[3] The magnitude of Central Bank and Federal Gov't monetary/fiscal stimulus; equity and fixed income valuations, flows and positioning; a history of market bottoms

The first table compares the enormous amount of monetary and fiscal stimulus unleashed by the Federal Reserve and other Central Banks in recent weeks, measured as Central Bank liquidity provisions, new fiscal stimulus programs and rate cuts. For context, new fiscal stimulus and total fiscal deficits in the US are roughly double the levels seen in 2008-2009, and the US fiscal deficit we project for 2020 of 15%-18% is only matched by deficits seen at the height of WWII in 1942-1943.

Country	Central Bank Liquidity Injection US$ trillions	Central Bank Liquidity Injection GDP %	New Govt Fiscal Stimulus US$ trillions	New Govt Fiscal Stimulus GDP %	Rate cuts basis points
United States	$4.80	22.4%	$2.82	13.1%	-150
Eurozone	$1.10	8.3%	$1.76	13.2%	
Japan	$0.20	3.9%	$0.99	19.2%	
United Kingdom	$0.25	9.0%	$0.14	5.1%	-65
China	$1.29	9.0%	$0.54	3.8%	-100
Others	$0.65		$1.85		
Total	**$8.29**	**9.6%**	**$8.10**	**9.4%**	

Source: Cornerstone, JPM Economic Research. Apr 15, 2020. Others include: RoW, Asian Development Bank, IMF, World Bank.

The amounts of stimulus and support for markets cannot be fully captured by the chart above. To do that, one would have to add up all of the Asset Purchase commitments, Direct Lending programs and Guarantee/Backstop programs as well. For the Fed, that amounts to around $8 trillion.

Federal Reserve Programs to Support Credit (US$, Billions)

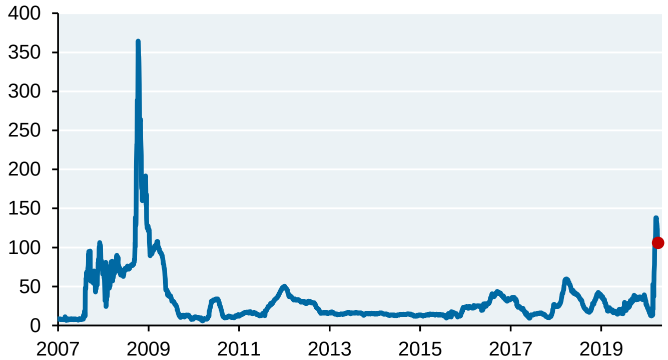
Targeted Sector & Policy	Asset Purchases	Direct Lending	Guarantee/Backstop	
Government				
QE Treasury Purchases	$2,200			
Commercial Paper Funding Facility (Muni CP)			$30	
Households				
QE MBS Purchases	$1,000			
TALF (Consumer ABS Purchases)	$100			
Businesses				
Commercial Paper Funding Facility (Non-Fin Corp CP)			$240	
Primary Market Corporate Credit Facility		$500		**New**
Secondary Market Corporate Credit Facility	$250			**New**
Paycheck Protection Program Lending Facility	$350			**New**
Municipal Liquidity Facility		$500		**New**
Main St Loan Facility		$600		**New**
Financials/Liquidity				
Repo Operations		$200		
Commercial Paper Funding Facility (Fin + ABCP)			$640	
Money Market Mutual Fund Liquidity Facility			$1,400	
Total by type of program	$3,900	$1,800	$2,310	
Cumulative Total			**$8,010**	
Other Fed facilities include the revival of the Primary Dealer Credit Facility for broker-dealers, and FX swap lines for developed and developing economy central banks.				

Source: Bridgewater, J.P. Morgan Asset Management. April 2020.

Measuring the Fed's ability to alleviate a credit crunch. Spread increases are in many cases much smaller than in 2008, which reflects improvements in the plumbing and capitalization of the banking sector. **Note in the 6th chart how bank spreads have barely budged relative to non-bank investment grade issuers**.

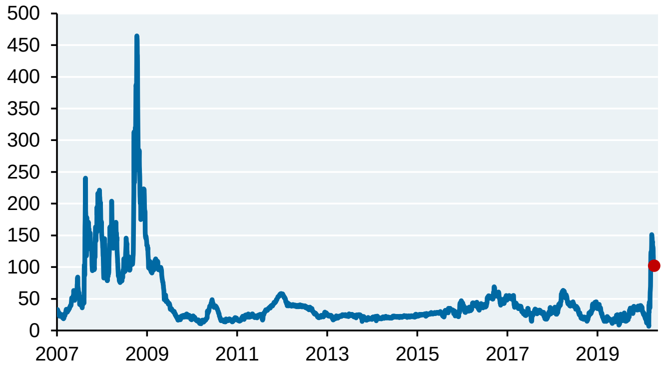
The new facilities include loans, asset purchases and relaxed accounting standards for banks, all of which are designed to reduce selling pressure and improve the flow and cost of credit. We see value in investment grade credit, select municipal issuers and upper tier non-energy high yield. Red dots indicate current levels.

3 month LIBOR - 3 month forward Fed Funds rate
basis points



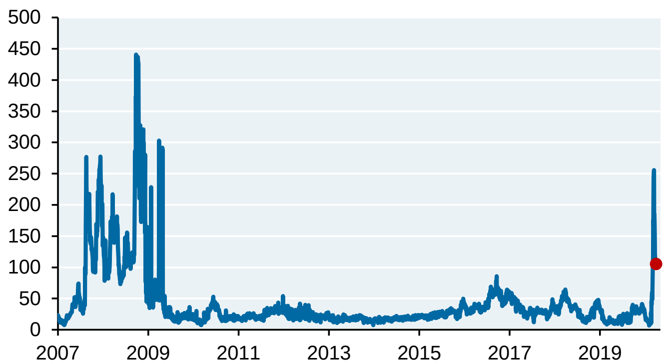
Source: Bloomberg. April 15, 2020.

US 3 month Libor - 3 month Treasury (TED spread)
basis points



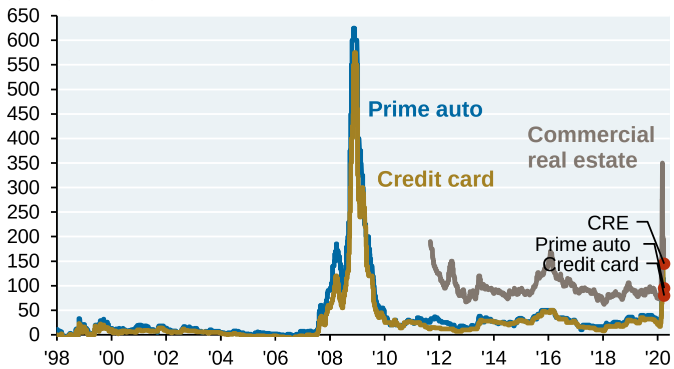
Source: Bloomberg. April 15, 2020.

US asset backed commercial paper - 3 month Treasury
basis points



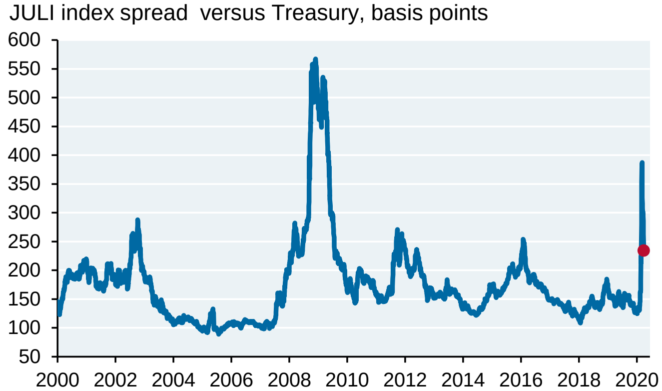
Source: Bloomberg. April 09, 2020.

AAA asset backed securities spreads
basis points, spread versus Treasury



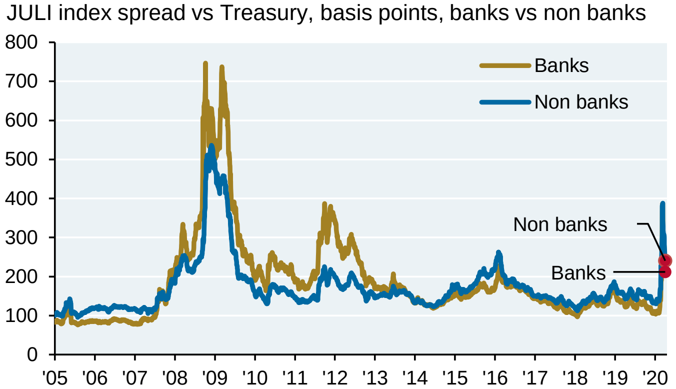
Source: J.P. Morgan. April 14, 2020.

US investment grade corporate bond spreads
JULI index spread versus Treasury, basis points



Source: Bloomberg, J.P. Morgan. April 14, 2020.

Financial & Non financial investment grade bond spreads
JULI index spread vs Treasury, basis points, banks vs non banks



Source: Bloomberg. April 14, 2020.

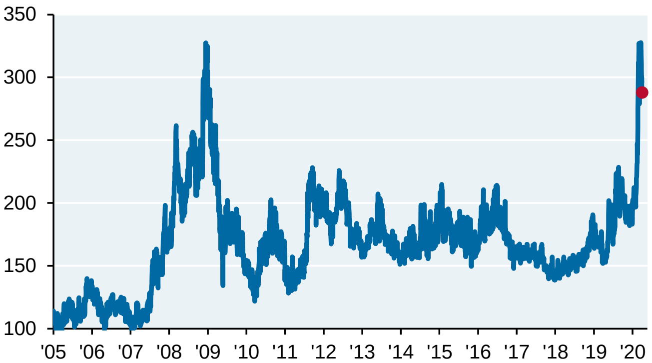
US high yield corporate bond spreads
JPDFHYI index spread versus Treasury, basis points

Source: Bloomberg, J.P. Morgan HY Team. April 14, 2020.

BB - BBB US corporate bonds spread
CSSWBB index - JULIBBBS index, basis points

Source: Bloomberg, J.P. Morgan. April 14, 2020.

30 year fixed rate mortgage - 10 year Treasury
basis points

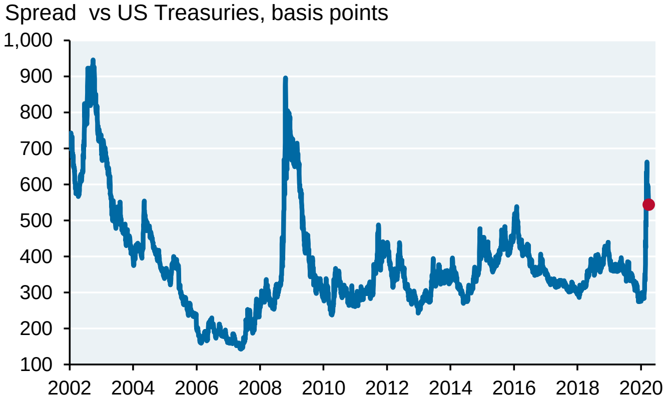


Source: Bloomberg, J.P. Morgan. April 14, 2020.

Fixed rate preferred securities option adjusted spread
P0P1 index, basis points

Source: Bloomberg, J.P. Morgan. April 14, 2020.

Emerging markets dollar denominated bonds
Spread vs US Treasuries, basis points



Source: Bloomberg, J.P. Morgan. April 14, 2020.

S&P 500 leveraged loan price index
SPBDALB index

Source: Bloomberg. April 15, 2020.

Equities

Valuations[1]. The first two charts below show P/E ratios relative to 2021 consensus earnings, which we believe is a more useful way to think about valuation. In essence, the enormous earnings collapse likely to occur in 2020 is not necessarily predictive of what happens in 2021, particularly if lockdown provisions are eased due to some combination of herd immunity or vaccine treatment.

S&P 500 price/earnings
Price / forward 2 year earnings per share

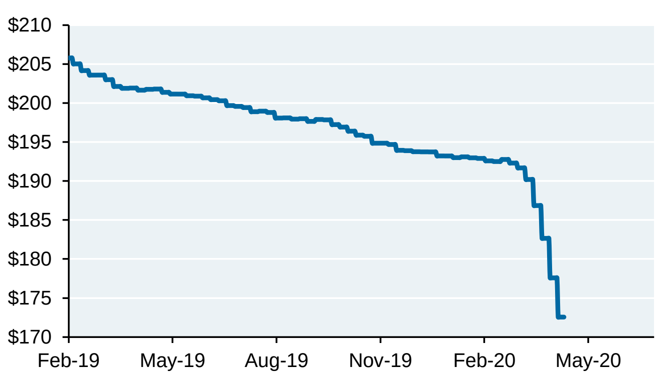
Source: Bloomberg, J.P. Morgan. April 15, 2020.

Stoxx Europe 600 price/earnings
Price / forward 2 year earnings per share

Source: Bloomberg, J.P. Morgan. April 15, 2020.

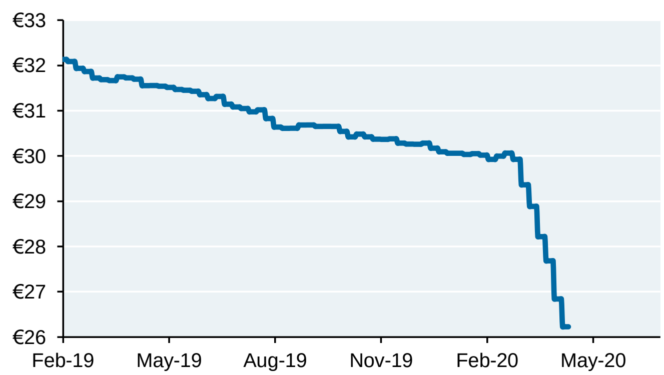
The P/E ratios shown above are based on consensus earnings forecasts for 2021, which so far have only declined by 10%-15% from their initial levels at the start of the year, and which are now still above 2019 actual levels. As a result, the P/E ratios above are understated if 2021 earnings undershoot the levels shown below. For context, J.P. Morgan Economic and Policy Research team analyzed the historical relationship of global earnings and GDP, and now projects a 60% profits decline in 2020, followed by a large profits recovery in 2021 that ends up just 11% below 2019 levels[2].

S&P 500 2021 EPS forecasts



Source: Datastream, J.P. Morgan. April 14, 2020.

Stoxx Europe 600 2021 EPS forecasts

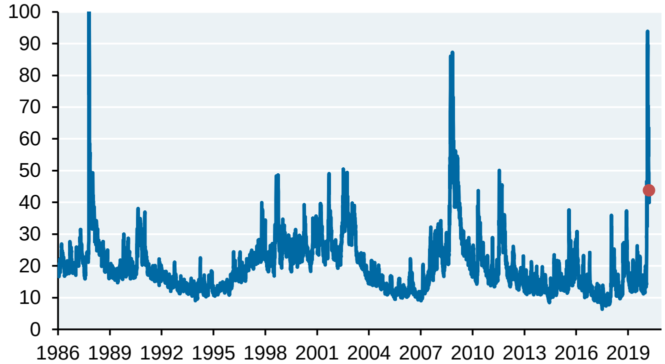


Source: Datastream, J.P. Morgan. April 14, 2020.

[1] Our Europe P/E chart starts in 2006. Before 2006, IFRS required European companies to amortize goodwill, and the amounts involved were at times substantial. As a result, pre-2006 P/E multiples for Europe are not exactly comparable to post-2006 multiples.

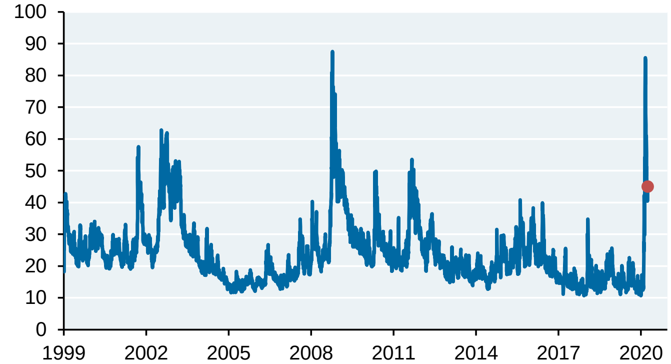
[2] "*Global profits to plunge*", Joseph Lupton, April 13, 2020, J.P. Morgan Economic and Policy Research.

S&P 100 implied volatility index
Index level



Source: Bloomberg. April 15, 2020.

Euro Stoxx 50 implied volatility index
Index level

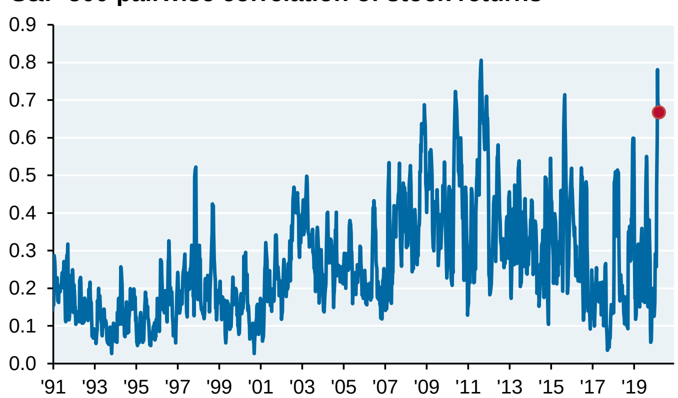


Source: Bloomberg. April 15, 2020.

Valuation dispersion and the opportunity for stock pickers

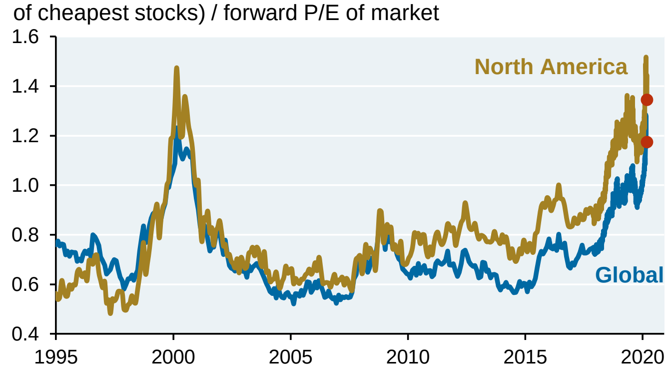
There has been a large spike in pairwise stock correlations, and in the dispersion of valuations across the entire market and within sectors. A spike can either mean a huge greed-based valuation gap between the most expensive stocks and the rest (i.e., tech bubble in 1999), or a huge fear-based valuation gap between the cheapest stocks and the market (i.e., today's selloff in airlines, cruise ships, energy and other distressed cyclicals). These valuations are of course based on pre-virus expectations of the future, a lot of which will now change due to changes in consumption, possible changes in buyback policy subject to bailout provisions and other lingering effects of the virus. Even so, market pricing is creating opportunities for investors to underwrite business models at some of the lowest valuations on record.

S&P 500 pairwise correlation of stock returns



Source: JPMAM Equity Research. April 09, 2020.

Spread of cheapest versus most expensive stocks within each industry, (forward P/E of most expensive stocks -forward P/E of cheapest stocks) / forward P/E of market

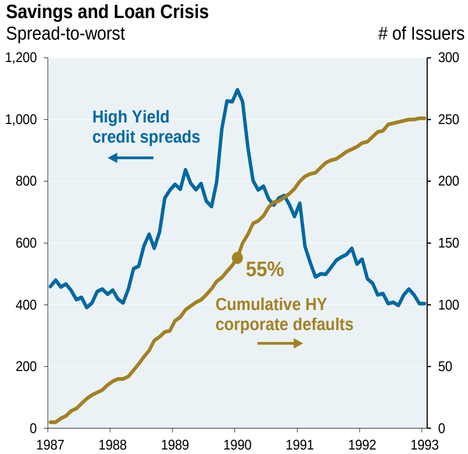


Source: J.P. Morgan Asset Management. April 09, 2020.

A history of market bottoms, with a summary of all results on page 8

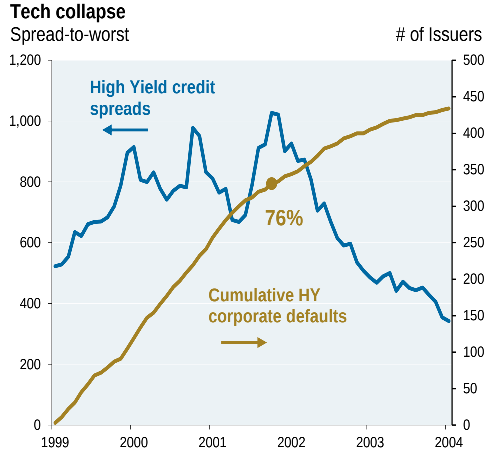
A history of asset prices bottoming before associated defaults, bank failures and delinquencies started to improve. In the first and third rows, spreads peaked well before defaults and delinquencies did; in the middle row, banks stocks bottomed long before bank failures stopped rising.

Savings and Loan Crisis



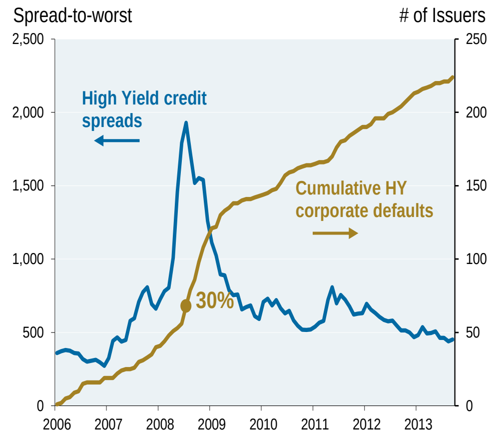
Source: J.P. Morgan Securities LLC. 2020.

Tech collapse



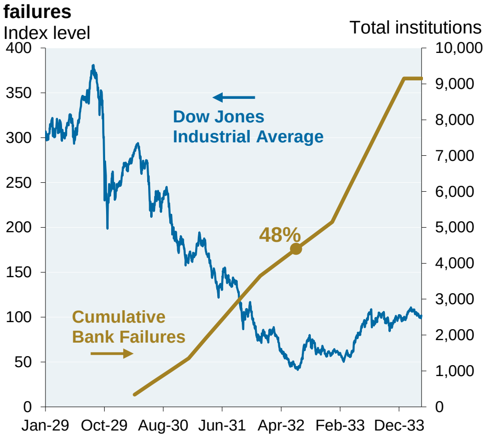
Source: J.P. Morgan Securities LLC. 2020.

Financial crisis



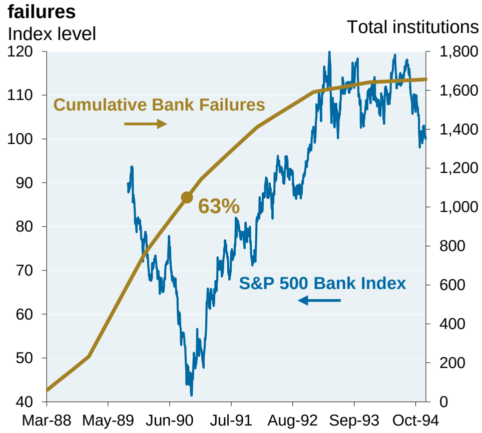
Source: J.P. Morgan Securities LLC. 2020.

The Great Depression: Equity market vs. bank failures



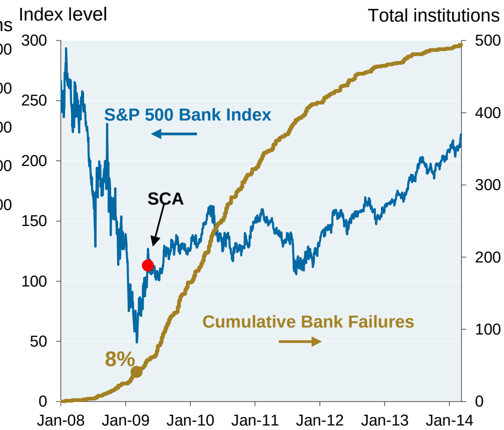
Source: FDIC, Bloomberg. 2020.

Savings and Loan Crisis: Bank stocks vs. bank failures



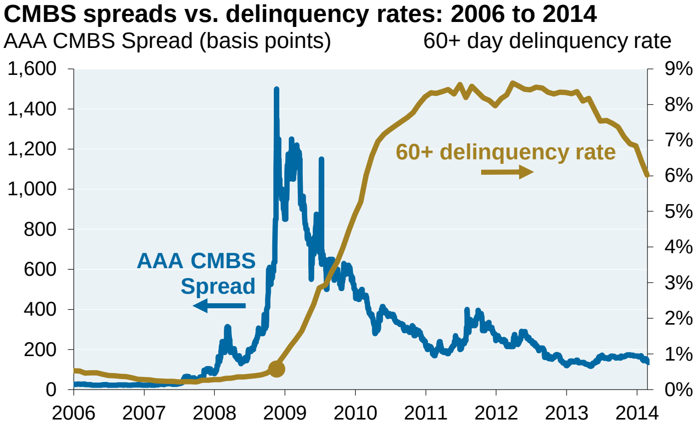
Source: FDIC, Bloomberg. 2020.

Financial crisis: Bank stocks vs. bank failures



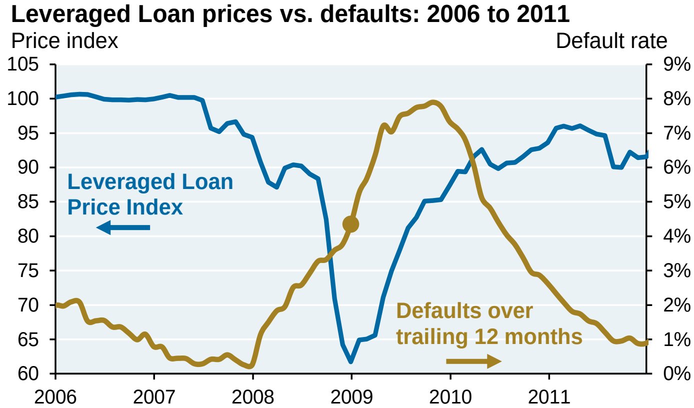
Source: FDIC, Bloomberg. 2020.

CMBS spreads vs. delinquency rates: 2006 to 2014



Source: Trepp, J.P. Morgan Securities LLC. 2020.

Leveraged Loan prices vs. defaults: 2006 to 2011

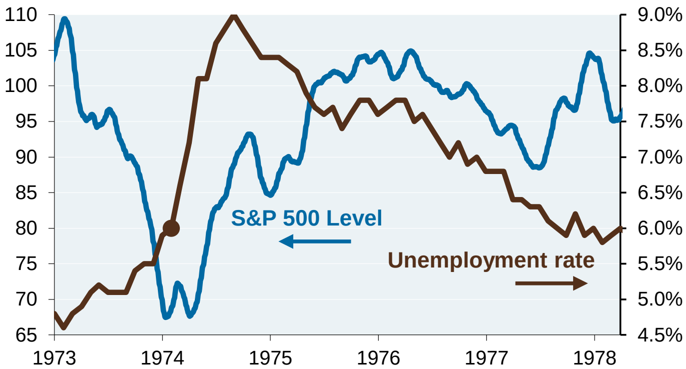


Source: J.P. Morgan Securities LLC, Standard and Poor's, S&P/LSTA Leveraged Loan Index. 2020.

Note: SCA in the financial crisis stock price chart refers to the implementation of the 2009 Supervisory Capital Assessment Program on US banks.

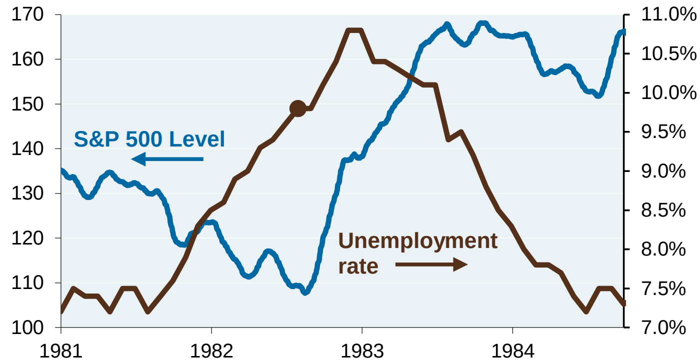
Some history of unemployment as a lagging indicator for investors, both in the US and in Europe. When the bottom does occur, I expect it to be consistent with prior cycles in the US and Europe in which markets bottomed well before unemployment levels started to decline. Look at the stagflation era of the 1970's; equities bottomed when unemployment was just starting to ***rise***. The tech collapse, in which peak unemployment closely coincided with the market bottom, was the exception.

1970's stagflation crisis
Index level (30-day moving average) Unemployment rate



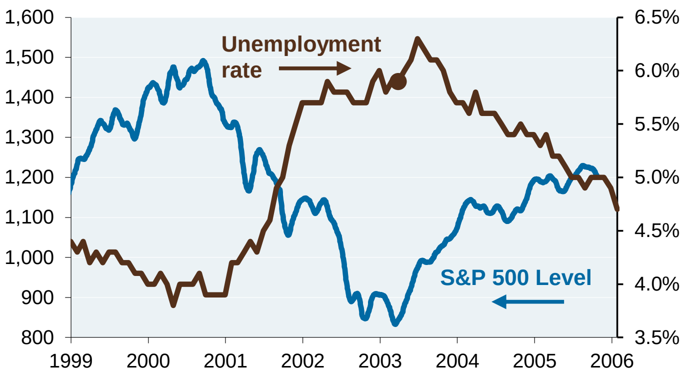
Source: Bloomberg, BLS. 2020.

1980's inflation / housing crisis
Index level (30-day moving average) Unemployment rate



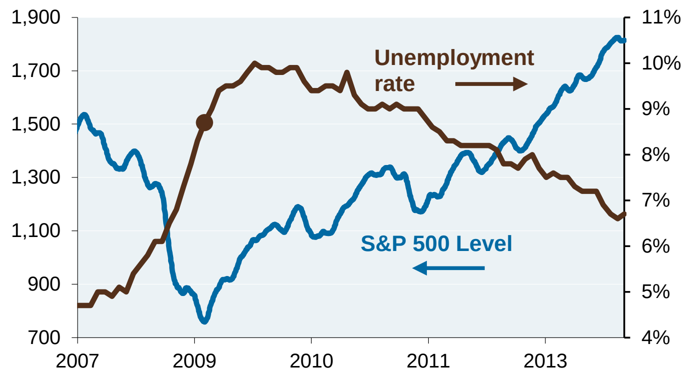
Source: Bloomberg, BLS. 2020.

Tech collapse
Index level (30-day moving average) Unemployment rate



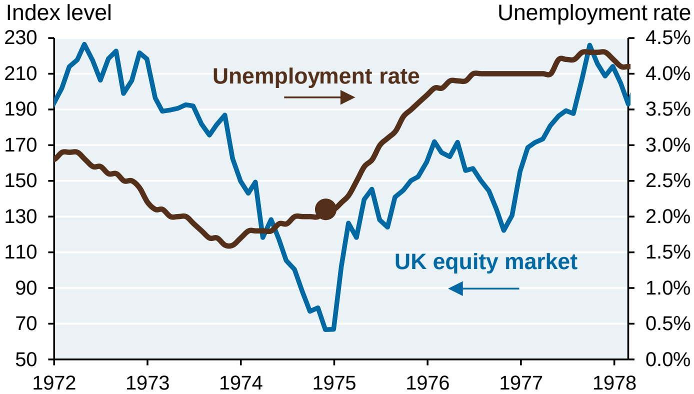
Source: Bloomberg, BLS. 2020.

Financial crisis
Index level (30-day moving average) Unemployment rate



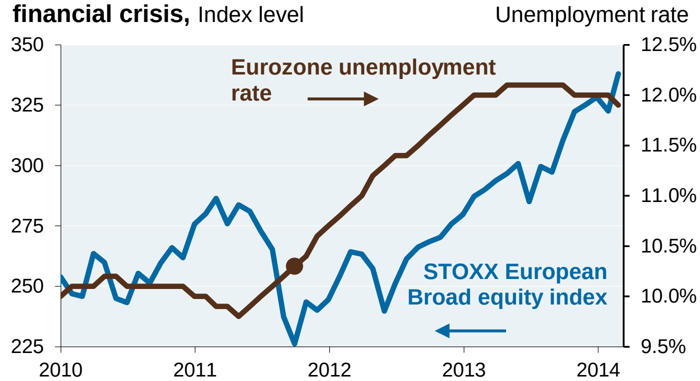
Source: Bloomberg, BLS. 2020.

UK equity market and unemployment rate in the 1970's
Index level Unemployment rate



Source: Bloomberg, Federal Reserve Bank of St. Louis. 2020.

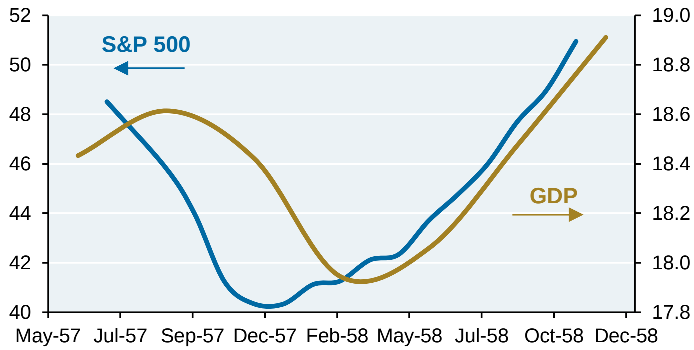
European equities and unemployment rate during global financial crisis, Index level Unemployment rate



Source: STOXX, Eurostat. 2020.

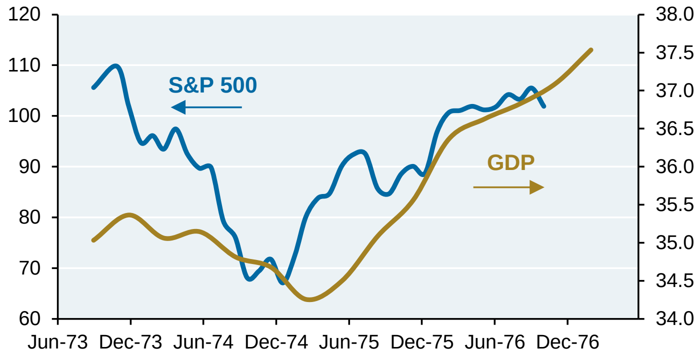
Equities vs the recovery in GDP: on average, equities lead the GDPP rebound by 4-8 months

Eisenhower recession
Index level US GDP, Index 2012 = 100



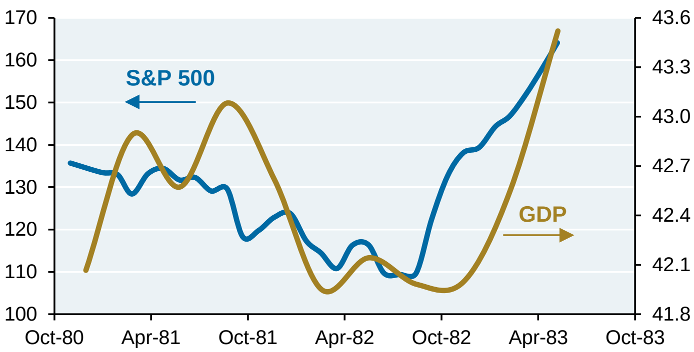
Source: BEA, Shiller. April 2020.

Stagflation era
Index level US GDP, Index 2012 = 100



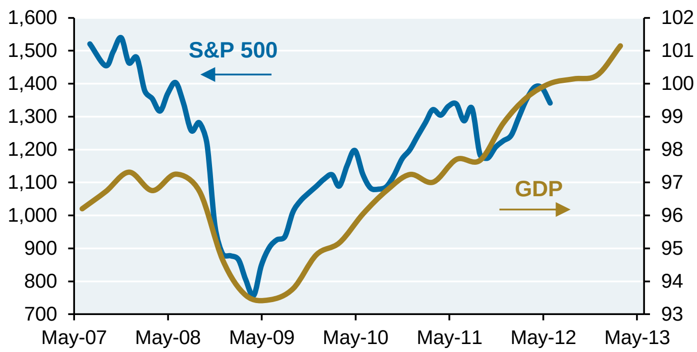
Source: BEA, Shiller. April 2020.

1980's double-dip recession
Index level US GDP, Index 2012=100



Source: BEA, Shiller. April 2020.

Global financial crisis
Index level US GDP, Index 2012=100



Source: BEA, Shiller. April 2020.

This final table summarizes the results of all of our market bottom analyses

Market appreciation during times of ample economy-wide distress

Date	Market	Rallied By	From	Before	Action
1932	Dow Jones	67%	Lowest Level	Bank Failures	Reached 75% of eventual total
1957	US Equities	4%	Lowest Level	GDP	Bottomed
1974	US Equities	25%	Lowest Level	GDP	Bottomed
1974	US Equities	35%	Lowest Level	Unemployment	Peaked
1982	US Equities	26%	Lowest Level	GDP	Bottomed
1983	US Equities	27%	Lowest Level	Unemployment	Peaked
1990	US High Yield	350 bps	Widest Spread	HY Defaults	Reached 75% of eventual total
1990	S&P Bank Index	90%	Lowest Level	Bank Failures	Reached 75% of eventual total
2002	US High Yield	0 bps	Widest Spread	HY Defaults	Reached 75% of eventual total
2003	US Equities	17%	Lowest Level	Unemployment	Peaked
2008	US High Yield	1177 bps	Widest Spread	HY Defaults	Reached 75% of eventual total
2009	US Equities	24%	Lowest Level	GDP	Bottomed
2009	S&P Bank Index	180%	Lowest Level	Bank Failures	Reached 75% of eventual total
2009	AAA CMBS	975 bps	Widest Spread	Deliquency rates	Reached 75% of max deliquency rate
2009	Leveraged Loans	6%	Lowest Level	Defaults	Reached 75% of max default rate
2009	US Equities	33%	Lowest Level	Unemployment	Peaked
2012	European Equities	33%	Lowest Level	Unemployment	Peaked

Sources: Spreads measured in basis points. STOXX, Eurostat, FDIC, Bloomberg, J.P. Morgan Securities, BLS, Trepp, Standard & Poor's, S&P/LSTA Leveraged Loan Index , BEA, Shiller , JPMAM. 2020.

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