

# Financial Implications of COVID-19

Andrew W. Lo, MIT

MIT ILP Webinar, March 16, 2020

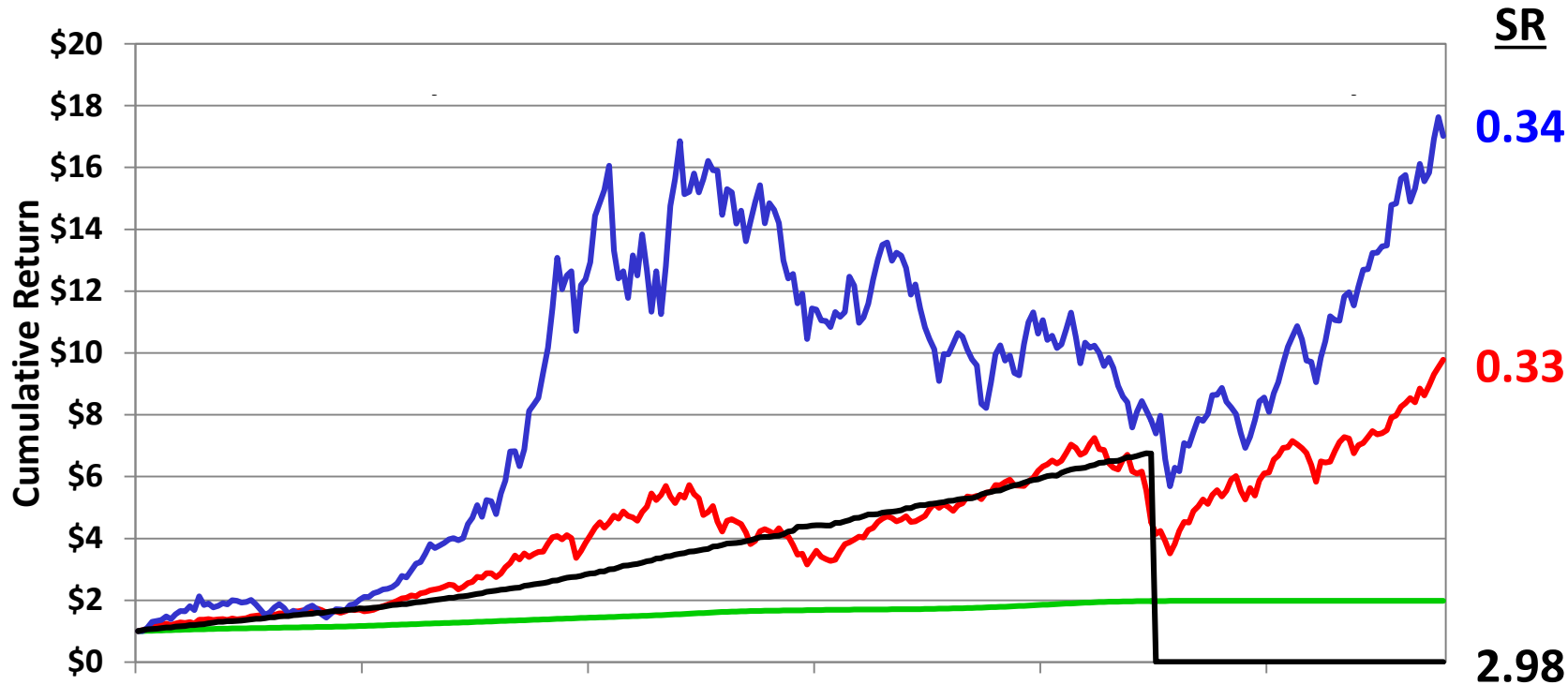


# Summary

- Traditional finance framework is limited
- Not wrong, but incomplete (physics envy)
- Stable environment  $\Rightarrow$  stable financial policies (EMH)
- Dynamic environment  $\Rightarrow$  dynamic financial policies (AMH)
- The current environment is highly **dynamic**
- We must adapt to changing market conditions
- “It’s the ~~economy~~, **environment**, stupid”
- The **Adaptive Markets Hypothesis** provides a framework for thinking about how to respond to COVID-19

# What Do Investors Want?

$$\text{Sharpe Ratio} \equiv \frac{E[R] - R_f}{\text{SD}[R]}$$



# What Do Investors Fear?

## Urn A contains 100 balls:

- 50 red, 50 black
- Pick a color, then draw a ball
- If you draw your color, \$10,000 prize
- Which color would you prefer?
- How much would you pay to play?

# What Do Investors Fear?

## Urn B contains 100 balls:

- Unknown proportion of black and/or red balls
- Pick a color, then draw a ball
- If you draw your color, \$10,000 prize
- Which color would you prefer?
- How much would you pay to play?

**The  
Unknown  
Unknowns**

# Risk/Reward Trade-Offs

## Long-Term Returns of Various Assets 1928 to 2019

Asset	Mean	SD	Min	Median	Max	CumReturn
Stocks	9.7%	19.6%	-43.8%	13.9%	52.6%	\$ 5,024
Baa Corporate Bonds	7.0%	7.6%	-15.7%	6.5%	29.1%	\$ 487
U.S. 10-Year Treasuries	4.9%	7.7%	-11.1%	3.3%	32.8%	\$ 80
U.S. 3-Month T-Bills	3.4%	3.0%	0.0%	3.0%	14.0%	\$ 21

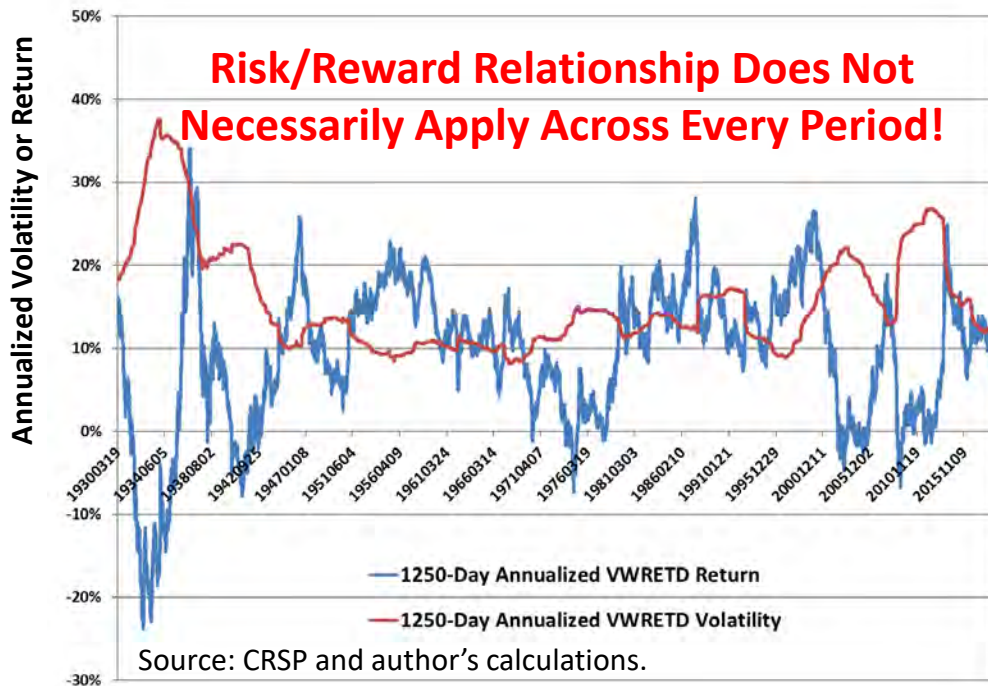
Source: Aswath Damodaran ([http://pages.stern.nyu.edu/~adamodar/New\\_Home\\_Page/datafile/histretSP.html](http://pages.stern.nyu.edu/~adamodar/New_Home_Page/datafile/histretSP.html))

**Risk/Reward Relationship Seems To  
Apply Over Long Periods**

# Risk/Reward Trade-Offs

## 1250-Day Rolling-Window Volatility and Return of CRSP Value-Weighted Return

March 19, 1930 to December 31, 2018

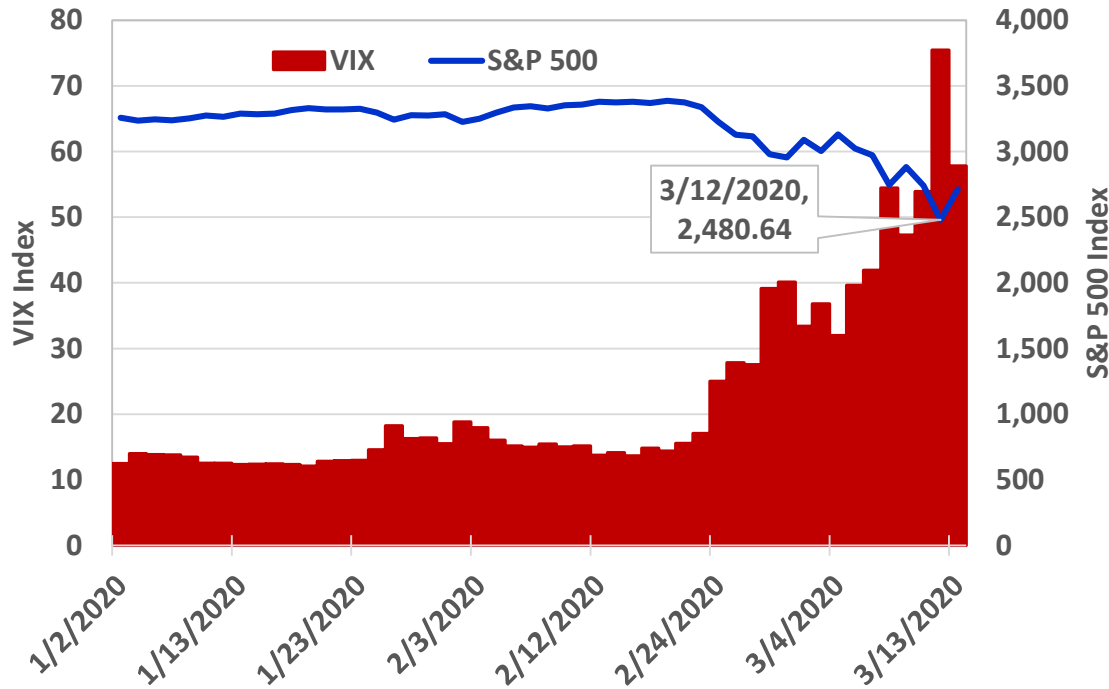


Correlation = ??

**-59.9%**

# Market Recap

## VIX and S&P 500 Indexes, 2020



## Top 10 Worst Days

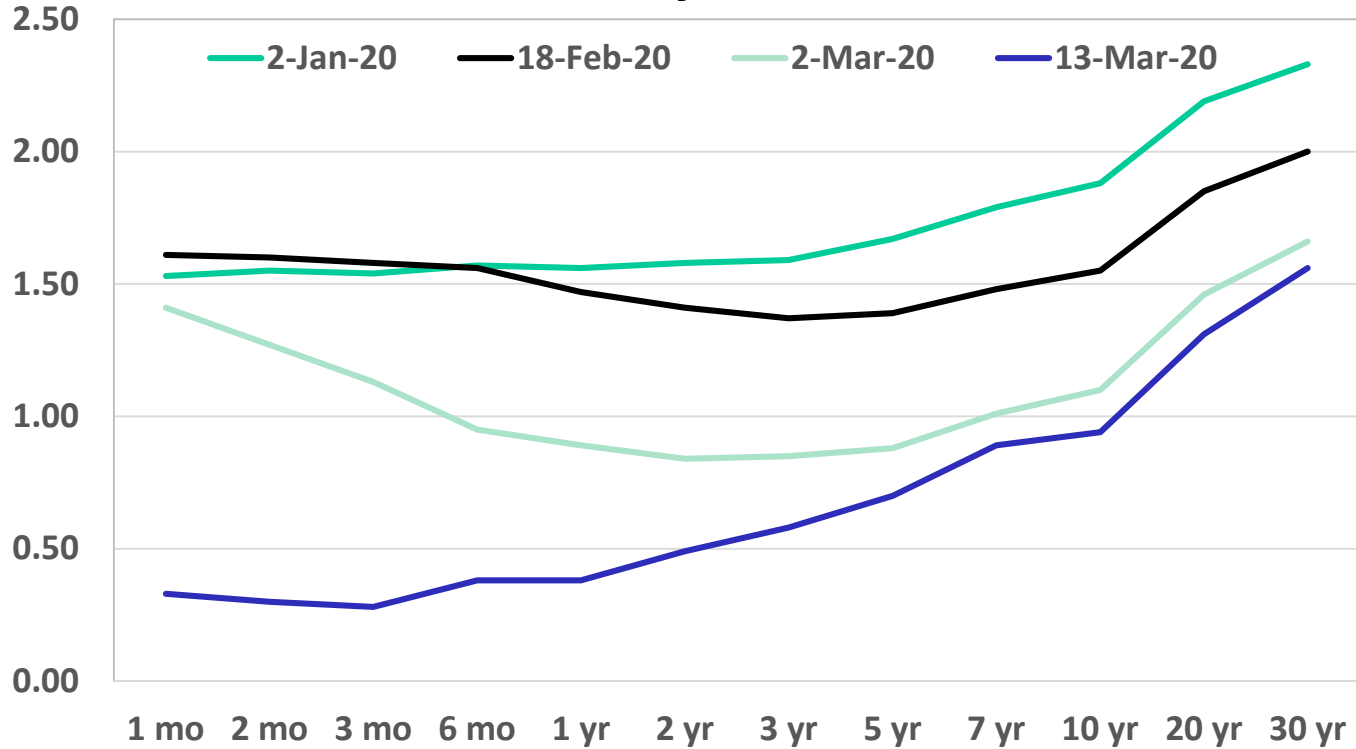
1 Jan 1926 to 13 March 2020

19-Oct-1987	-19.5%
28-Oct-1929	-11.7%
29-Oct-1929	-10.0%
6-Nov-1929	-9.7%
12-Mar-2020	-9.5%
18-Oct-1937	-9.3%
15-Oct-2008	-9.0%
21-Jul-1933	-9.0%
20-Jul-1933	-8.9%
1-Dec-2008	-8.9%



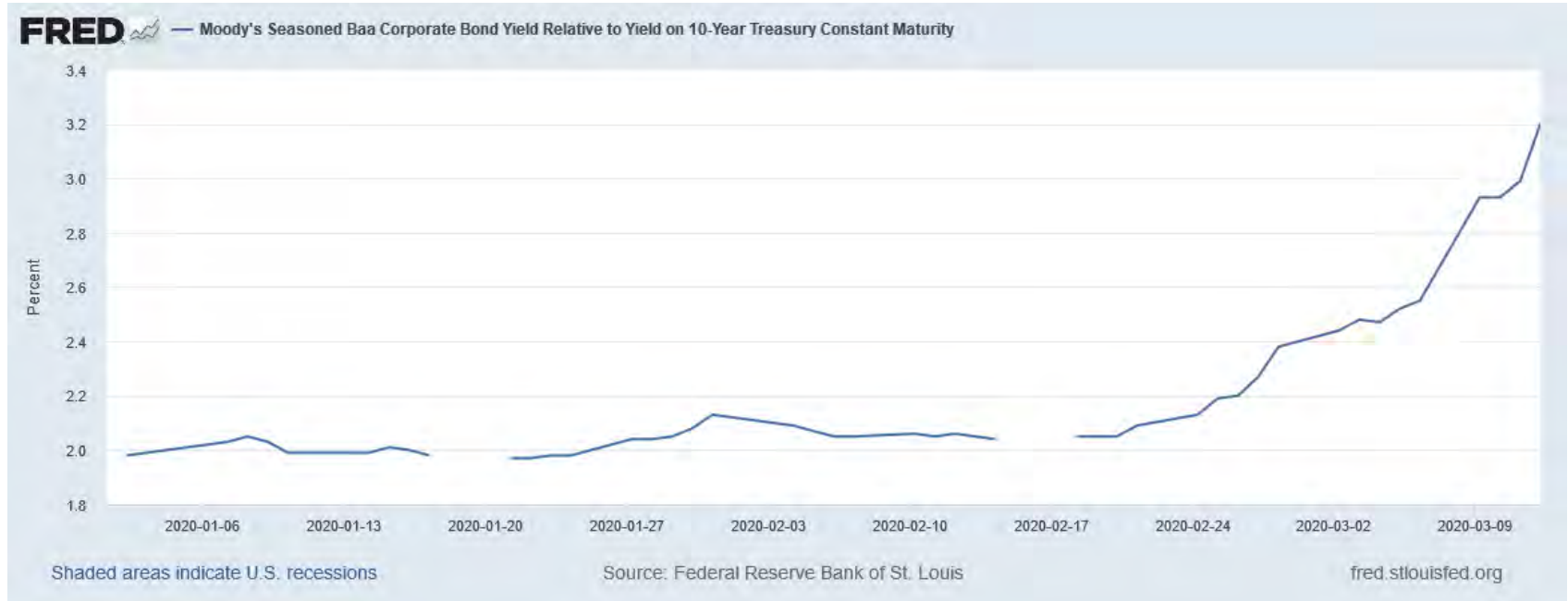
# Market Recap

## U.S. Treasury Yield Curves



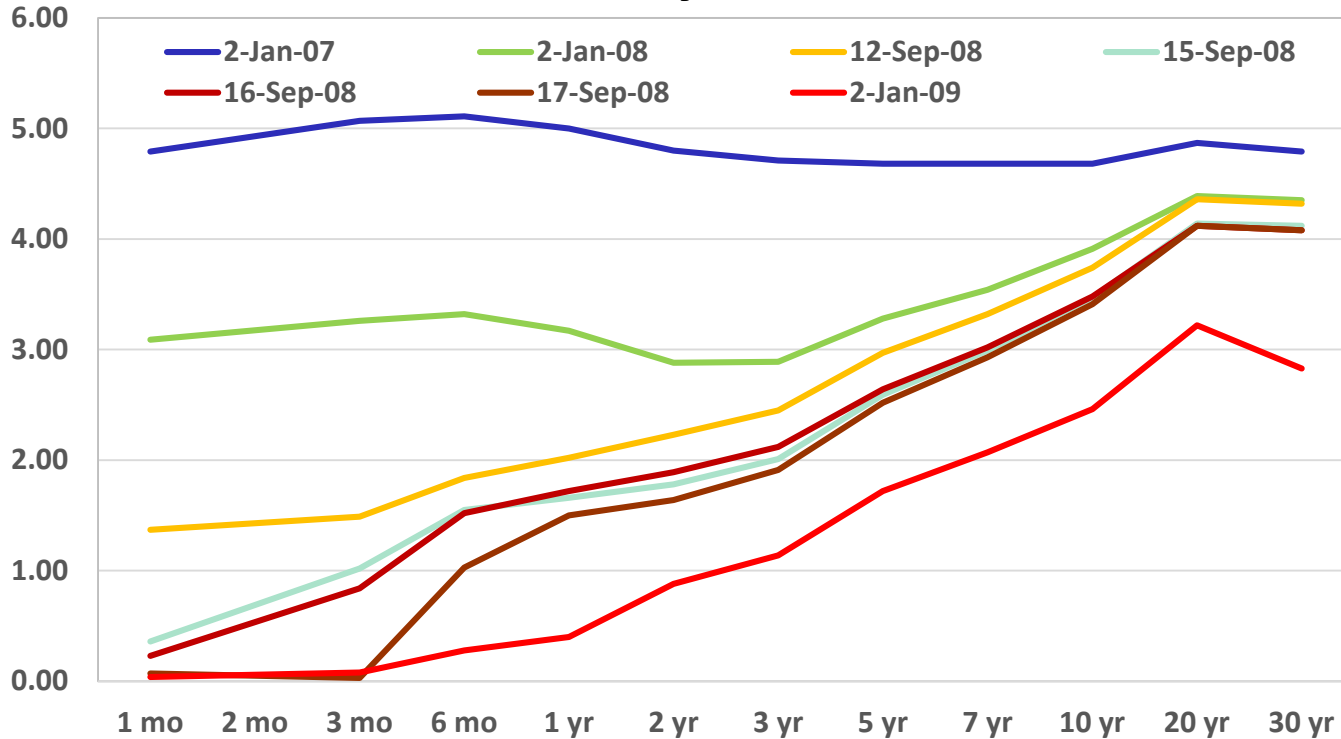
# Market Recap

## Moody's Baa Corporate /10Y TBond Spread



# Market Recap

## U.S. Treasury Yield Curves



# A Bit of Perspective

## VIX and S&P 500 Indexes, 4 Jan 2016 to 13 March 2020

80

**CNN BUSINESS** Markets Tech Media Success Video

Markets Now

### Feb 5, 2018

## Dow plunges 1,175 -- worst point decline in history

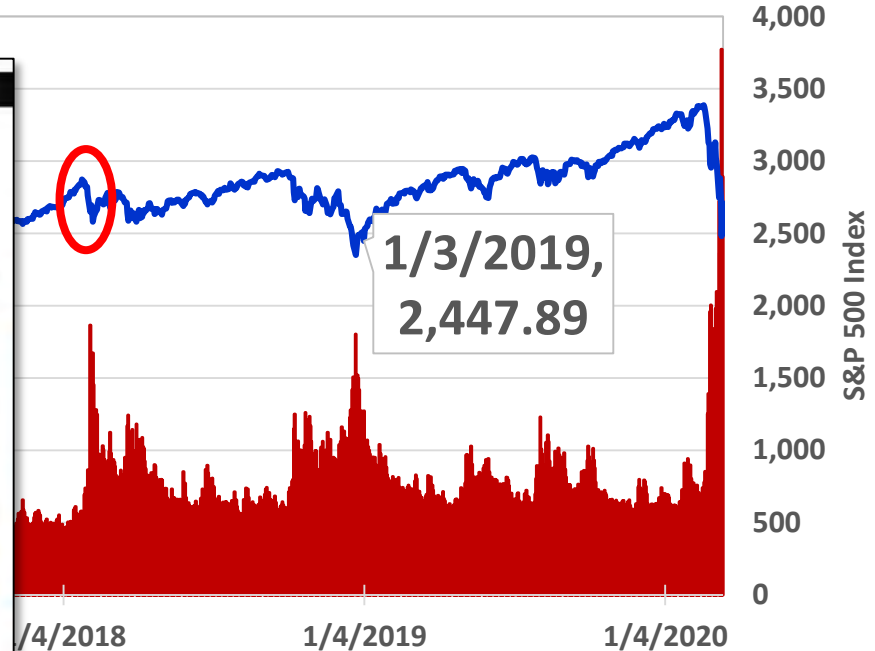
by Matt Egan @MattEganCNN  
February 5, 2018 7:45 PM ET

**What happened during the Dow's worst single-day point fall ever**

Here's what happened during the Dow's worst single-day point fall ever

It was the scariest day on Wall Street in years.

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# A Bit More Perspective

## S&P 500 Top 10 Worst Days

1 Jan 1926 to 13 March 2020

19-Oct-1987	-19.5%
28-Oct-1929	-11.7%
29-Oct-1929	-10.0%
6-Nov-1929	-9.7%
12-Mar-2020	-9.5%
18-Oct-1937	-9.3%
15-Oct-2008	-9.0%
21-Jul-1933	-9.0%
20-Jul-1933	-8.9%
1-Dec-2008	-8.9%

## VIX Top 10 Highest Days

2 Jan 1990 to 13 March 2020

20-Nov-2008	80.9
27-Oct-2008	80.1
24-Oct-2008	79.1
12-Mar-2020	75.5
19-Nov-2008	74.3
21-Nov-2008	72.7
17-Oct-2008	70.3
29-Oct-2008	70.0
10-Oct-2008	69.9
22-Oct-2008	69.7

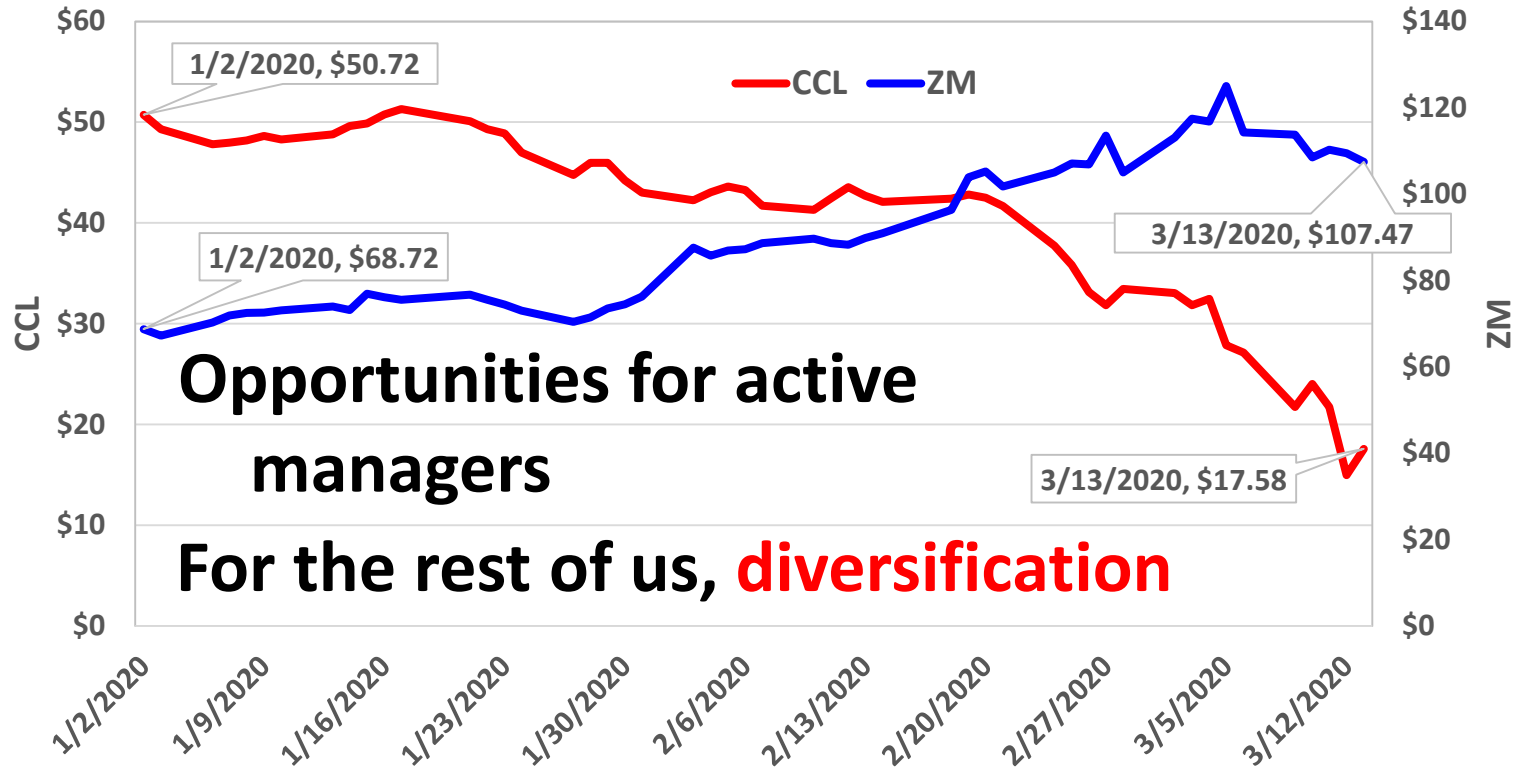
## S&P 500 Top 10 Best Days

1 Jan 1926 to 13 March 2020

15-Mar-1933	16.8%
6-Oct-1931	12.6%
30-Oct-1929	12.3%
21-Sep-1932	11.8%
13-Oct-2008	11.5%
28-Oct-2008	10.7%
5-Sep-1939	9.9%
13-Mar-2020	9.3%
20-Apr-1933	9.3%
3-Aug-1932	9.1%

# Will You Know **When** To Get Back In??

# There Will Be New Winners and Losers



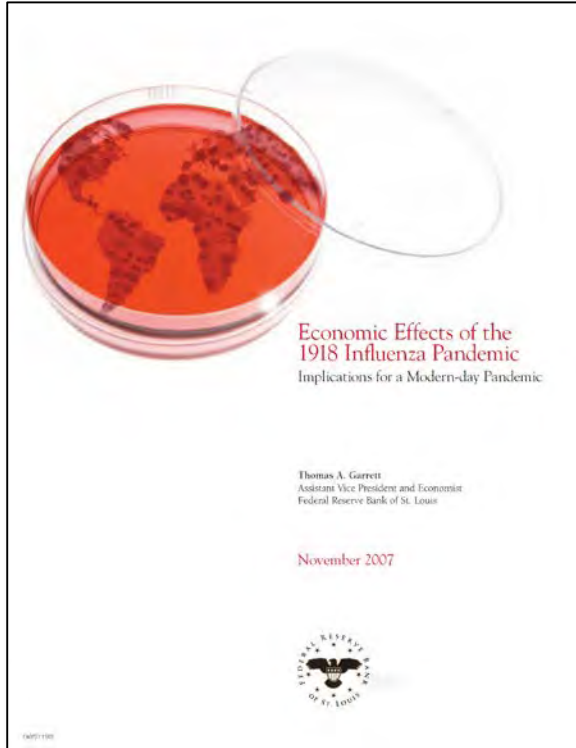
# Comparisons

“History doesn’t repeat itself, but it often rhymes”

– Mark Twain (?)

- 1918 Influenza Pandemic (“Spanish Flu”)
- 2008 Financial Crisis

# 1918 Influenza Pandemic



## Summary

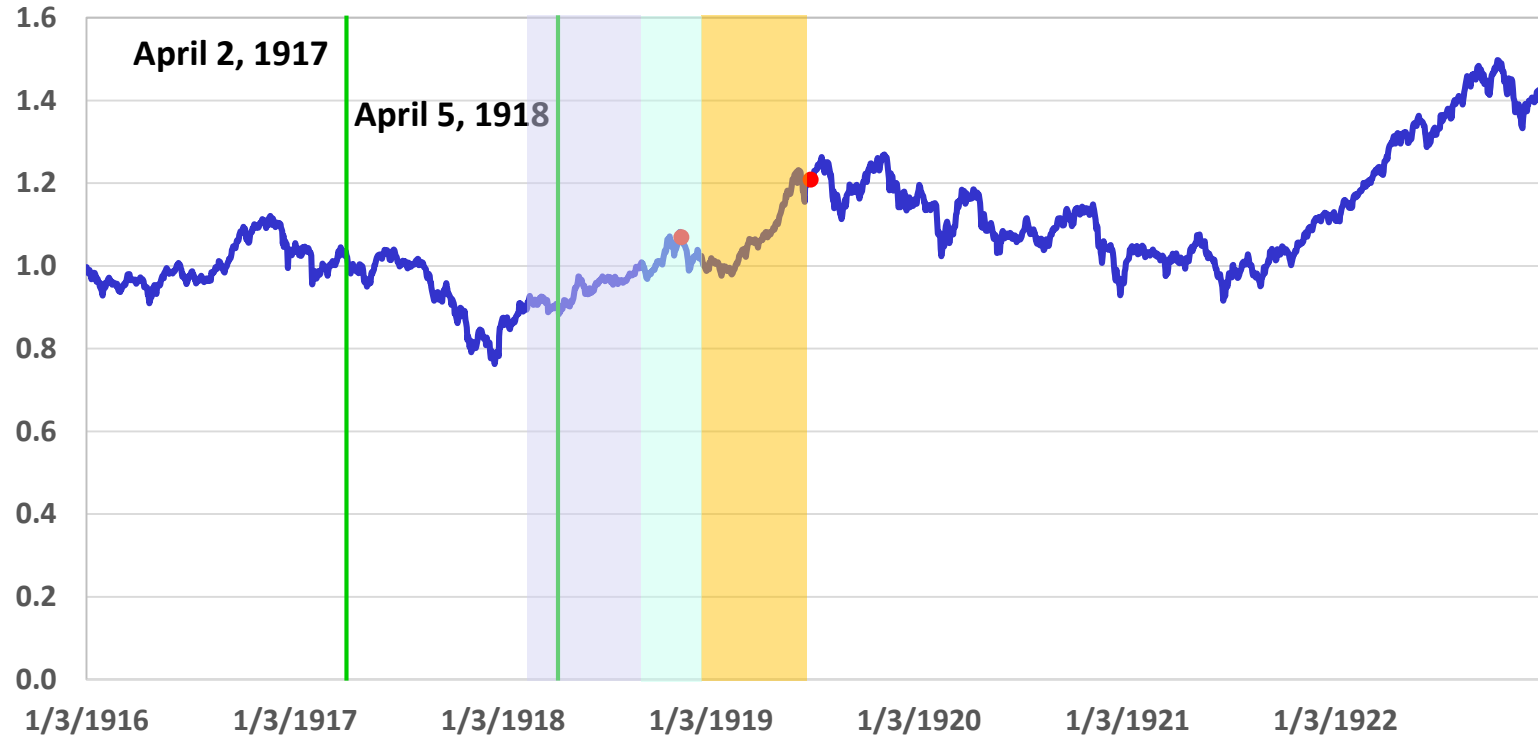
Most of the evidence indicates that the economic effects of the 1918 influenza pandemic were short-term. Many businesses, especially those in the service and entertainment industries, suffered double-digit losses in revenue. Other businesses that specialized in health care products experienced an increase in revenues.

Some academic research suggests that the 1918 influenza pandemic caused a shortage of labor that resulted in higher wages (at least temporarily) for workers, though no reasonable argument can be made that this benefit outweighed the costs from the tremendous loss of life and overall economic activity. Research also suggests that the 1918 influenza caused reductions in human capital for those individuals in utero during the pandemic, therefore having implications for economic activity occurring decades after the pandemic.



# 1918 Influenza Pandemic

## U.S. Stock Market, 3 Jan 1916 to 30 Dec 1922



# 1918 Influenza Pandemic

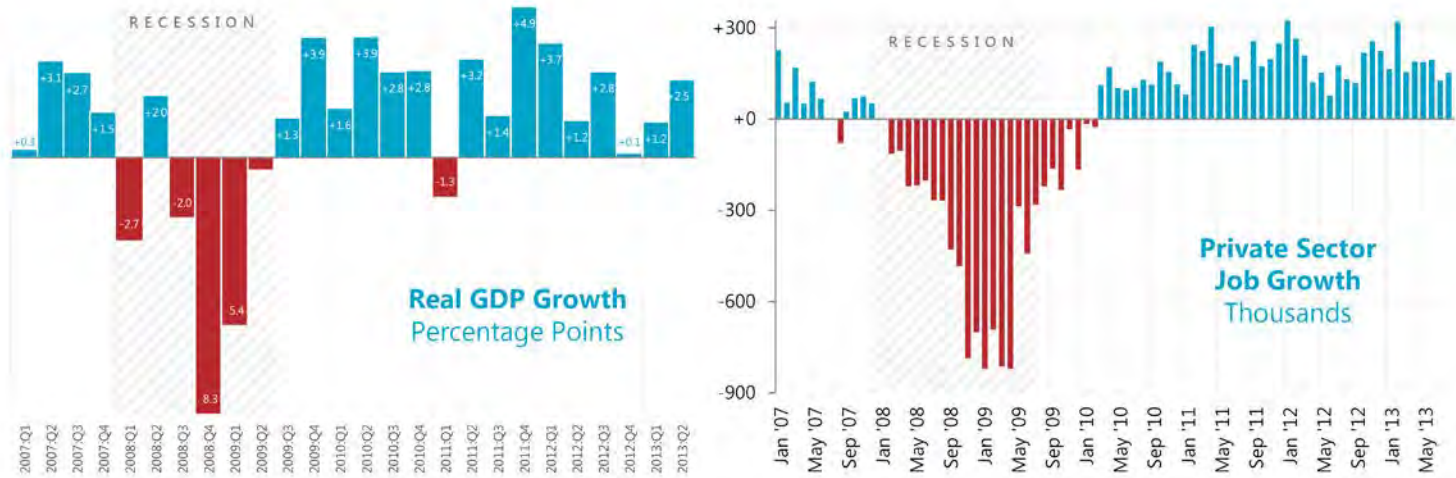


# The Financial Crisis of 2008



# The Financial Crisis of 2008

🕒 History of the Financial Crisis: **The Economy Before, During, and After the Crisis**

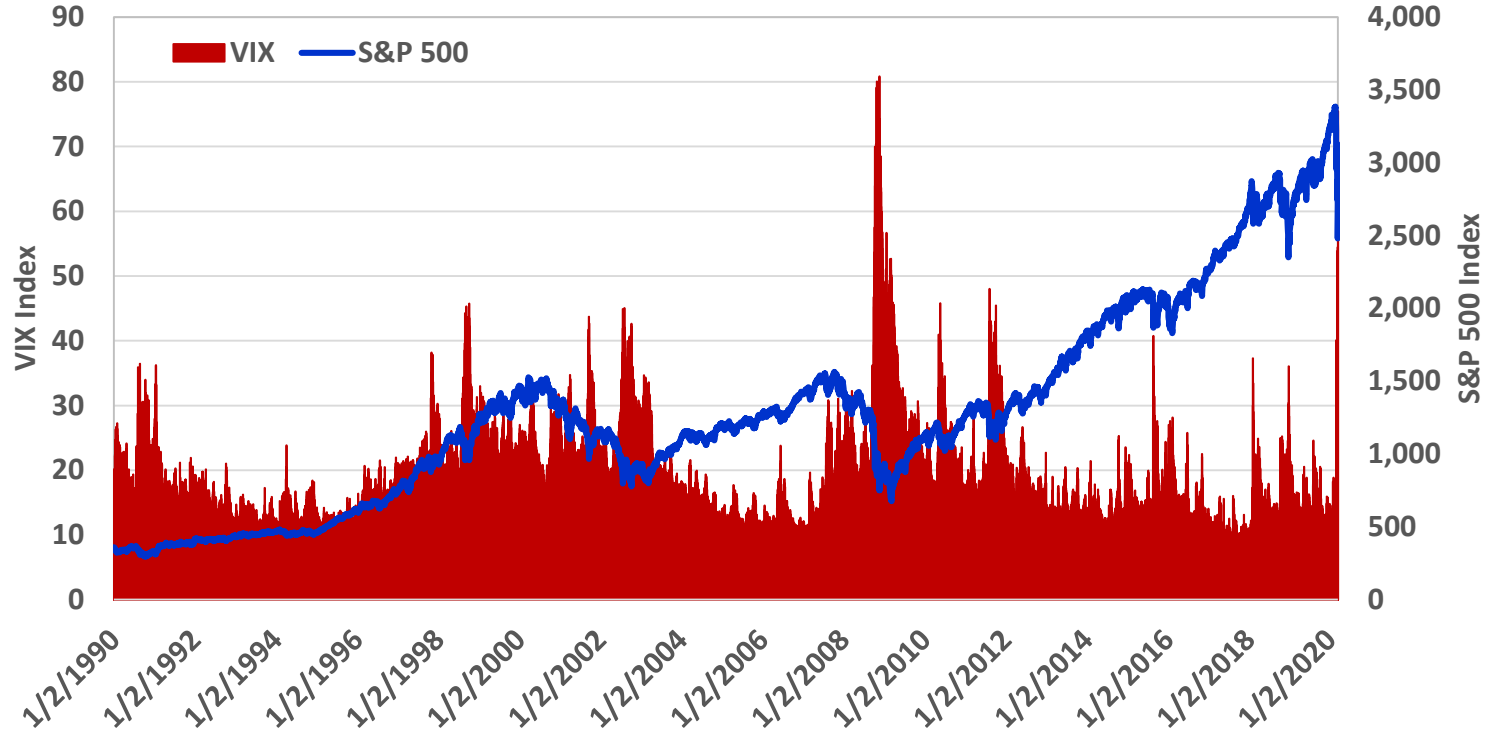


The financial crisis triggered the worst recession since the Great Depression, which ultimately destroyed almost 9 million jobs and shrank the economy by hundreds of billions of dollars. The crisis was caused by, among other things, an unsustainable **housing boom** as shown below. The severity of the crisis is also illustrated by the rapid increase in **corporate bond spreads** in the fall of 2008 as well as the dramatic fall in **household net worth**.

Source: U.S. Treasury (2013)

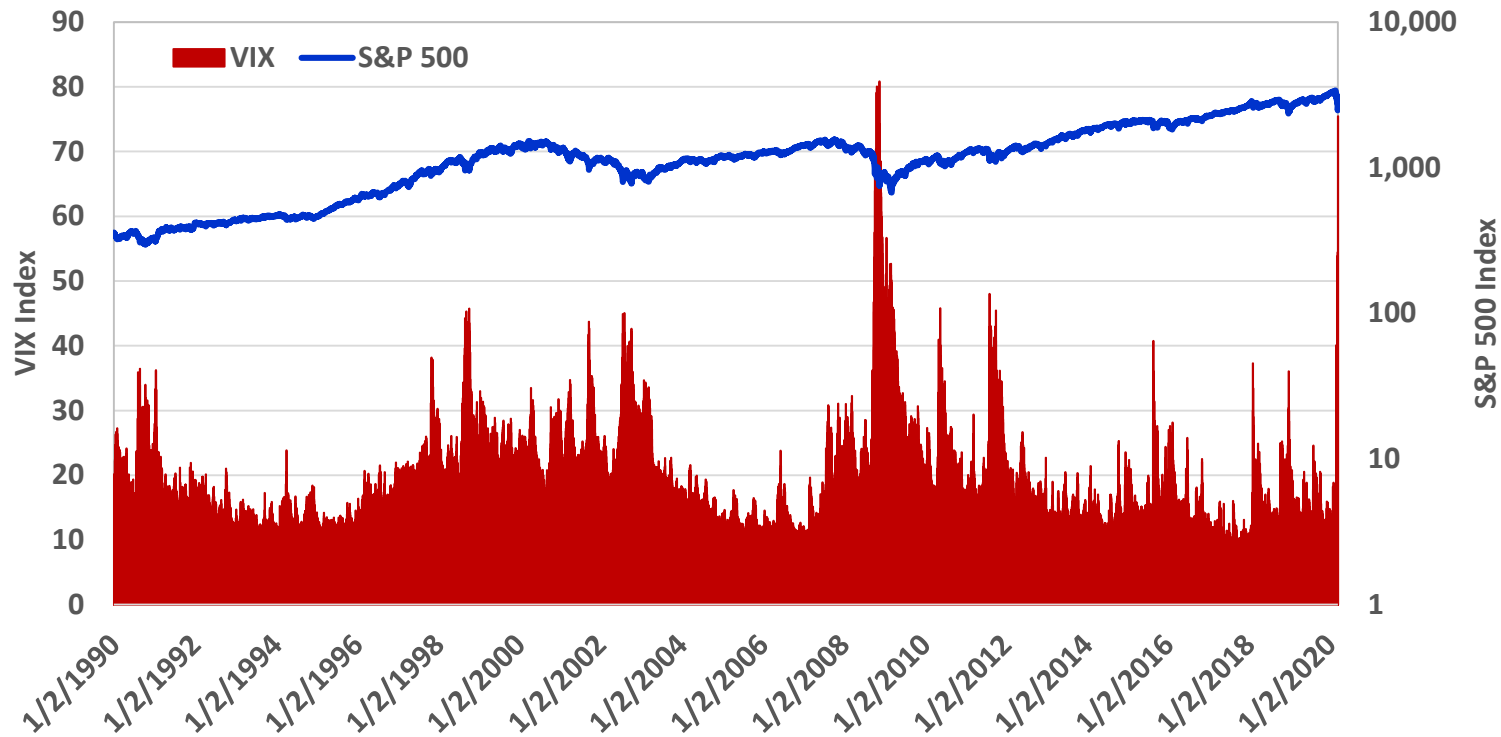
# The Financial Crisis of 2008

## VIX and S&P 500 Indexes, 2 Jan 1990 to 13 March 2020



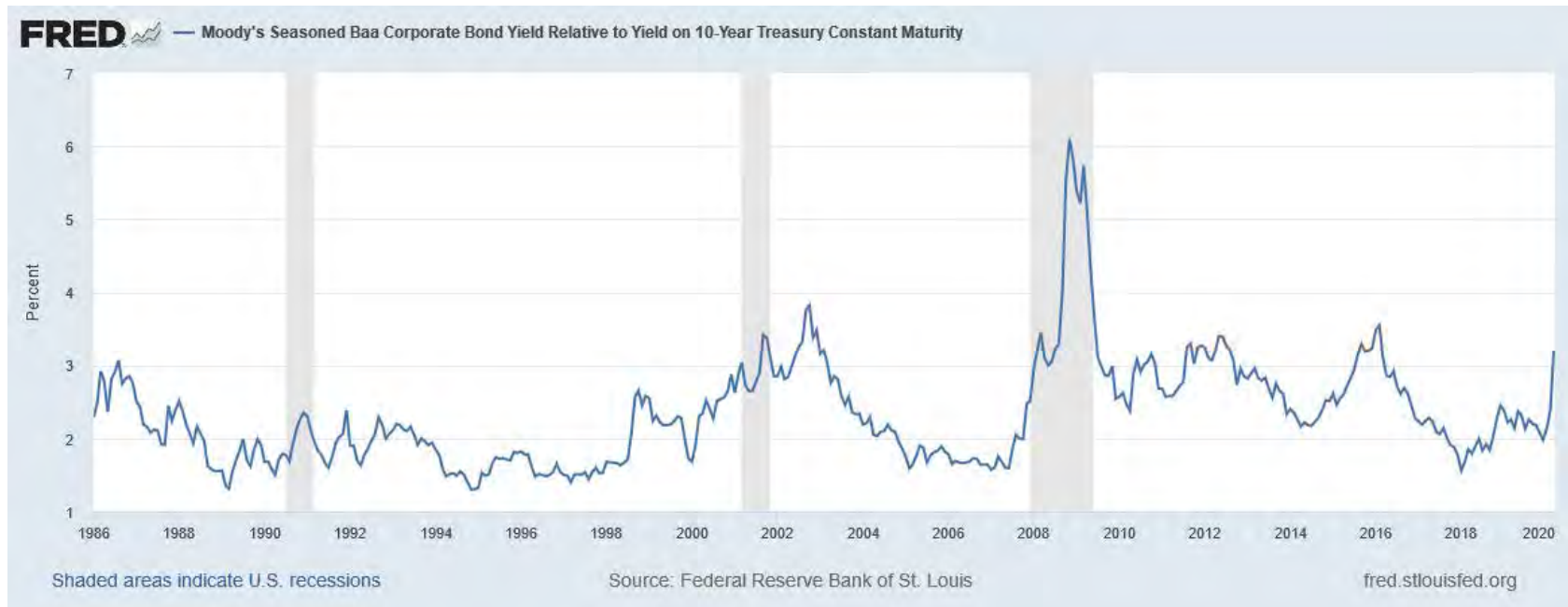
# The Financial Crisis of 2008

## VIX and S&P 500 Indexes, 2 Jan 1990 to 13 March 2020



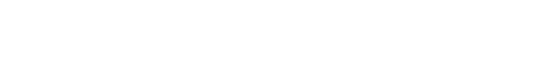
# The Financial Crisis of 2008

## Moody's Baa Corporate /10Y TBond Spread





# Unprecedented Intervention



## BAILOUT PLAN WINS APPROVAL; DEMOCRATS VOW TIGHTER RULES



After the House vote, President Obama and Treasury Secretary Henry M. Paulson Jr. shake hands in the White House.

# TARP: \$700 Billion

## The Crisis Response: Overview of the Government Response

- Federal Reserve financing programs**  
*Asset-backed commercial paper money-market mutual fund liquidity facility*  
*Commercial paper funding facility*  
*Currency swap lines with international central banks*  
*Money-market investor funding facility*  
*Primary dealer credit facility*  
*Term auction facility*  
*Term securities lending facility*
- Large bank stress tests**
- TARP bank investment programs**  
*Capital Assistance Program (CAP)*  
*Capital Purchase Program (CPP)*  
*Community Development Capital Initiative (CDCI)*  
*Asset Guarantee Program (AGP)*  
*Targeted Investment Program (TIP)*
- Recovery Act**
- TALF credit market program**
- FDIC bank debt insurance program (TLGP)**
- TARP auto industry programs**  
*GM/Chrysler restructurings*  
*Auto supplier support program*  
*Auto warranty commitment program*
- FDIC deposit insurance limit increase to \$250,000**
- Treasury money market fund guarantee program**
- AIG stabilization effort**

We tackled the financial crisis on several different fronts, supporting many facets of the economy so as to prevent further declines and restart growth.

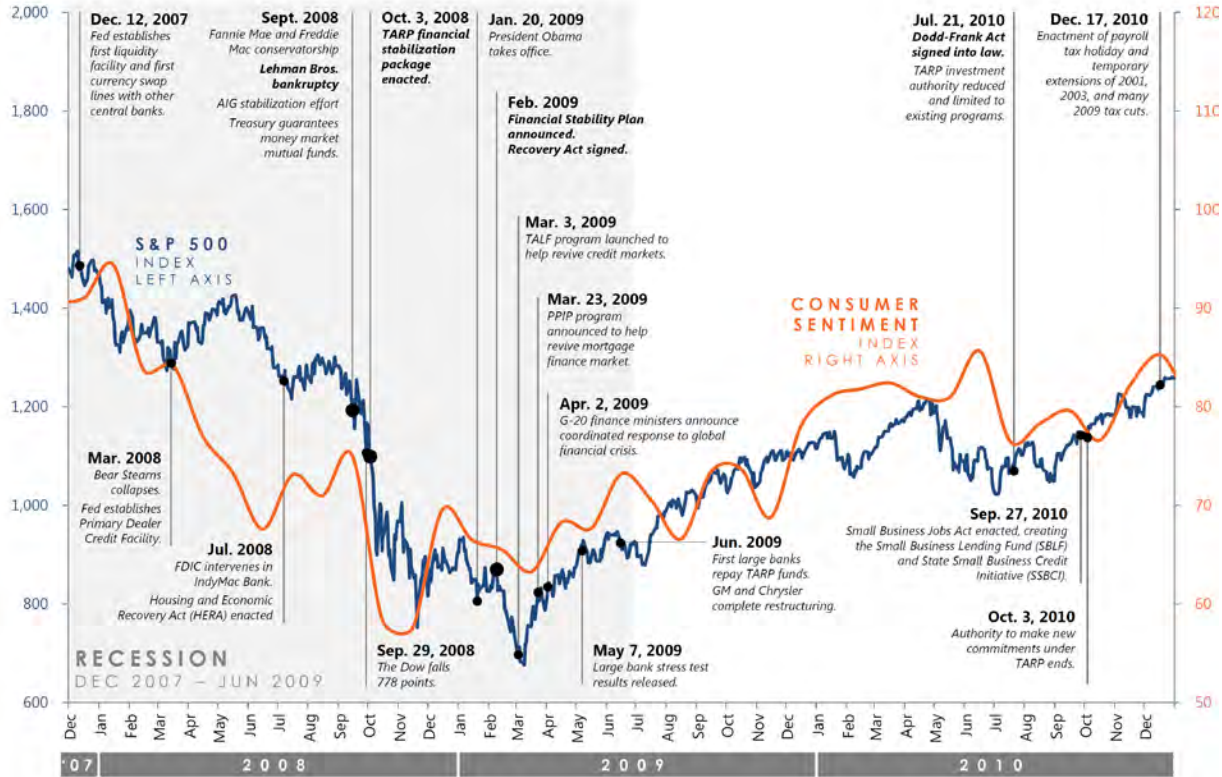
- WHAT DID IT SUPPORT?
- Small Business** *Helped support companies that need credit to hire and grow.*
  - Autos** *Helped support a crucial manufacturing industry and save American jobs.*
  - Financial Markets** *Helped restart markets that provide credit to consumers and businesses.*
  - Consumers** *Helped support families that need auto, credit card, and student loans.*
  - Retirement** *Helped support savers with 401(k) plans, money market funds, and other investments.*
  - Housing** *Helped support Americans seeking to obtain or refinance a mortgage, or avoid foreclosure.*

- Fannie Mae/  
Freddie Mac stabilization effort**
- Foreclosure-prevention  
and refinancing initiatives**  
*Making Home Affordable (MHA)*  
*Home Affordable Modification Program (HAMP)*  
*Home Affordable Refinance Program (HARP)*  
*Other federal loan modification programs*  
*Hardest Hit Fund*  
*Neighborhood Stabilization Program*
- Legacy Securities Public-Private Investment Program (PPIP)**
- Small Business Administration 7(a) Lending program, Small Business Lending Fund (SBLF), State Small Business Credit Initiative (SSBCI)**
- Treasury mortgage-backed securities purchase program**

Source: U.S. Treasury (2013)



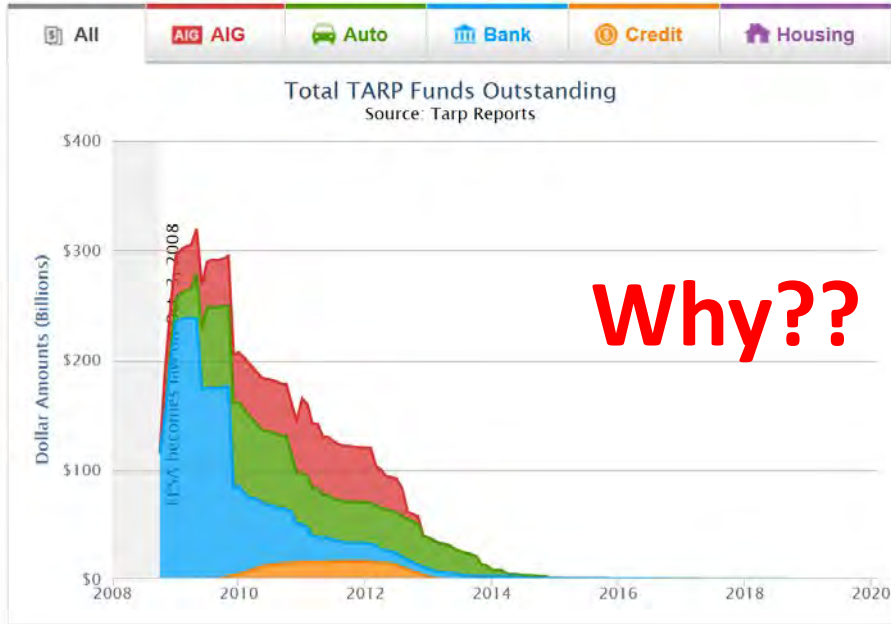
# Unprecedented Intervention



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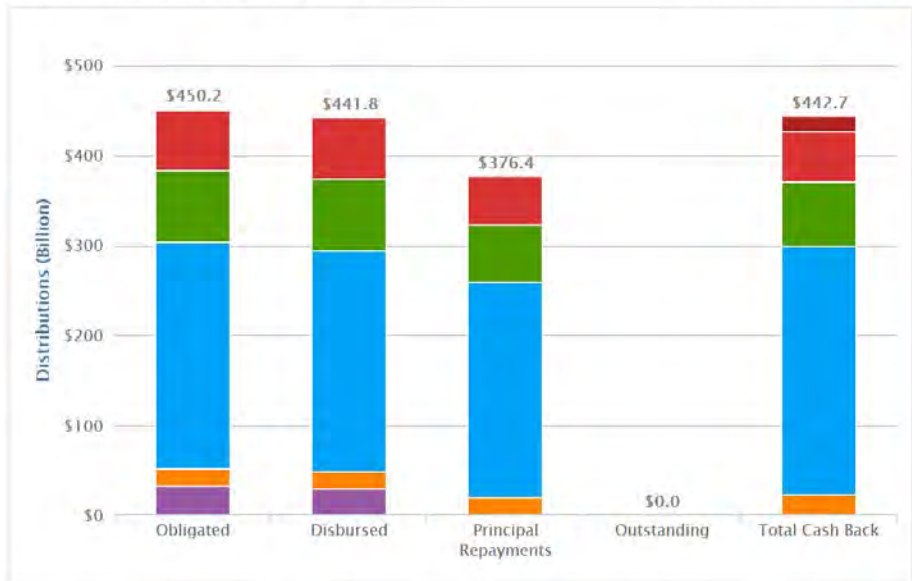
# Unprecedented Intervention

TARP Tracker from November 2008 to January 2020


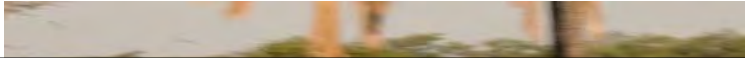


Disposition of TARP Funds to date

Percent Recovered: 96.2%



# To Prevent the Madness of Mobs!



“FDA is currently not aware of any adequate and well-controlled studies demonstrating that killing or decreasing the number of bacteria or viruses on the skin by a certain magnitude produces a corresponding clinical reduction in infection or disease caused by such bacteria or virus.”

– FDA (case #599132, 17 Jan 2020)



# Our Response To COVID-19 So Far

DOW JONES, A NEWS CORP COMPANY ▼

DJIA 23185.62 9.36% ▲ S&P 500 2711.02 9.29% ▲ Nasdaq 7874.88 9.35% ▲ U.S. 10 Yr 0/32 Yield 0.981% ▼ Crude Oil 32.97 3.91% ▲

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### **f** President Trump Signs Coronavirus Spending Bill

WASHINGTON—President Trump signed into law **an \$8.3 billion bill** for fighting the coronavirus outbreak, funding efforts to develop a vaccine and assisting local and state governments' responses, as officials said they were also weighing steps to bolster the U.S. economy.

# Our Response To COVID-19 So Far

- Public health crisis is not like a financial crisis
- Just throwing money at the problem isn't enough
- Need sustained attention and resources to monitor global health and **prepare** for outbreaks
- Vaccines and antibiotics are under-resourced
- CEPI, WHO, Gates Foundation are helping, but...

# Take-Aways

- Short-, medium-, and long-term perspectives
- Things will probably get worse before they get better
- One size does not fit all; diversification is key
- Re-examine your goals, constraints, resources
- Don't "freak out"; manage your fears, and beware of the madness of mobs
- Tools vs. solutions: if needed, seek financial advice ("fiduciary")

# Conclusion

- “So, first of all, let me assert my firm belief that the only thing we have to fear is fear itself—nameless, unreasoning, unjustified terror which paralyzes needed efforts to convert retreat into advance.” Franklin D. Roosevelt
- “Success consists of going from failure to failure without loss of enthusiasm.” Winston Churchill
- “If you’re going through hell, keep going.” Winston Churchill

**Thank You!**