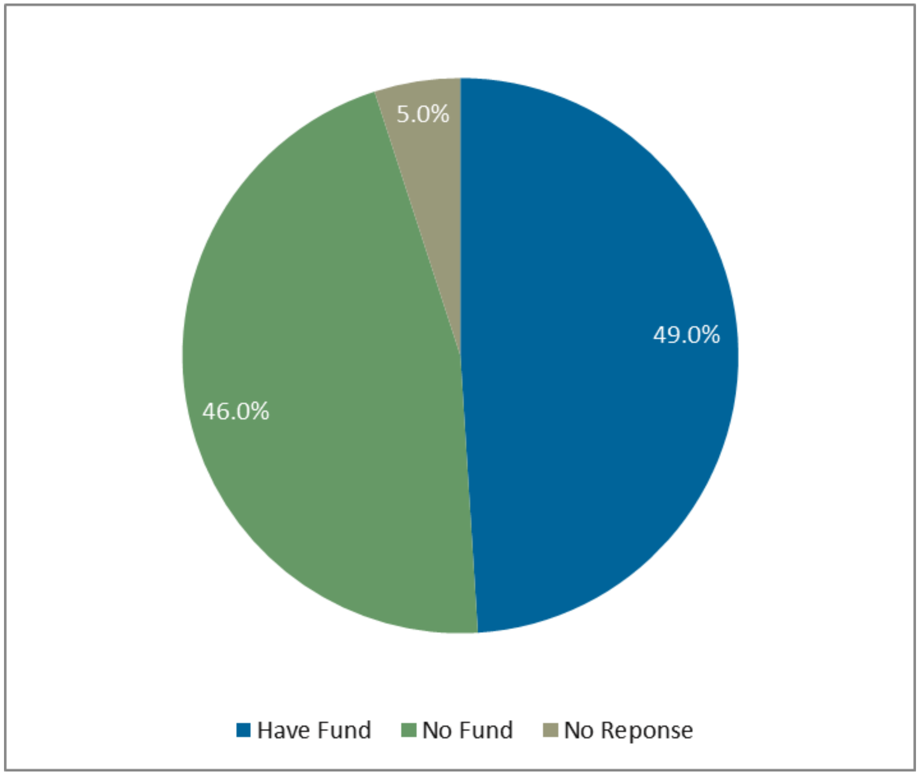
What We Are Paying Attention To – Resilience of Individuals

Lack of Financial Backstop Troubling As Economy Struggles to Reopen

Household Spending



Rainy Day Fund



- Many Have Insufficient Income Prior to Crisis
  - 45% spend all or more than their income
- Less Than Half Can Draw On Savings
  - 46% have no emergency reserves

Source: FINRA Investor Education Foundation, National Financial Capability Study, https://www.usfinancialcapability.org/results.php?region=US

Callan Scenarios Analysis – Shape of Potential Recovery

	Baseline	V-Shaped	U-Shaped	L-Shaped
Description	- Callan 2020 – 2029 Capital Market Assumptions (CMAs) established in Fall, 2019 - Callan CMAs implicitly reflect the possibility of recessions	- Global economy is fully re-opened in 2020Q3 - Optimistic scenario - Fiscal and monetary policy is effective - Job recovery is quick	- Global economy is not fully re-opened until 2021Q1 - Scenario that falls between V-Shaped and L-shaped scenarios	- Global economy is not fully re-opened until 2021Q3 - Fiscal and monetary stimulus is unprecedented and low rates remain for a long time - Job destruction takes years to recover, while consumer demand is slow to resume - Low inflationary regime
Time to Open		2 quarters	4 quarters	6 quarters
Equity Year 1	7.0%	-20%	-38%	-38%
Equity Year 2	7.0%	+30%	+9%	-25%
Equity Year 3 *	7.0%	+17%	+27%	+15%
10-Year Annualized				
Equities	7.0%	7.0%	3.3%	-1.5%
BB Aggregate	2.8%	2.1%	2.0%	1.8%
Long Government	1.8%	1.0%	1.2%	3.3%

** 7.0% return per year for each scenario thereafter*

Source: Callan LLC

Shape of Future Capital Market Projections

Fixed income is the conundrum

Massive monetary and fiscal intervention will change the landscape:

- New yield environment and the capital markets going forward favor growth
- Purpose of capital market expectations: tailor portfolios to meet investor tolerance for risk across a range of outcomes

Why hold fixed income?

- Diversify equity
- Flight to quality
- Low volatility
- Generate income, and a small positive return
- What can serve as an equity diversifier equal to bonds with the return of zero interest rates? Are we willing to pay for the benefit of fixed income?

Fixed Income Going Forward

Return on the BB Aggregate for the year heading toward 7%

- Pulled return for the next two years forward
- Yield is now 1.2%, current yield is a key driver of future return
- Duration is up to 6.1 years, above long-term average; yield per unit of duration is very low = higher risk

Yields likely to remain low under zero interest rate policy for some time

- If we still believe in the benefit of holding fixed income, may be forced to take a hard look at alternatives to traditional investment-grade fixed income
  - Attendant higher and different risks outside of traditional investment grade – credit, implementation, illiquidity
  - Active management in pursuit if alpha – another set of attendant risks
  - Leverage – magnifies the results, both returns and risks
    - *Not magic, no free lunch, and not for everyone*
  - TIPS and global linkers – contain an optionality with a floor to deflation
    - *May be appealing if we move into a negative rate environment*
- Spread between equity and bonds would widen if we lower fixed income returns without lower equity
  - Lower capital market opportunity set a great challenge to many public investment programs

2020 Callan Capital Market Assumptions – Base Line

Risk and return: 2020–2029

Asset Class	Index	PROJECTED RETURN 1-Year Arithmetic	PROJECTED RETURN 10-Year Geometric*	PROJECTED RETURN Real	PROJECTED RISK Standard Deviation	Projected Yield
Equities						
Broad U.S. Equity	Russell 3000	8.55%	7.15%	4.90%	18.10%	2.00%
Large Cap U.S. Equity	S&P 500	8.35%	7.00%	4.75%	17.70%	2.10%
Small Cap U.S. Equity	Russell 2500	9.25%	7.25%	5.00%	21.20%	1.55%
Global ex-U.S. Equity	MSCI ACWI ex USA	9.10%	7.25%	5.00%	20.50%	3.10%
Developed ex-U.S. Equity	MSCI World ex USA	8.70%	7.00%	4.75%	19.70%	3.25%
Emerging Market Equity	MSCI Emerging Markets	10.25%	7.25%	5.00%	25.70%	2.65%
Fixed Income						
Short Duration Gov't/Credit	Bloomberg Barclays 1-3 Yr G/C	2.70%	2.70%	0.45%	2.10%	2.85%
Core U.S. Fixed	Bloomberg Barclays Aggregate	2.80%	2.75%	0.50%	3.75%	3.40%
Long Government	Bloomberg Barclays Long Gov	2.55%	1.80%	-0.45%	12.50%	3.40%
Long Credit	Bloomberg Barclays Long Cred	3.75%	3.25%	1.00%	10.50%	5.05%
Long Government/Credit	Bloomberg Barclays Long G/C	3.25%	2.75%	0.50%	10.60%	4.45%
TIPS	Bloomberg Barclays TIPS	2.50%	2.40%	0.15%	5.05%	3.15%
High Yield	Bloomberg Barclays High Yield	5.10%	4.65%	2.40%	10.25%	7.30%
Global ex-U.S. Fixed	Bloomberg Barclays Glbl Agg xUSD	1.30%	0.90%	-1.35%	9.20%	2.05%
Emerging Market Sovereign Debt	EMBI Global Diversified	4.70%	4.35%	2.10%	9.50%	6.70%
Other						
Core Real Estate	NCREIF ODCE	7.05%	6.25%	4.00%	14.00%	4.75%
Private Equity	Cambridge Private Equity	12.00%	8.50%	6.25%	27.80%	0.00%
Hedge Funds	Callan Hedge FOF Database	5.25%	5.00%	2.75%	8.70%	0.00%
Commodities	Bloomberg Commodity	4.50%	2.75%	0.50%	18.00%	2.25%
Cash Equivalents	90-day T-bill	2.25%	2.25%	0.00%	0.90%	2.25%
Inflation	CPI-U		2.25%		1.50%	

Note that return projections for public markets assume index returns with no premium for active management.

- Geometric returns are derived from arithmetic returns and the associated risk (standard deviation); Projected yields represent the expected 10-year average
  Source: Callan

2020 Callan Capital Market Assumptions

Correlation: 2020 - 2029

	Lg Cap	Sm/Mid	Dev ex-US	Em Market Eq	Sht Dur	Core Fix	Long Gov	Long Credit	TIPS	Hi Yield	Global ex-US Fixed	EMD	Core Real Estate	Private Equity	Hedge Funds	Comm	Cash Equiv	Inflation
Large Cap U.S. Eq	1.000																	
Small/Mid Cap U.S. Eq	0.915	1.000																
Dev. ex-U.S. Eq	0.765	0.775	1.000															
Emerging Market Eq	0.775	0.765	0.845	1.000														
Short Duration	-0.040	-0.065	-0.050	-0.080	1.000													
Core U.S. Fixed	-0.100	-0.125	-0.105	-0.140	0.845	1.000												
Long Government	-0.100	-0.125	-0.110	-0.170	0.770	0.900	1.000											
Long Credit	0.300	0.275	0.230	0.230	0.640	0.840	0.750	1.000										
TIPS	-0.040	-0.075	-0.050	-0.085	0.555	0.640	0.530	0.480	1.000									
High Yield	0.600	0.585	0.570	0.560	-0.030	0.030	-0.100	0.400	0.055	1.000								
Global ex-U.S. Fixed	0.010	0.000	0.050	0.100	0.495	0.530	0.470	0.540	0.400	0.120	1.000							
EM Sovereign Debt	0.530	0.515	0.515	0.545	0.050	0.110	-0.010	0.350	0.180	0.600	0.010	1.000						
Core Real Estate	0.695	0.665	0.660	0.625	-0.005	-0.035	-0.045	0.320	0.000	0.455	-0.050	0.360	1.000					
Private Equity	0.830	0.805	0.795	0.765	-0.160	-0.185	-0.250	0.190	-0.135	0.525	0.060	0.425	0.600	1.000				
Hedge Funds	0.775	0.750	0.745	0.720	0.055	0.100	0.120	0.390	0.085	0.560	-0.050	0.540	0.525	0.635	1.000			
Commodities	0.220	0.210	0.205	0.200	-0.195	-0.100	-0.030	-0.045	0.120	0.100	0.150	0.190	0.200	0.180	0.210	1.000		
Cash Equivalents	-0.030	-0.045	-0.030	-0.065	0.300	0.100	0.040	-0.100	0.120	-0.110	0.000	-0.070	-0.060	0.000	-0.070	0.070	1.000	
Inflation	-0.020	0.020	0.000	0.030	-0.205	-0.280	-0.250	-0.250	0.100	0.070	-0.100	0.000	0.100	0.060	0.200	0.400	0.000	1.000

– Relationships between asset classes are as important as standard deviation
– To determine portfolio mixes, Callan employs mean-variance optimization
– Return, standard deviation, and correlation determine the composition of efficient asset mixes

Source: Callan

2020 Callan Capital Market Assumptions: Efficient Mixes

Subdued returns even for higher risk portfolios

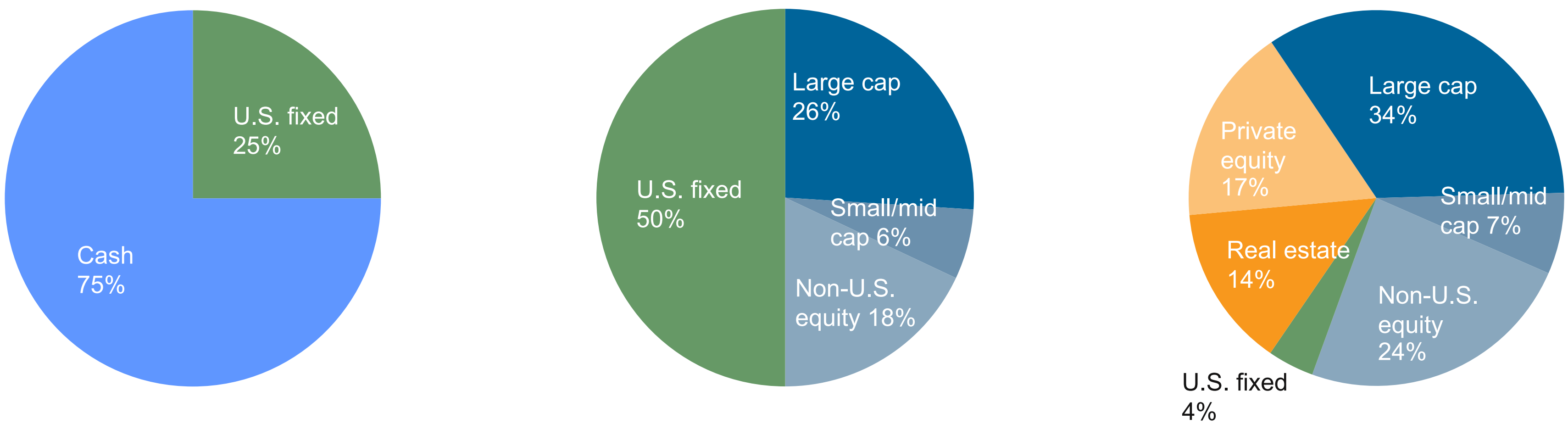
- A portfolio with approximately 40% fixed income is expected to earn 6.0% over the next 10 years.
- The fixed income allocation has to fall below 20% to earn more than 7%.
- Total alternatives allocations in excess of 15% are common for diversified asset mixes.
- Private equity is constrained to be no more than 25% of the total public equity exposure. The purpose of the constraint is to hold private equity to a relative share of total equity that is appropriate at each place along the efficient frontier. The assumed premium for private equity would cause an unconstrained optimization to allocate a disproportionate amount to private equity that would be neither prudent nor implementable.

	Constraints		Optimal Mixes					
Asset Classes	Min	Max	Mix 1	Mix 2	Mix 3	Mix 4	Mix 5	Mix 6
Broad U.S. Equity	0	100	15	19	23	28	33	39
Global ex-U.S. Equity	0	100	9	12	15	18	21	25
Core U.S. Fixed	0	100	60	50	40	29	17	4
Core Real Estate	0	100	5	6	8	10	11	13
Hedge Funds	0	100	5	5	5	4	4	3
Private Equity	0	100	6	8	9	11	14	16
Totals			100	100	100	100	100	100
Projected Arithmetic Return			5.14	5.74	6.38	7.08	7.85	8.72
Projected Standard Deviation			6.88	8.50	10.32	12.34	14.59	17.17
10 Yr. Geometric Mean Return			5.00	5.50	6.00	6.50	7.00	7.50
Public Equity			24	31	38	46	54	64
Public Fixed Income			59	50	40	29	17	4
Alternatives			16	19	22	25	29	33

Source: Callan

7.5% Expected Returns Over Past 30+ Years

Increasing Complexity



1989		2004		2020	
Return:	**7.5%**	**Return:**	**7.5%**	**Return:**	**7.5%**
Risk:	**3.1%**	**Risk:**	**8.9%**	**Risk:**	**17.2%**

Increasing Risk

In 1989, our expectations for cash and broad U.S. fixed income were 6.80% and 9.35%, respectively

Return-seeking assets were not required to earn 7.5%

15 years later, an investor would have needed half of the portfolio in public equities to achieve 7.5%, nearly tripling the portfolio volatility of 1989

Today an investor is required to include 96% in return-seeking assets to earn 7.5% at over 5x the volatility compared to 1989

Source: Callan

What is the Appropriate Time Horizon for Setting Return Expectations?

Pre-COVID 19, consensus was that the economic cycle was long in the tooth

- Assets had become richly valued after strong 2019
- Downturn in the capital markets is imminent and inevitable
- Recession call was for 2020, but only a mild decline
- Growing chorus to “do something” – de-risking a common theme across investor types

Should long-term investors respond to short-term market movements and changes in valuation?

- Only when they reach an extreme
- Pessimistic capital market expectations overly reliant on current situation result in unfortunate consequences
  - Excessive risk taking when we may not believe it will be rewarded
  - Pursuit of the bright shiny object regardless of fit or understanding

Market cycles are inevitable and should be expected

- Long-term strategic plans already incorporate expected corrections and recessions
- The path to a long-term return is through shorter-term periods of boom and bust

Time horizon is everything

- Is 10 years sufficient for a long-term investor?
  - Should portfolios differ whether you have a 10-year outlook or are focused on a long-term equilibrium return?
  - How about 5 years?


Questions?

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