

A Brief History of Financial Crises in the United States: 1900 - Present

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Timeline of Financial Crises

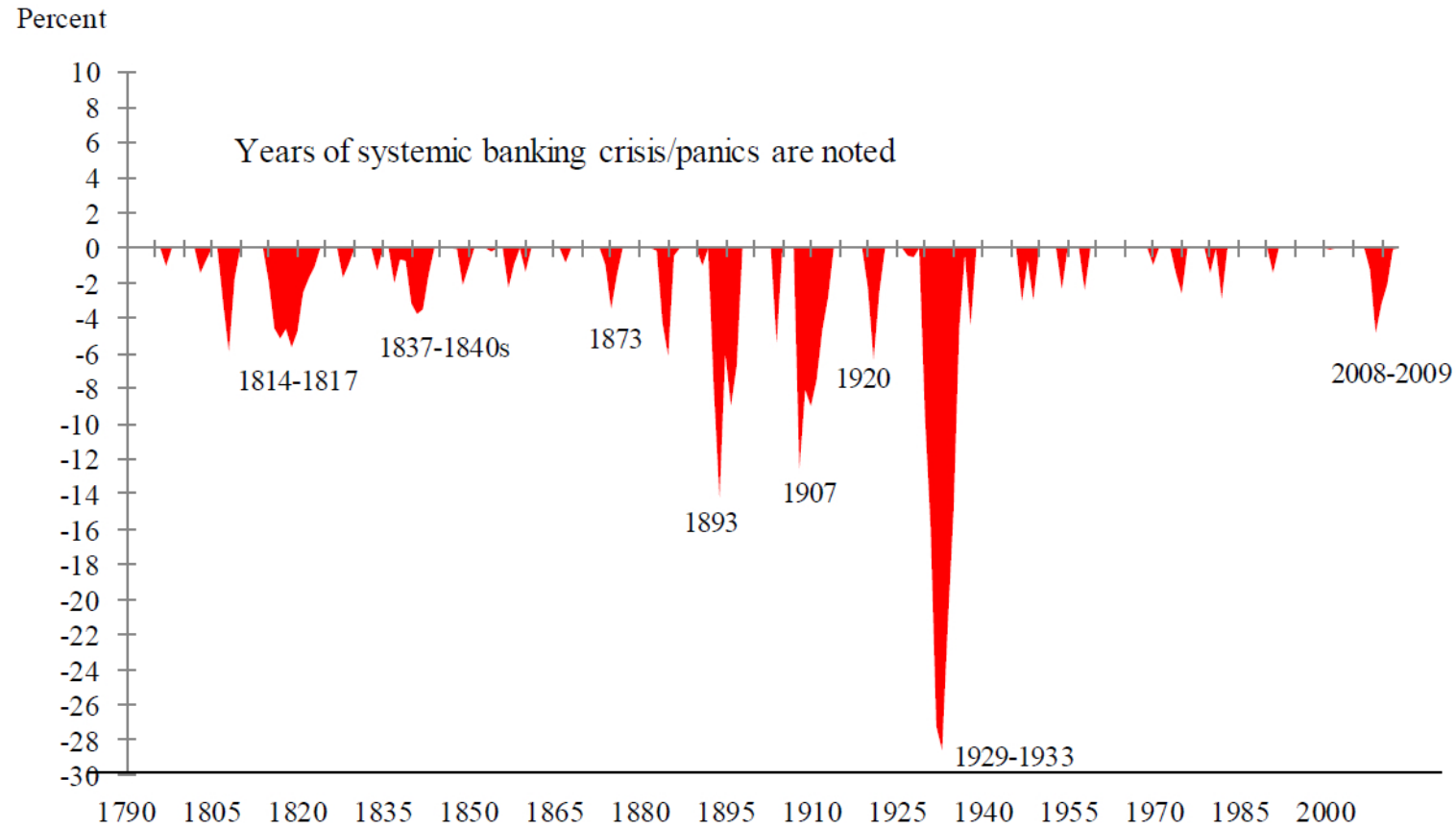
- ▶ Panic of 1837
- ▶ Panic of 1857
- ▶ Panic of 1873
- ▶ Panic of 1884
- ▶ Panic of 1893
- ▶ Panic of 1896
- ▶ Panic of 1901
- ▶ **Panic of 1907**
- ▶ **Wall Street Crash of 1929 and the Great Depression**
- ▶ **1970s Energy Crisis**
- ▶ 1980s Latin American Debt Crisis
- ▶ **Early 1980s Recession**
- ▶ 1983 Israel Bank Stock Crisis
- ▶ 1989-91 U.S. Savings and Loans Crisis
- ▶ 1990 Japanese Asset Price Bubble
- ▶ Early 1990s Recession
- ▶ 1994 Economic Crisis in Mexico
- ▶ 1997 Asian Financial Crisis
- ▶ 1998 Russian Financial Crisis
- ▶ 1999 Argentine Economic Crisis
- ▶ **Late 1990s and Early 2000s Dot-Com Bubble**
- ▶ **2007-2008 Financial Crisis**
- ▶ 2010 European Sovereign Debt Crisis

What is a Financial Crisis?

- (Claessens and Kose 2013): “extreme manifestations of the interactions between the financial sector and the real economy” (4)
 - Currency
 - Current and Capital Accounts
 - Debt (Sovereign)
 - Banking
- Crashes interact with Equities and Mortgage Markets

The Long View

Figure 2. Deviation of Real Per Capita GDP from its Previous Peak, United States 1790-2013
(deviation as a percent of previous peak level)



Sources: Reinhart, Rogoff and Harris (2014) and sources cited therein.

The Crisis and Panic of 1907

- Crisis: The beginning of a downturn and businesses contract and the prices of commodities and securities decline (Johnson 454)
- Panic: When the country's credit system breaks and confidence shifts. (Johnson 454)
- The Crisis began in January of 1907 and the Panic began in October of 1907 (Johnson 455).
- Crisis = world event (in countries who used the Gold Standard) (Johnson 455)

Panic of 1907 Continued

- ▶ Gold supply 1890-1907: 4,000,000 → 7,000,000 (Johnson 455)
- ▶ Bank Deposits 1890-1907: 6,000,000 → 19,000,000 (Johnson 455)
- ▶ Prices of commodities for Gold Standard countries rose 40% from 1897 to 1907 (Johnson 455)
- ▶ Stock Market reached a low in March of 1907 after an upwards rise leading up to the beginning of 1907 (Johnson 455-456)
- ▶ U.S. bank clearings increased from 51 billion in 1896 to 160 billion in 1906 (Johnson 456)
- ▶ Interest rates increased from 3-3.5% in 1897 to 7% in 1907 (Johnson 457)

Panic of 1907 Continued

- ▶ Output began to contract (Johnson 457)
- ▶ U.S. capital absorption went from 50,000,000 in 1892 to 487,000,000 in 1907 (Johnson 457)
- ▶ People decided the stock market was less attractive as returns on investing in railroads and industrial stocks paid lower returns than real estate and mines (more speculative) (Johnson 458)
- ▶ Cash Reserves: At banks they went from 18% in 1897 to 10% by 1907 and at trust companies reserves were 5% (Johnson 458)

Explicit Causes

- ▶ Capital funds decline because of wars (Johnson 461)
- ▶ Speculation (Johnson 461)
- ▶ Banks heavily increasing securities and holding very little in terms of reserves (Johnson 461)
- ▶ Started in January of 1907 with a decline in stocks that did not stop until March (known as the “silent panic”). Caused by people holding large interests had to sell and there were no buyers willing to pay what the stocks were quoted at in January. (Johnson 461)
- ▶ 1906 – Railroads and other businesses began issuing stocks and bonds, straining the money market and when Congress passed the Hepburn act, investors began to have concerns about the future of the railroads. (Johnson 461)
- ▶ Ultimately banks and trust companies were subject to deposit withdrawals (Johnson 464-465)

Ultimate signal of failure

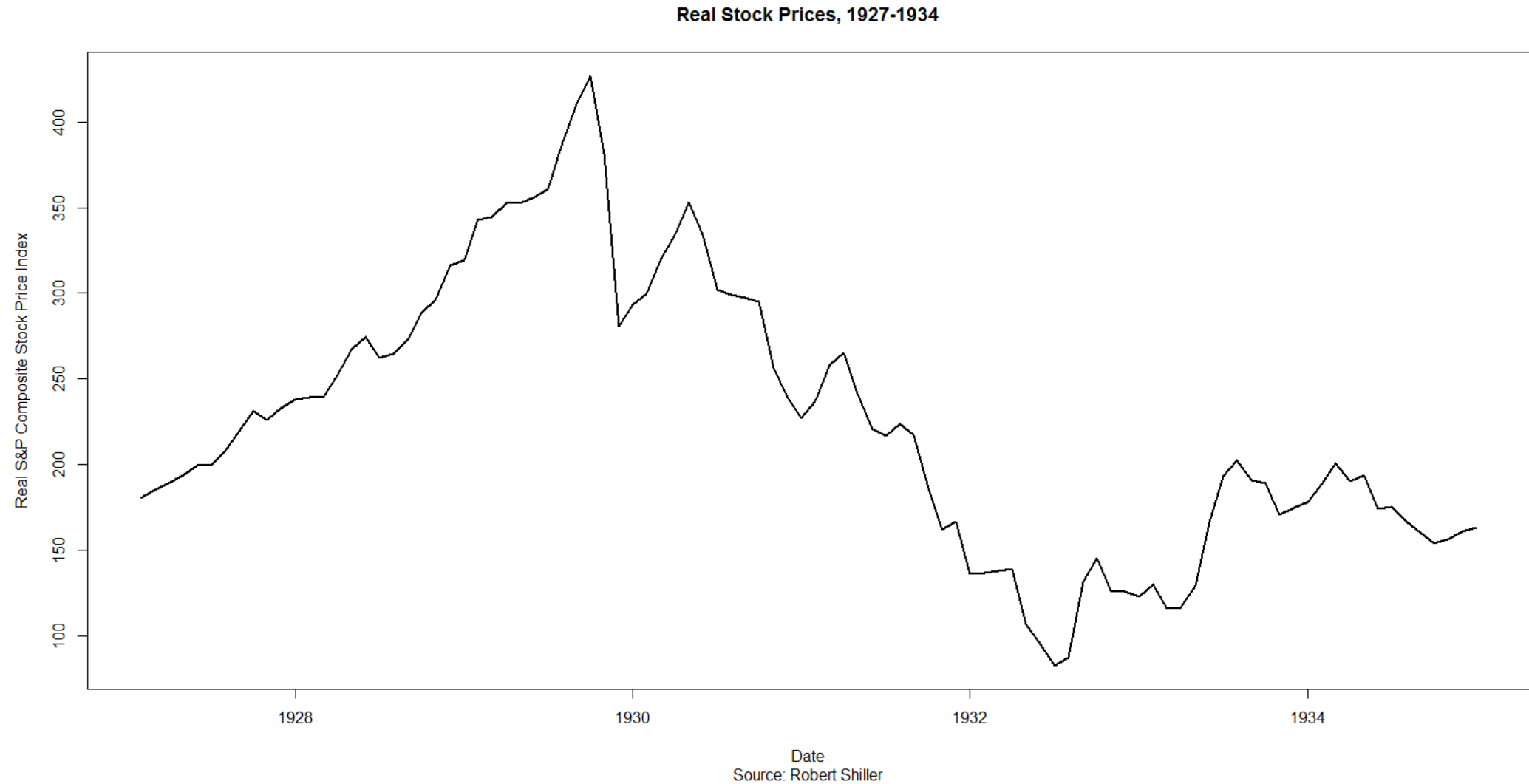
- Runs on the Knickerbocker Trust and Trust Company of America led to the Panic of 1907 in October (both located in New York and not supported by the New York clearing house banks) (Moen and Tallman 611)
- These clearing houses were important because they acted as lenders of last resort and because trust companies were not (Moen and Tallman 620)
- Main reason for financial distress = the contraction of collateralized loans (Moen and Tallman 622)

The Great Depression

Lead up to the Great Depression

- ▶ Weakness of capital spending between 1929 and 1933, real gross private investment fell by 90% and real gross national product fell by 30% (Barber 433)
- ▶ Autonomous investment in important sectors was much lower leading up to the Great Depression than it was prior to WWI (Barber 433)
- ▶ Rate of population growth was very low after WWI, in comparison to earlier decades (Barber 433)
- ▶ American economy generated capacity faster than demand. Production exceeded demand
- ▶ Unfavorable terms of trade internationally and hurt a lot of other countries (W.A. Lewis) Led to a fall in prices which was deflationary (Barber 434)
- ▶ Speculative optimism prolonged the boom and the collapse worsened the Depression (Arthur Smithies) (Barber 432)

Beginning of the Great Depression



Results of the Stock Market Crashing

- ▶ Output and asset prices fell (financial distress), leading to a fall in incomes and non-performing loans also increased (Eichengreen 12)
- ▶ Loss of confidence in the banking system, due to both real factors and general panic (White 119-120)
- ▶ Central banks whose obligations were reserve currencies and who suffered reserve losses, raised the discount rate to stem capital outflow (Eichengreen 13)
- ▶ Higher interest rates led to financial distress on commercial banks who then called in their loans to alter liquidity and increase reserves (Eichengreen 13)
- ▶ Decline in bank loans demand which contributed to the lowering of the money supply (Barber 452)

The Great Depression Continued

- ▶ Currency crises in other countries led to the Fed raising interest rates in 1931 in order to reduce capital outflows (Eichengreen 14-15)
- ▶ Gold Standard = restricted the ability of the central bank to act and ultimately caused very bad deflation (Eichengreen 17)
- ▶ United States ended up going off the Gold Standard, which freed up monetary policy and allowed the Fed to cut interest rates and fulfill the lender of last resort function (Eichengreen 16)
- ▶ U.S. also allowed the exchange rate to decline and to fulfill the demand for credit and money they discounted or left capital inflows unsterilized (Eichengreen 18)

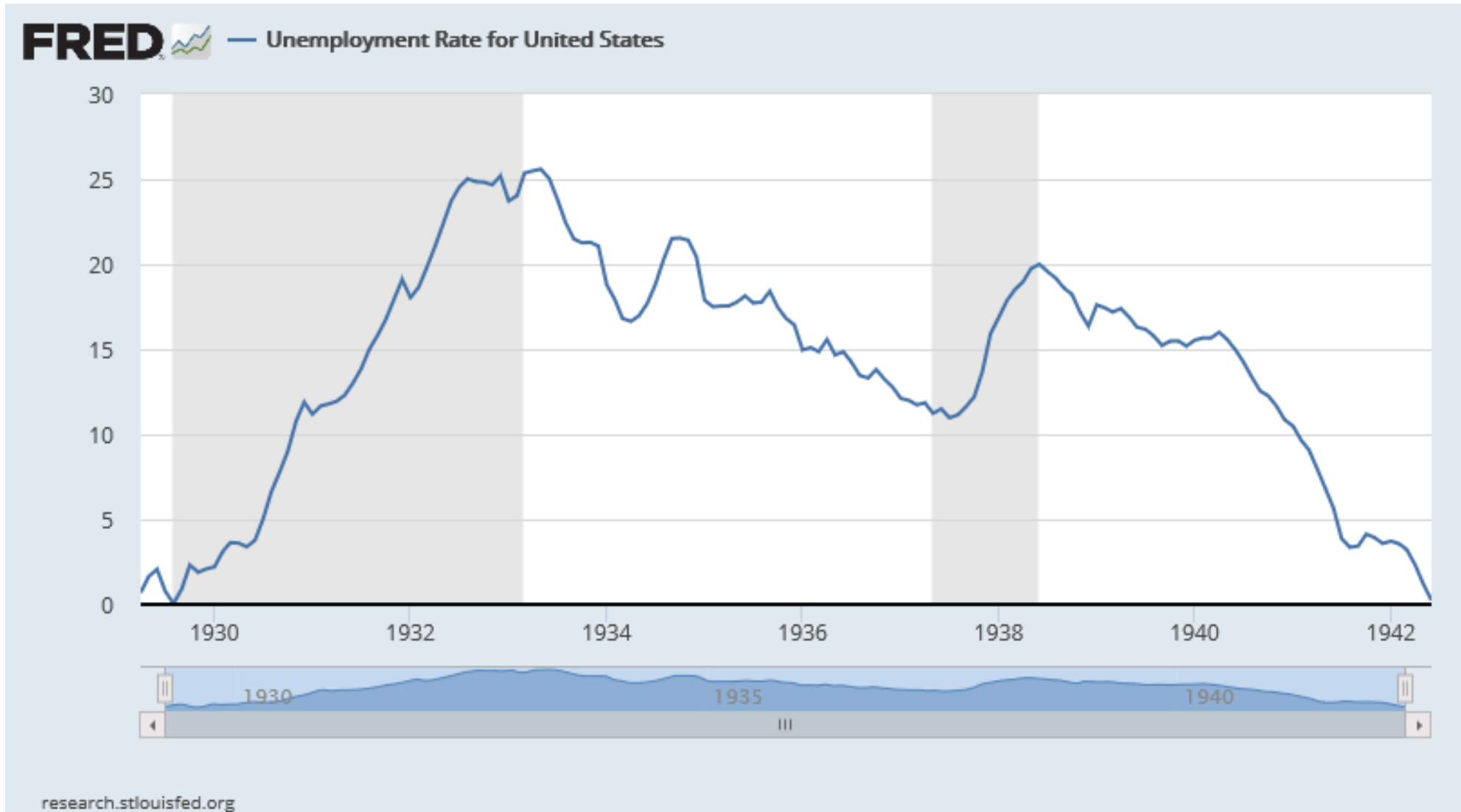
Great Depression and Wage-Price Rigidities (Bernanke and Carey 1996)

- ▶ Fed raised rates to lean against equities bubble
- ▶ Gold standard limited ability to expand M2, flight from fiat money
 - ▶ Banking Crisis in 1931
 - ▶ Runs, failures, bank holiday
 - ▶ “Scramble for Gold” worldwide, spread crisis
 - ▶ Countries that abandoned the gold standard earlier recovered faster
- ▶ Wage Rigidity (AR(1) Process), Persistent depression
- ▶ Dollar Devalued, Gold Inflow
 - ▶ Monetary expansion in 1933-1934 (Romer 1992)
 - ▶ Interest Rates decrease

International Ripples

- The Great Depression was felt throughout the whole world
- Although it began with the Wall Street Crash in 1929, it was compounded with a monetary slump in the form of the European monetary collapse in 1931 and then the U.S. monetary collapse in 1933 (Barber 434)
- Overproduction in branches of agriculture after WWI → fall in primary prices and demand for manufactured goods exported by advanced countries decreased (Barber 434)
- Protection of certain countries following WWI (Barber 434)
- International payments pattern = thrown off because of reparation payments and war debts
- U.S. cut imports (Barber 435)

U.S. Unemployment



The Energy Crisis of the 1970s

- Environmental concerns coupled with a demand for energy (Runyon and Rocks 3)
- Creation of the 1969 Environmental Protection Act and 1970 Clean Air Act (Runyon and Rocks 3)
- Oil and natural gas production in the U.S. lagged (Runyon and Rocks 3)
- Delays in construction of the Alaskan Pipeline (Runyon and Rocks 3)
- Opposition to nuclear energy (Runyon and Rocks 3)
- Exponential Population growth rates (Runyon and Rocks 3)
- Increases in energy prices (
➤ Brought on by an OPEC embargo on oil – decrease in supply and increase in prices
- Three parts to the crisis: the oil crisis, the natural gas crisis and the electrical utility crisis sector (Lifset 23)

Oil Crisis

- Started with downwards pressure on oil prices within the U.S. as the U.S. had a mandatory import program which ended up creating a ceiling and floor for the price of oil (Lifset 26)
- 1973 – Nixon ended this program and world prices matched U.S. prices and the U.S. had reached peak oil production (Lifset 26-27)
- Gas prices eventually became high due to a price freeze by Nixon so refineries shifted to creating gas as opposed to natural heating oil (Lifset 29) The price freeze was implemented on prices and wages and was designed to combat inflation (Lifset 28)
- Cold winter of 1972-73 led to refineries creating heating oil as opposed to gas (Lifset 29)
- Gas shortages came about before the OAPEC embargo and many viewed this as a policy failure and it got worse once the OAPEC embargo was implemented (Lifset 29)

Natural Gas Crisis

- ▶ 1973 employees in Midwest were laid off (Lifset 30)
- ▶ Natural gas could only be moved through a pipeline (Lifset 32)
- ▶ Costs of looking for it and creating natural gas = relatively high so a lack of supply (Lifset 33)
- ▶ Utility companies increased demands in order to address concerns about air pollution and thus demand exceeded supply creating a shortage (Lifset 33-34)

Utility Crisis

- ▶ Bailout of Consolidated Edison of New York, which was largest private utility company and helped it avoid bankruptcy (Lifset 34)
- ▶ Lack of technological advances, environmental movements and the other two crises (Lifset 35)
- ▶ Environmental laws → hard to build new utility plants as well as deciding on which fuel source to use (Lifset 36)
- ▶ Oil and natural gas crises helped exacerbate the utility part of the overall crisis (utilities used these fuel sources so they felt the shortages) (Lifset 36)

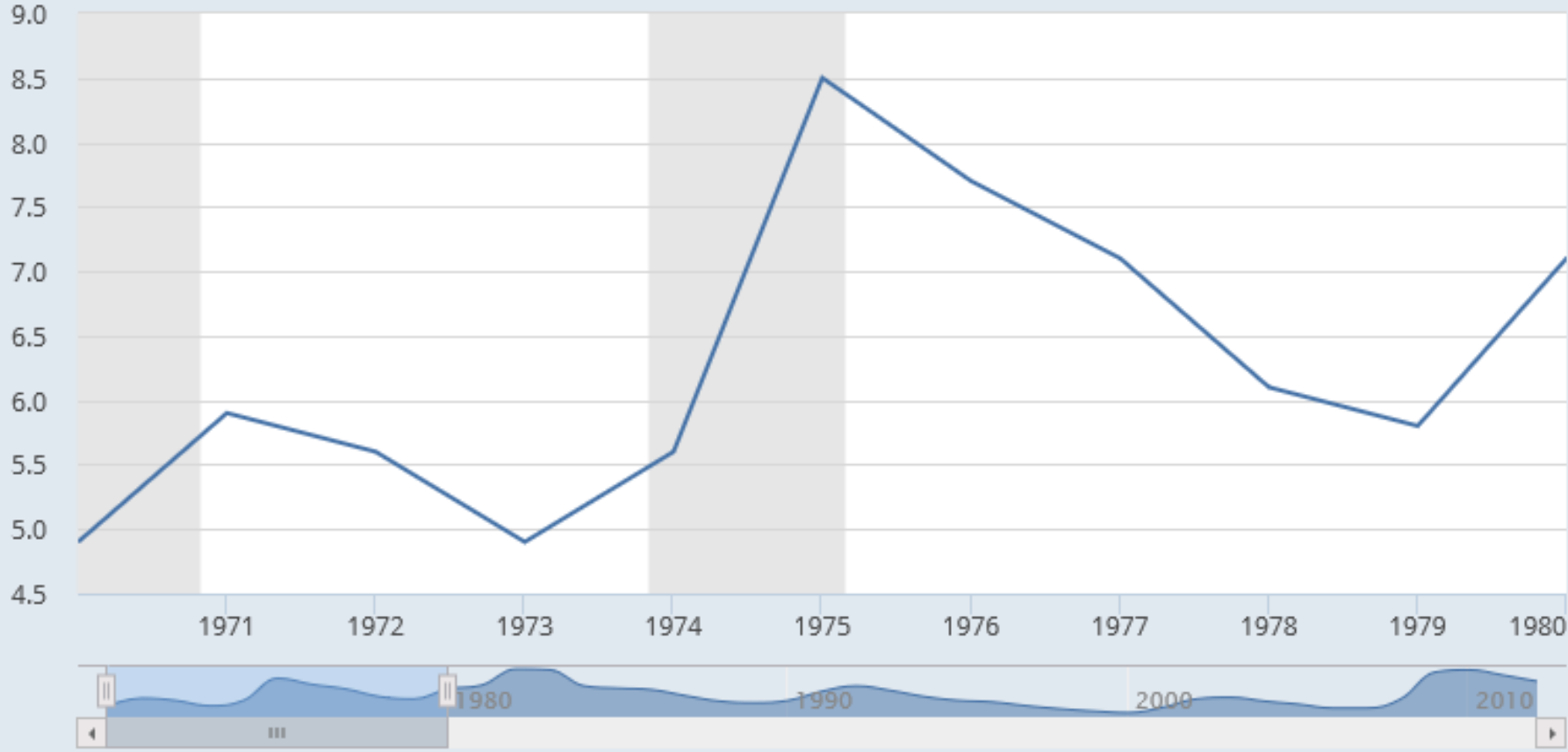
Effects of the Energy Crisis

- Price increases in energy
- Inflation would be a result
- Industries that use certain types of energy will falter (Runyon and Rocks 6)
- Increase in unemployment during the energy crisis (Early 14 and 16)

Unemployment Rate

FRED 

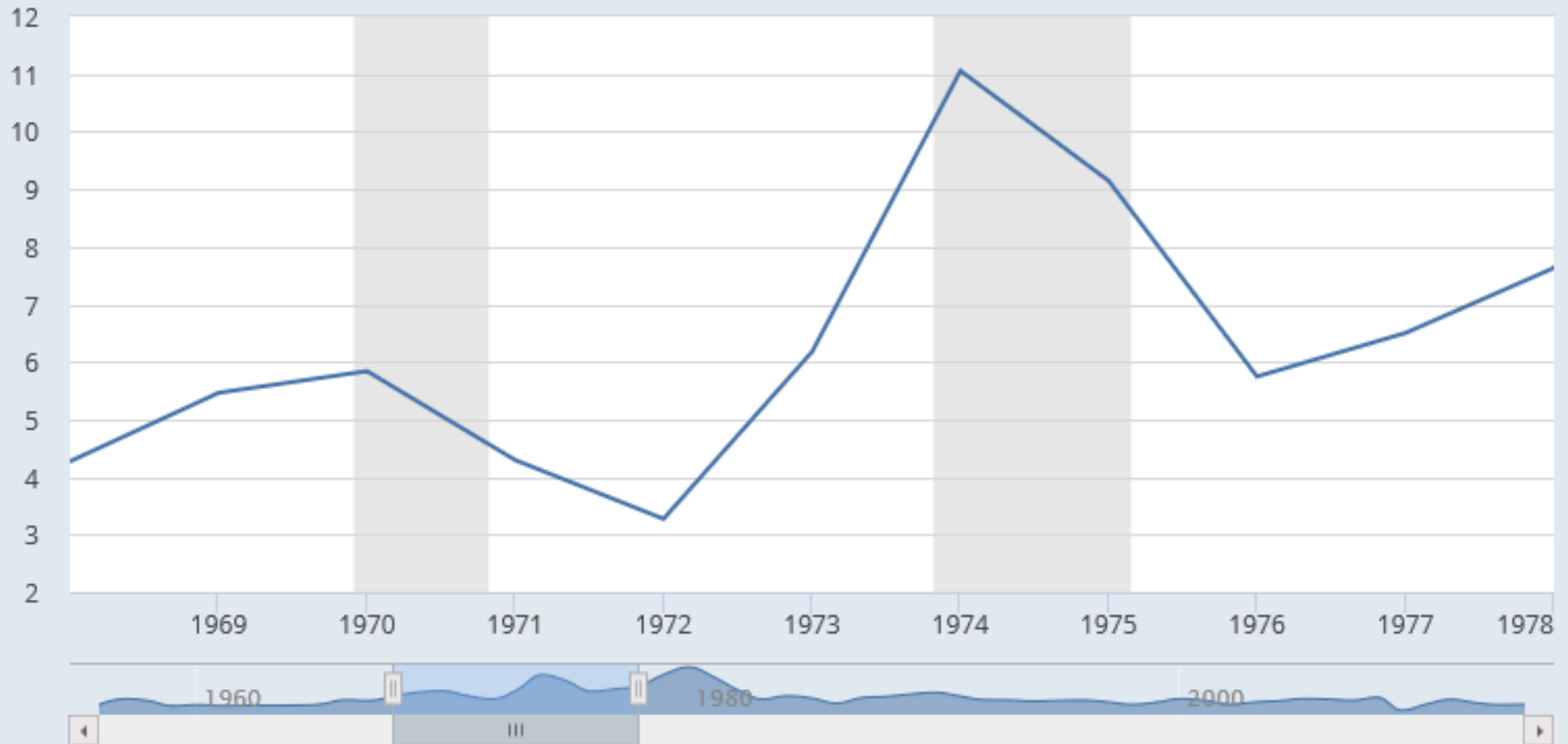
— Unemployment Rate in the United States (DISCONTINUED)



Consumer Price Index

FRED 

— Consumer Price Index: Total All Items for the United States®



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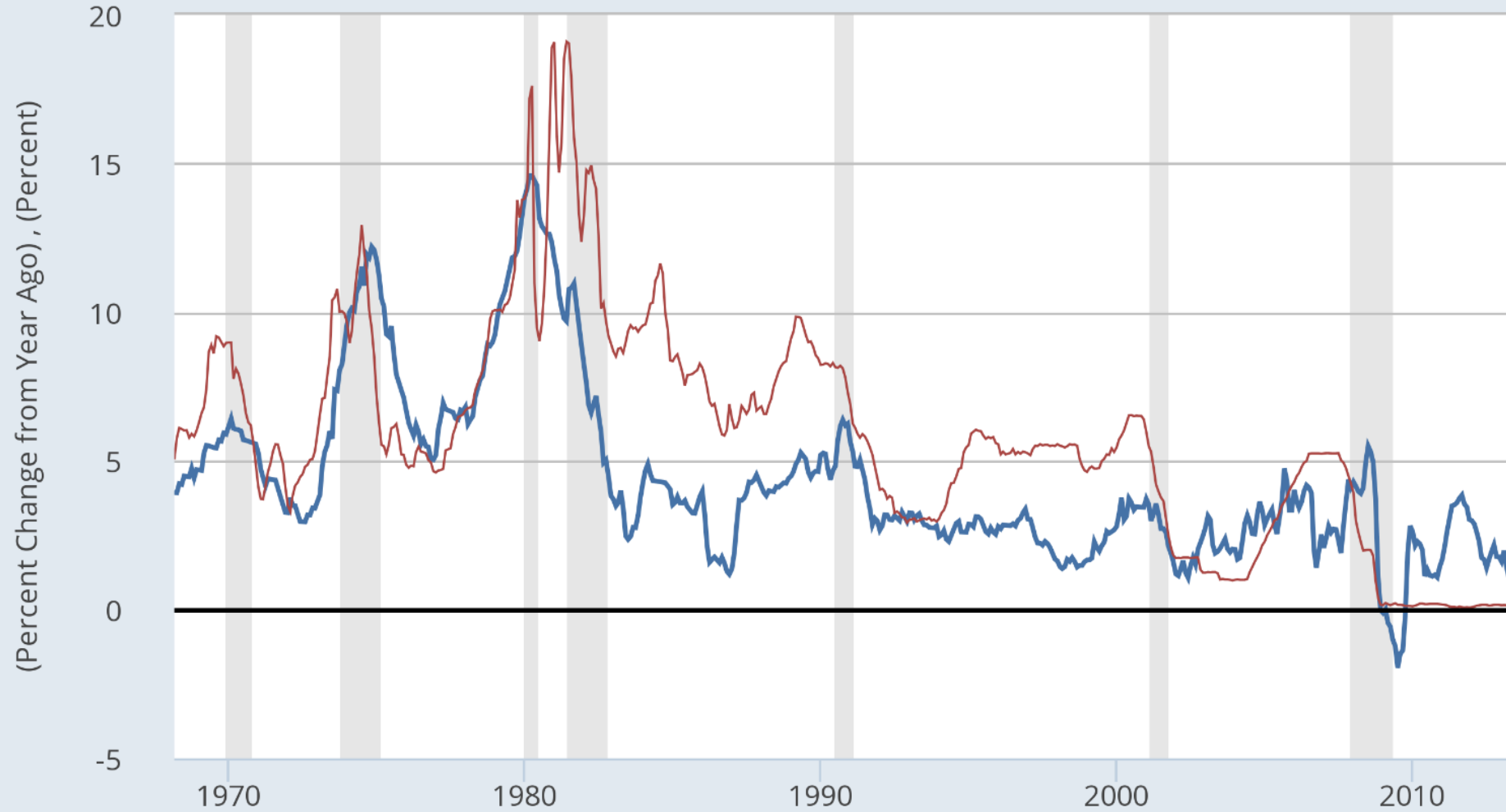
A BRIEF HISTORY OF MODERN US FINANCIAL CRISES, PART II

1980-2016

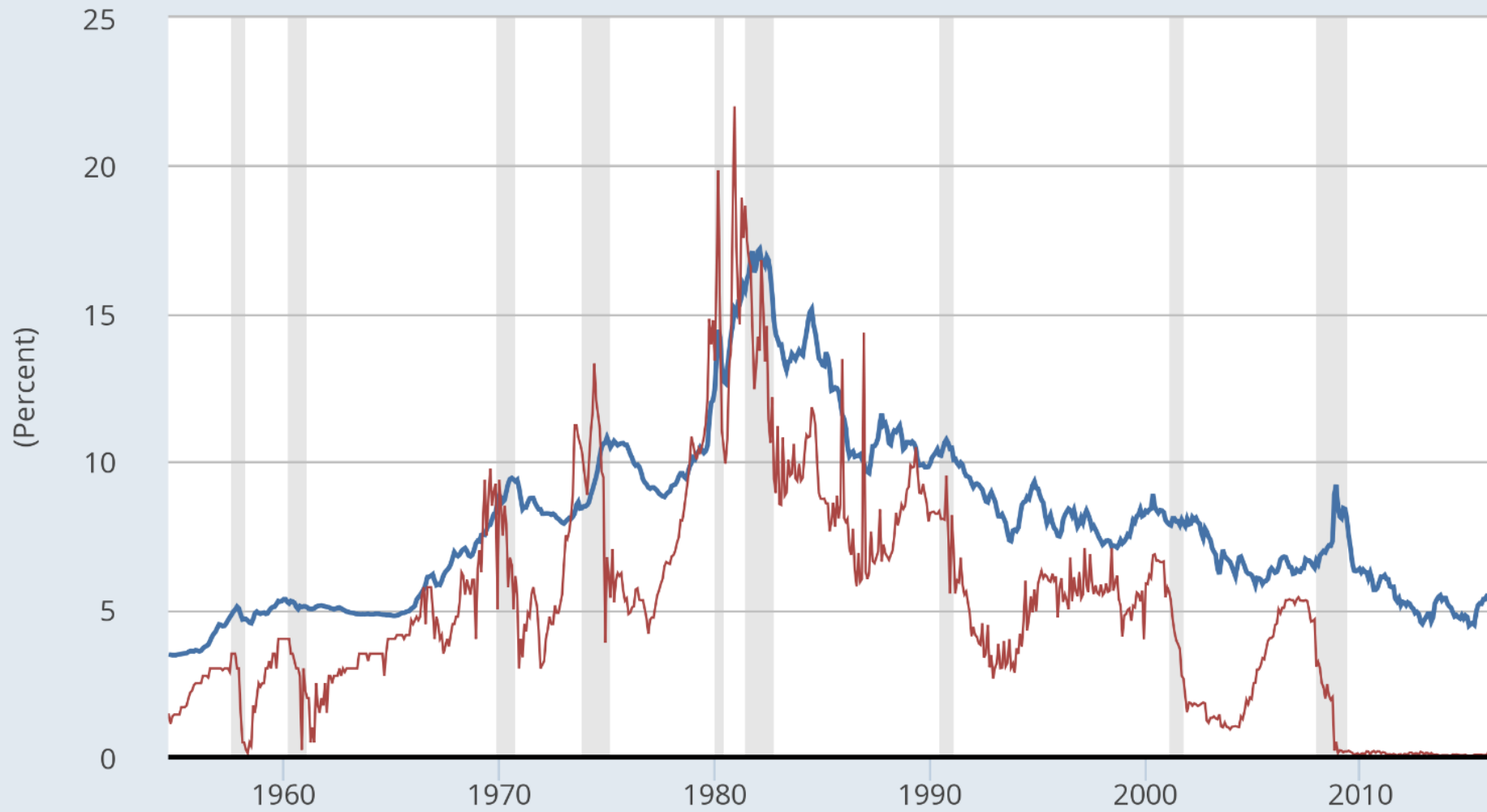
Brief Digression: 1981 Recession (Goodfriend and Kind 2005)

- ▶ Volcker shock: Fed raised rates to combat inflation
 - ▶ Inflation dropped from 11% in 1980 to 4% in 1983
 - ▶ Fed Funds: Rose to 19%
 - ▶ (Also fiscal shocks)
- ▶ “Double-dip Recession”
- ▶ Manufacturing Sector hit hard
 - ▶ Unemployment: 10.8%
- ▶ Financial Crises and credit crunches worldwide

— Consumer Price Index for All Urban Consumers: All Items
— Effective Federal Funds Rate



— Moody's Seasoned Baa Corporate Bond Yield©
— Effective Federal Funds Rate

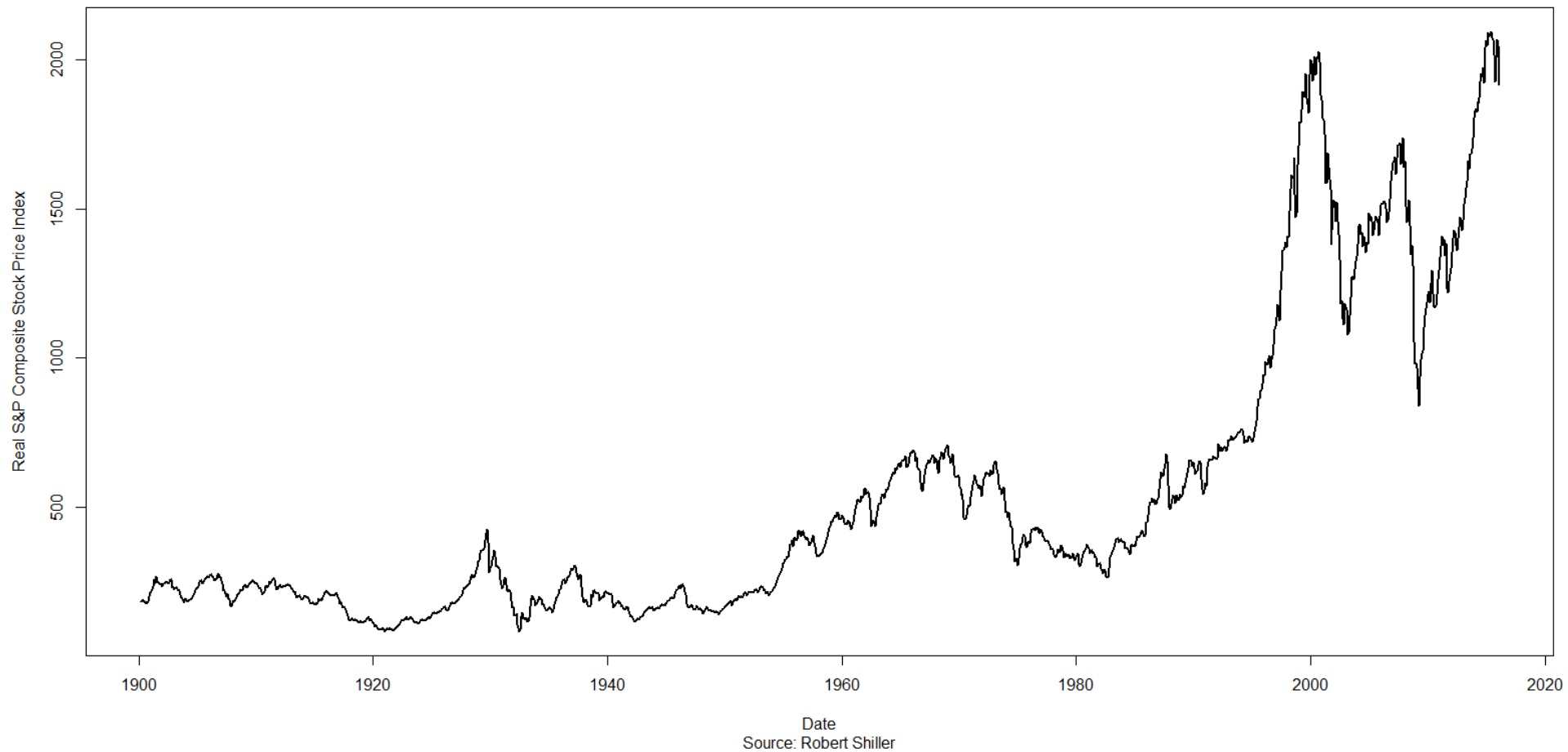


1997 Dot Com Bubble

- ▶ Signs of equities asset bubble and mispricing (Shiller)
 - ▶ CAPE: 10-year price earnings ratio inversely correlated to annualized real 10 year returns, with dividends
 - ▶ Year 2000: P/E 10 was around 45
 - ▶ Historical Average: Around 16
- ▶ Market lost 2/3 of its value (US 2011)
- ▶ Mostly confined to equity market (Claessens and Kose 2013)
 - ▶ Damage to rest of economy limited
- ▶ Punctuated with slowdown, small 2001 recession
 - ▶ Economy slipped from 12.71 trillion to 12.67 trillion (2009) USD after 9/11

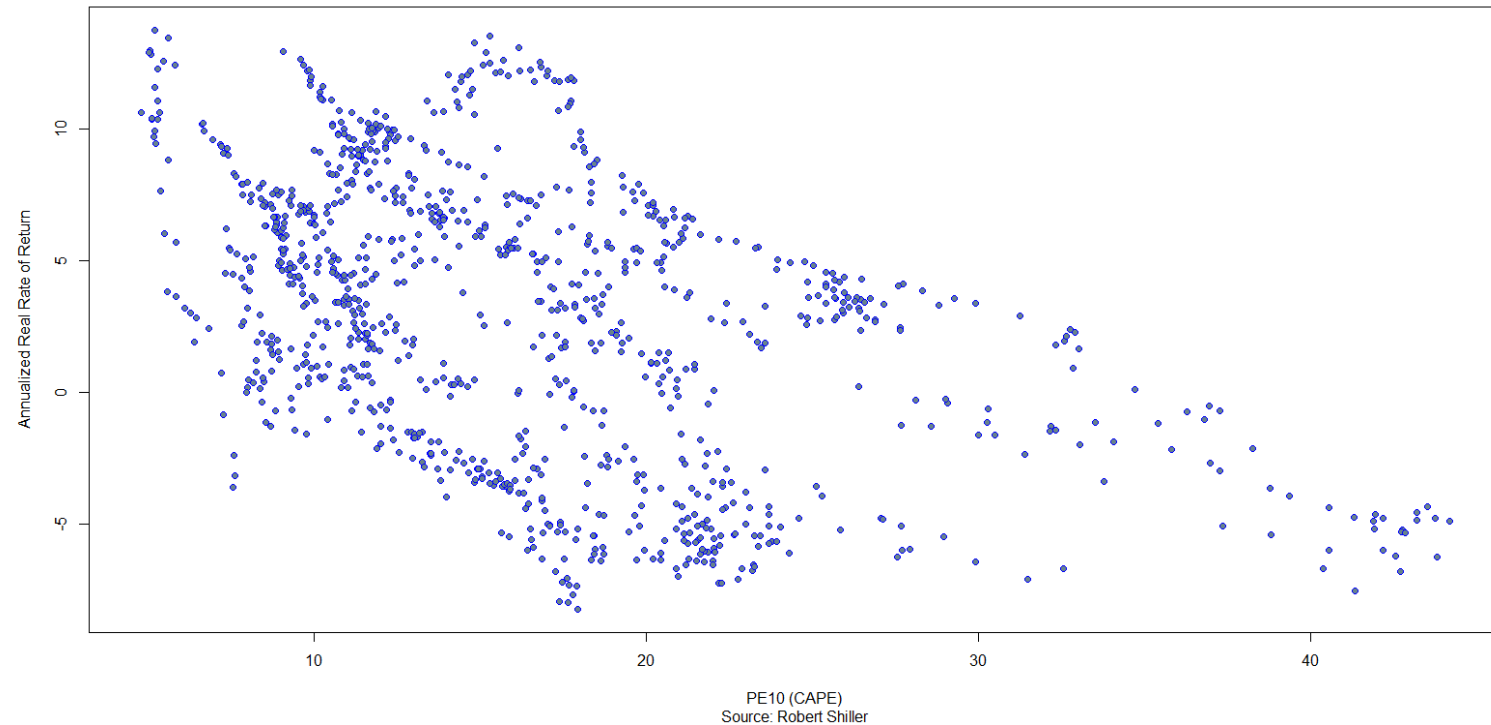
From Robert Shiller:

Real Stock Prices Since 1900



Price-Earnings Ratios and Returns (Here, sans-Dividends)

10 Year Price-Earnings and Annualized 10 Year Returns, 1920-2006

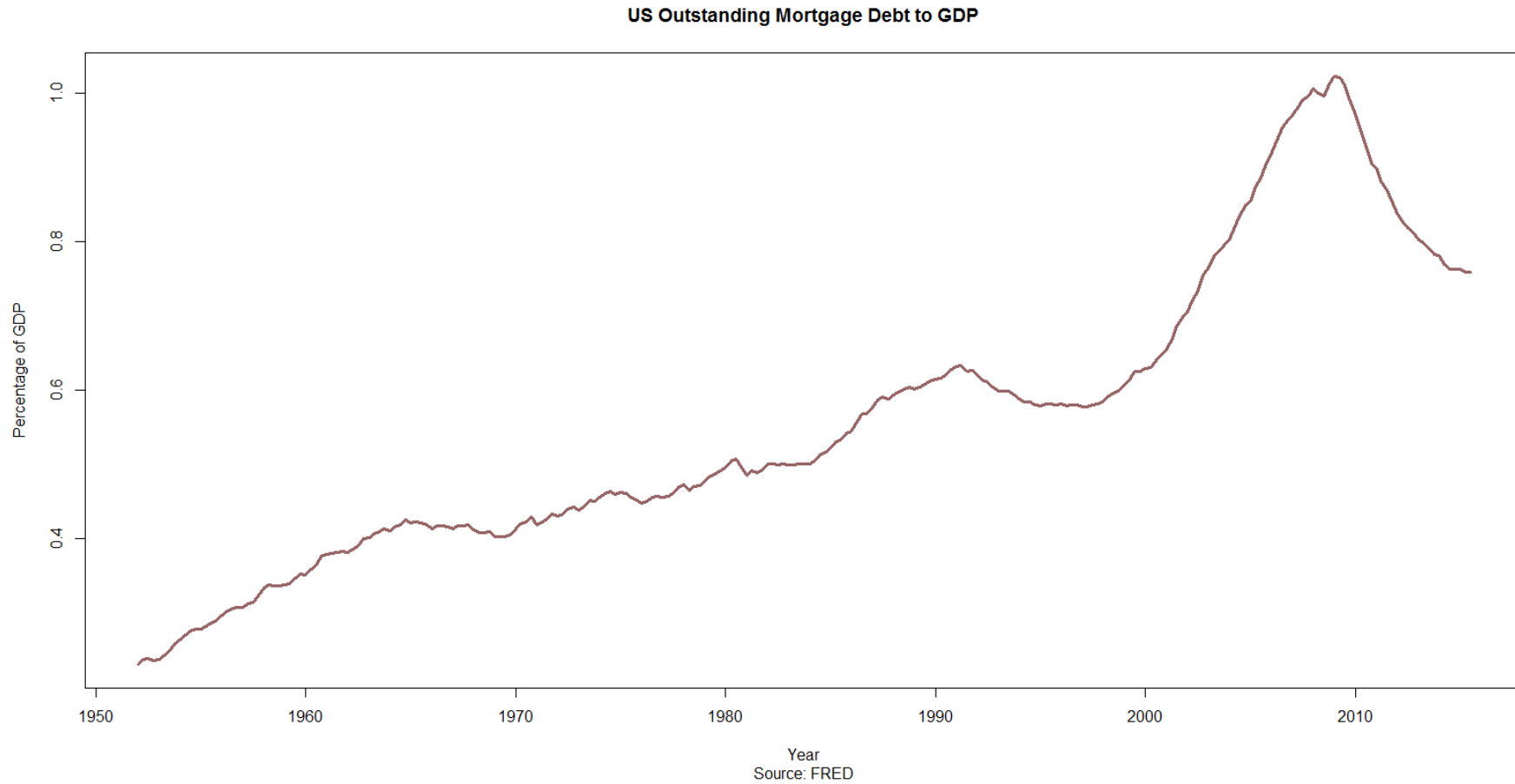


The 2008 Financial Crisis

Lead Up To the Crisis

- ▶ Loose Monetary Policy
 - ▶ Interest Rates and monetary expansion abnormally low compared to Taylor Rule (Taylor 2009)
- ▶ Expansion of Credit and Securitization
 - ▶ Fueled Housing Boom (Mian and Sufi 2010)
- ▶ Housing Boom
 - ▶ Further incentivized by 2000s tax credits (Mian and Sufi 2010)
 - ▶ Home Prices increased 50% from 2000 to 2006 (US 2011)
 - ▶ By 2005, 69% of Americans estimated to own a home, a 5% increase since 1995 (US 2010)
 - ▶ House prices and borrowing rising far faster than incomes (Mian and Sufi 2010)
- ▶ Leverage (40:1) (US 2011)
 - ▶ Fanny Mae and Freddy Mac: 70:1

Housing Debt to GDP (FRED Data)

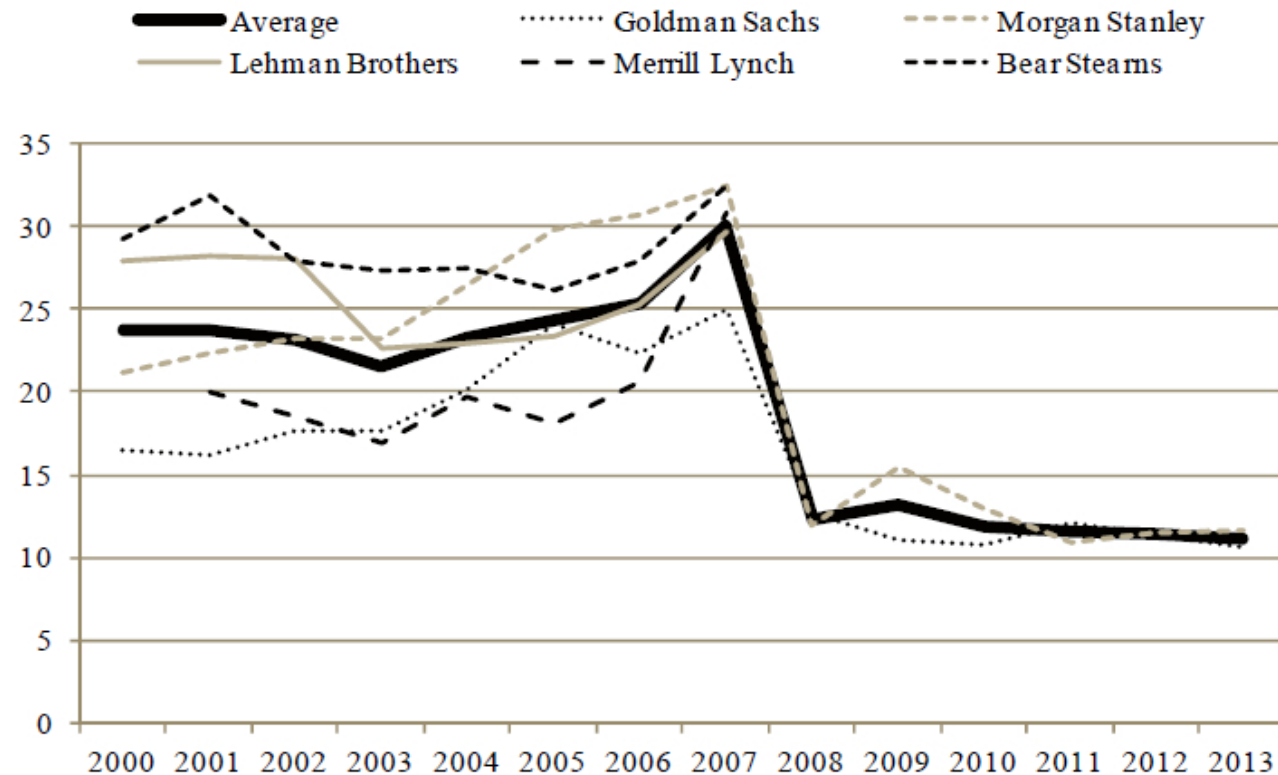


Securitization (US 2010)

- ▶ Mortgage Backed Securities: contingent upon mortgages
 - ▶ Debt pooled by lending banks, resold to investment banks and hedge funds
 - ▶ Fannie Mae and Freddie Mac guaranteed theirs in case of default
 - ▶ Sub-Prime Mortgages: Borrowers not Credit Worthy
 - ▶ FICO > 660, high debt, delinquencies, bankruptcies, etc
 - ▶ Adjustable Rate Mortgages (ARMs): low initial rates, higher market rates later
 - ▶ In 2006, 23.5% of all new mortgages were subprime (\$700B)
- ▶ Grouped into AAA, AA, BBB, BB Risk-Sorted Tranches
- ▶ Sold as Collateralized Debt Obligations (CDOs)
 - ▶ Intended to lower risk exposure
 - ▶ Diversification requires low covariance
 - ▶ Passing dangerous debts along: Moral Hazard?
- ▶ CDO²: CDOs of CDO Tranches; more stable, or less?
- ▶ Credit Default Swaps: primarily a means of “going long” or “shorting” securities, betting on future value
 - ▶ AIG ended up on the wrong side of this (US 2011)

Leverage of Financial Institutions (Giroud and Mueller 2015)

Panel (B): Investment Banks' Debt-to-Equity Ratios
(Giroud and Mueller 2015)



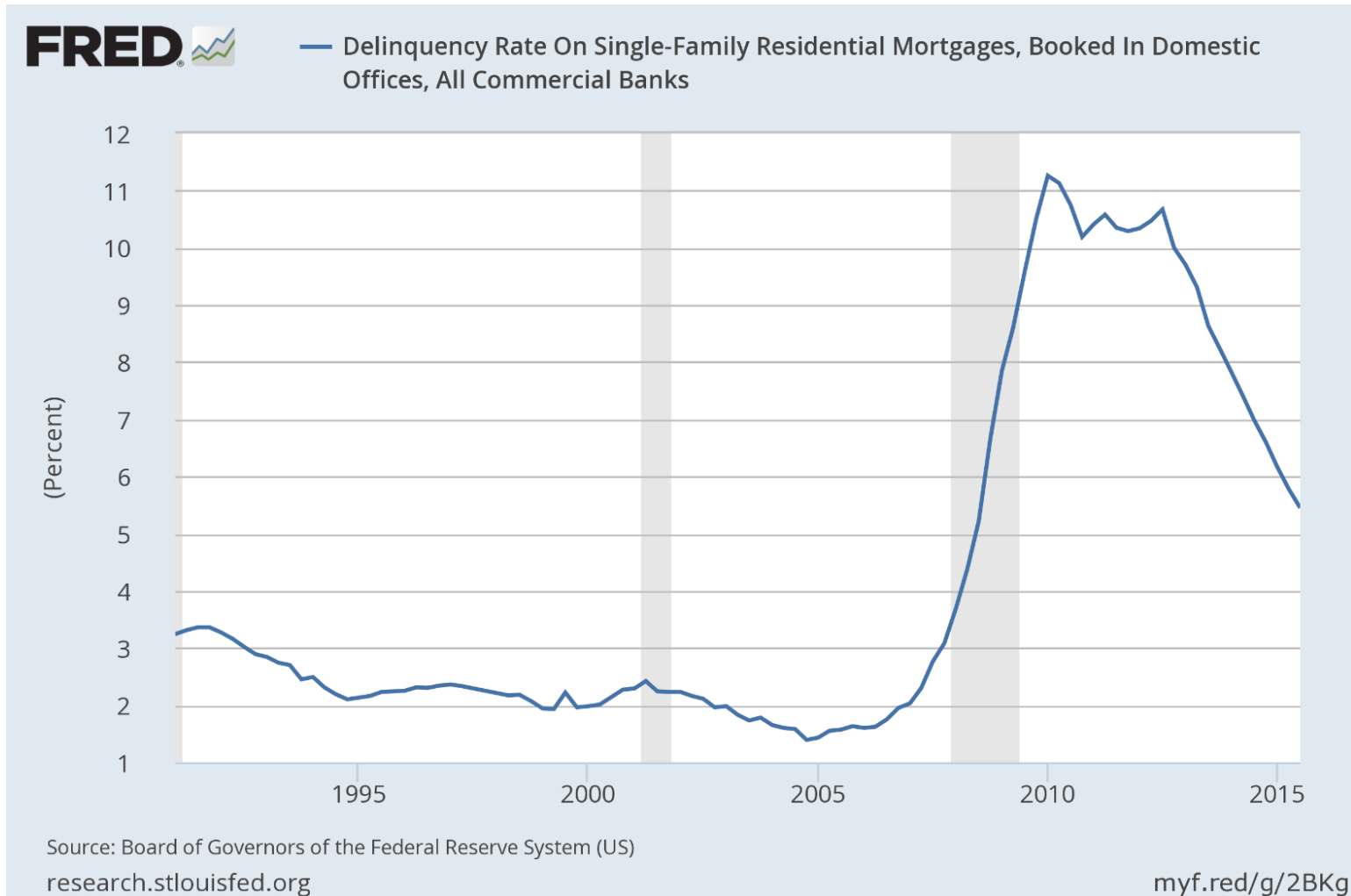
The Failure of Credit Ratings Agencies (US 2011)

- ▶ 10 registered agencies in US, but just 3 issue 98% of credit ratings, take in 90% of revenue
 - ▶ Moody's
 - ▶ Standard and Poor's
 - ▶ Fitch Ratings Ltd.
- ▶ AAA implies ~0.04% probability of default or interruption of revenue
 - ▶ Assumed independence of housing defaults, MBS revenues, CDOs
- ▶ SEC: "Potential conflicts of interest"
 - ▶ Ex: Moody's profits on MBS ratings rose from \$61M (2002) to \$260M (2006)
- ▶ By 2010, 90% of previously "AAA" RMBS downgraded to junk
 - ▶ 83% securities rated AAA in 2006 later downgraded, 73% to BB (JUNK)
- ▶ 2006 Long Beach AAA MBS: 50%+ default rate
 - ▶ Ratings agencies off by scales of by factor of over 1000

“The credit ratings and observations contained herein are solely statements of opinion and not statements of fact or recommendations to purchase, hold, or sell any securities or make any other investment decisions.”

-S&P Disclaimer (qtd. in US 2011)

Mortgage Delinquency Rate



Contagion

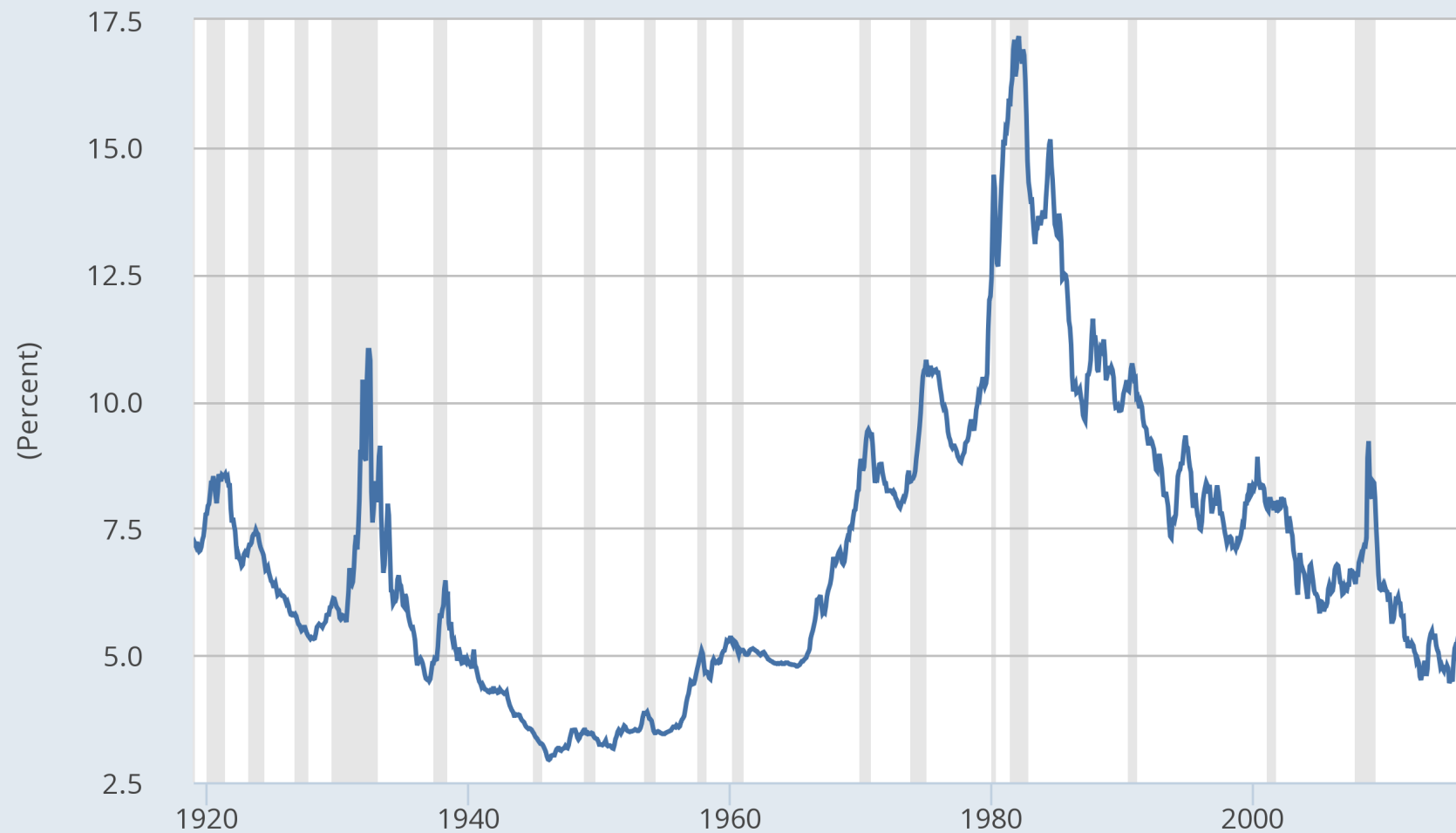
- ▶ Systemic risks prevalent, even with the influence of the Federal Reserve
 - ▶ Banks “coinsure” and lend to/deposit at one another (Allen et al. 2009)
 - ▶ Balance Sheets, interbank deposits
 - ▶ High degree of interconnectedness
 - ▶ CDS
 - ▶ Synthetic CDOs, OTC Derivatives (2011)
- ▶ Harmful positive feedback loops
- ▶ Liquidity Crises
 - ▶ “Firesale” Prices (US 2011)
 - ▶ Lending markets “dry up” (US 2011)
 - ▶ Note: Shadow Bank Runs (US 2011)
 - ▶ Contract renegotiations
 - ▶ Collateral payments
 - ▶ Solvency vs Liquidity: the self-fulfill prophecy of runs (2011)
- ▶ “Too Big to Fail” Institutions

The Timeline of the Crash (US 2011)

- ▶ July 2007: Mortgage default rate edges up, home prices decline 4%
 - ▶ Sub-prime mortgages up to 16% delinquent
 - ▶ Shock to revenue streams and value of RMBS
 - ▶ Moody's downgrades AAA ratings en-masse
 - ▶ Moves to short via CDS
 - ▶ Commercial Paper and Repo Lending (short term, largely uncollateralized) disappeared
 - ▶ Shock to firms using them to finance day-to-day
- ▶ Runs on Shadow Banks
- ▶ March 2008: Bear Stearns Collapses, liquidity nosedives
 - ▶ Bought out by JP Morgan, with \$30B loan from NY Fed
- ▶ September 2008: Fannie Mae and Freddie Mac fail, nationalized
 - ▶ Obligated to \$5T of mortgages, capital < 2%
- ▶ Lehman Brothers goes Bankrupt, files Chapter 11
 - ▶ Barclays walks away from buyout deal
 - ▶ Fed opts not to lend, fearing run on Lehman too expensive to cover, uncertainty deepens

Timeline of the Crash, Continued (US 2011)

- ▶ The financial crisis begins in full, dozens of firms fail
- ▶ (Still) September 2008: AIG bailed out for \$180B
 - ▶ Systemic risk in case of failure deemed too great
 - ▶ Short-term commercial paper lending practically nonexistent
- ▶ September 15: Dow Jones -4%
 - ▶ By Mid-October, losses would be 9%, or \$889 B
- ▶ October 2008: Troubled Asset Relief Program (TARP)
 - ▶ Signed by Bush
 - ▶ \$700B initially, worked back
- ▶ 2009: American Recovery and Reinvestment Act:
 - ▶ \$787B stimulus
- ▶ Fed expanded money supply by \$1.7T from 2008-10, bringing rates down to near-zero
 - ▶ Open Market Operations, Quantitative Easing, Forward Guidance



Source: Board of Governors of the Federal Reserve System (US)
research.stlouisfed.org

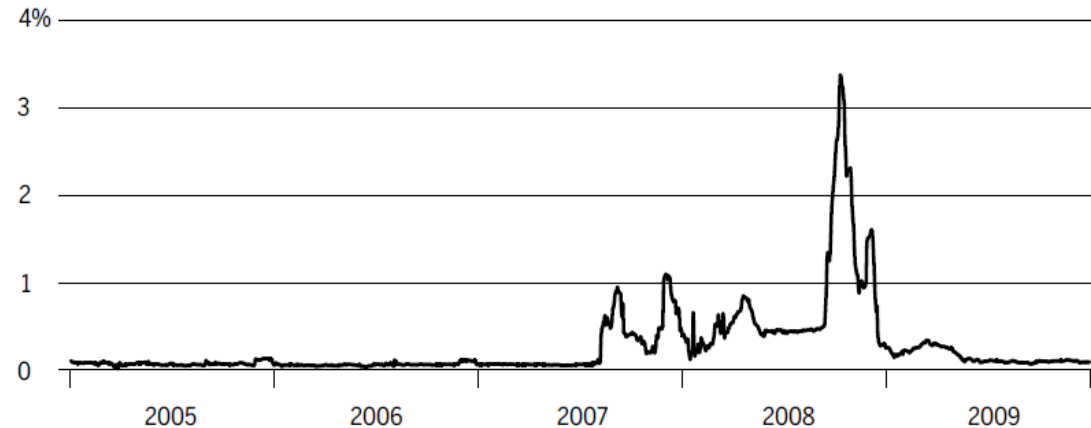
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From the Report... (US 2011)

Cost of Interbank Lending

As concerns about the health of bank counterparties spread, lending banks demanded higher interest rates to compensate for the risk. The one-month LIBOR-OIS spread measures the part of the interest rates banks paid other banks that is due to this credit risk. Strains in the interbank lending markets appeared just after the crisis began in 2007 and then peaked during the fall of 2008.

IN PERCENT, DAILY



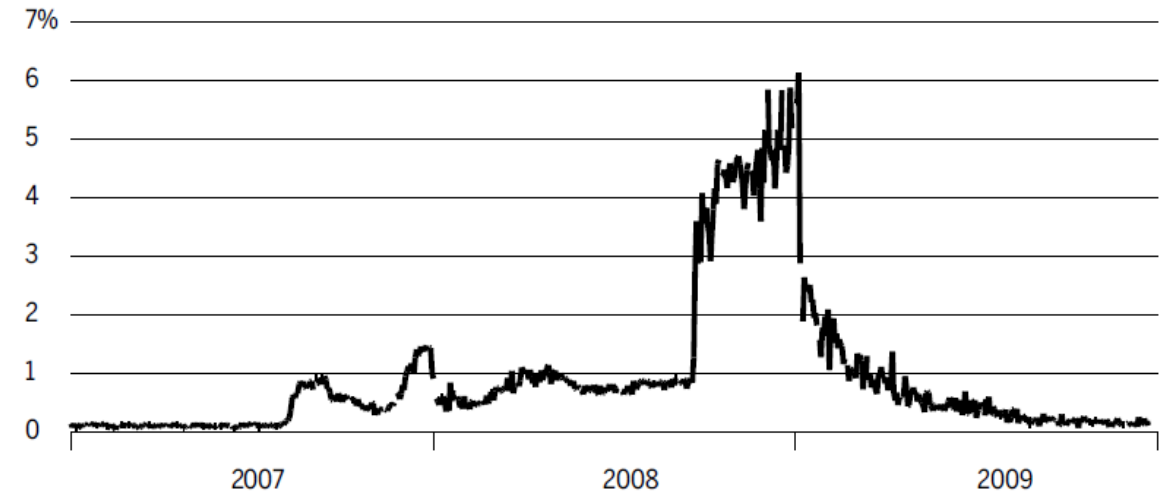
NOTE: Chart shows the spread between the one-month London Interbank Offered Rate (LIBOR) and the overnight index swap rate (OIS), both closely watched interest rates.

SOURCE: Bloomberg

Cost of Short-Term Borrowing

During the crisis, the cost of borrowing for lower-rated nonfinancial firms spiked.

IN PERCENT, DAILY



NOTE: Shown is the spread between the rate paid by second-tier rated nonfinancial companies (A2/P2) that borrowed by issuing 30-day commercial paper and the rate paid on similar paper by the best-rated companies.

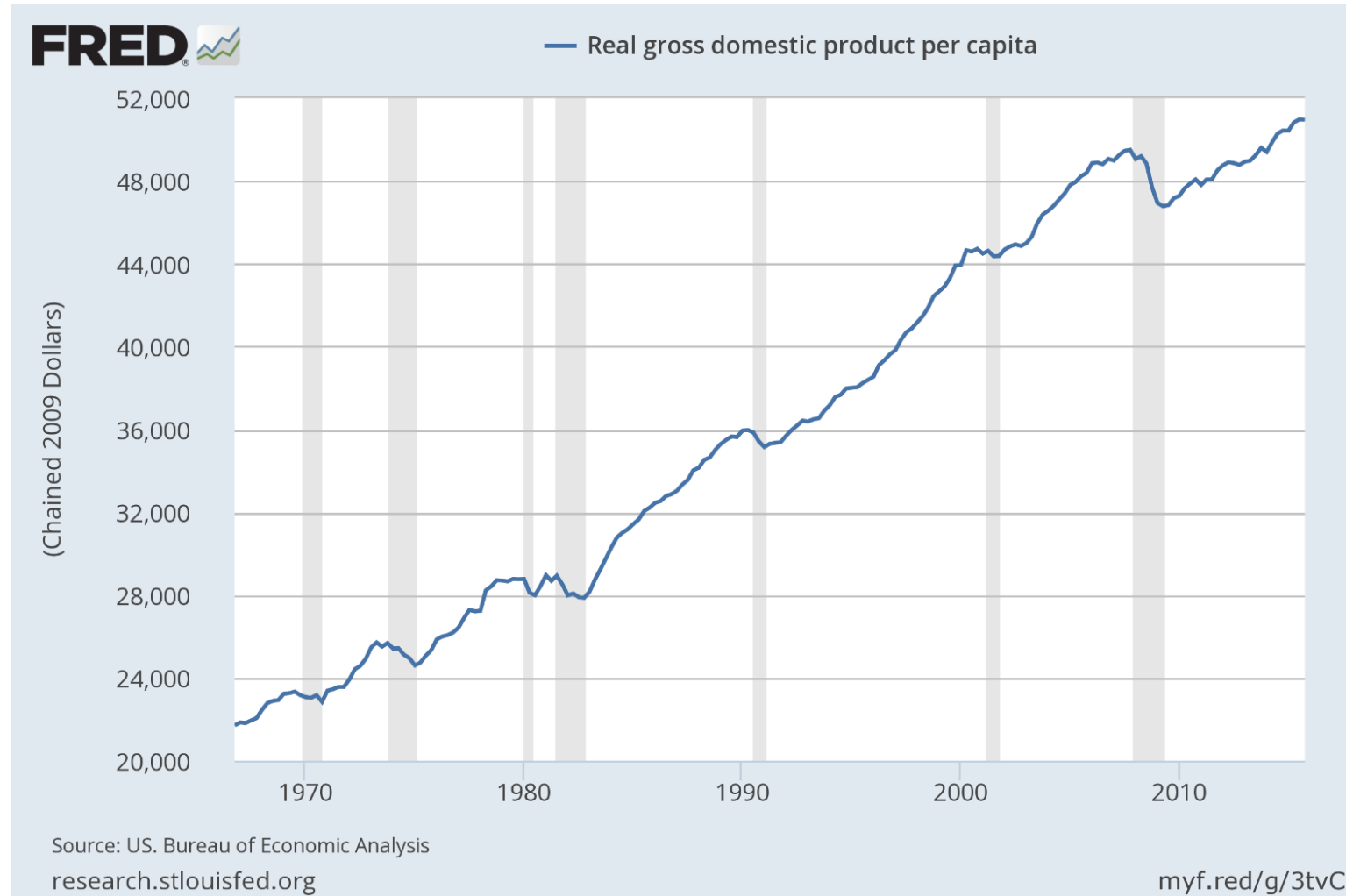
SOURCE: Federal Reserve Board of Governors

Figure 20.3

Effects on the Macro-Economy

- Debt markets “froze” (US 2010)
- Home Prices down 32% by 2009 (US 2011)
 - Widespread foreclosures
- “Contagion” dynamics amongst banks (US 2011)
 - Whole market deemed riskier
 - Difficult for Fed to guide rates
 - Risk premium and default risk linked
- 4.2% Trough-to-Peak Contraction in USA (FRED)
 - Collapse in Consumption (US 2011)
 - \$17T lost household wealth from 2007-09 (US 2011)
 - Worldwide slowdown
- Unemployment: 4.4% in December 2006, 10% in October 2009 (FRED)
 - Credit evaporated, constraining households and firms (Giroud and Mueller 2015)
 - High-Leverage non-financial firms hit especially hard
- Public Debt to GDP: Increased from 63% (2008) to 100.5% (2015)

Six Years



Return to 2007 Q4 (Peak) Per Capita Output: Q4 2013 (Six Years)

General Takeaways

- ▶ Credit availability vastly important in determining the severity of downturns
 - ▶ Debt and Leverage of Financial Institutions, households, and non-financial firms (Giroud and Mueller 2015)
 - ▶ Downward spiral
 - ▶ “Credit Crunches” and house price collapses (linked to mortgages) lead to downturns some 4 and 6 times larger than those of equity collapses (Claessens and Kose 2013)
 - ▶ Recessions longest with house price crashes: 18 quarters on average
- ▶ Rapid increases in asset prices do not last forever
- ▶ “This Time is Different” (Reinhart and Rogoff) and “New Economy” (Shiller) Narratives

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Questions?
Comments?