

FINAL

- “Take-home”: posted Wednesday May 13 at 9am EDT.
- Due via upload to Canvas by 9am EDT on Thursday May 14.
- Coverage: everything since Midterm.
- You may use your own notes, the textbook, and anything on the course website. You **may not** communicate with each other or look for material on the internet. You will be asked to include an Honor Code affirmation with your exam.
- Format similar to midterm, but longer.

FAVOR

Please fill out online evaluations.

COVID19

Harvard Economics 1011B
Professor Gabriel Chodorow-Reich
Spring 2020

OUTLINE

- 1 CURRENT SITUATION
- 2 POSSIBLE SCENARIOS

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SUMMARY

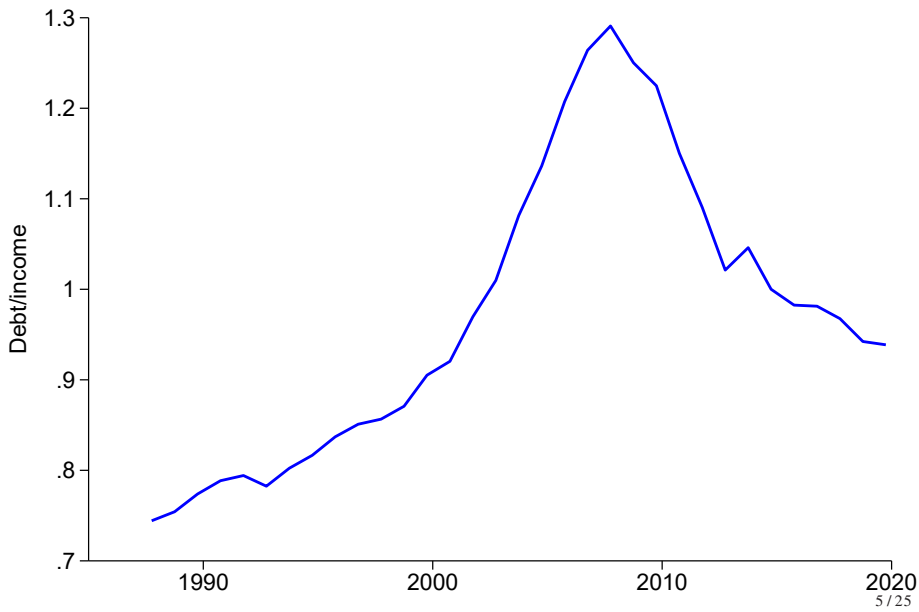
- ① Economy fundamentally pretty sound at end of 2019.
- ② Economic activity now contracting at unprecedented rate.
- ③ Aggregate shock+reallocation shock.
- ④ Not only due to fiat: contraction started before official orders.
- ⑤ Unprecedented policy response.

1. ECONOMY FUNDAMENTALLY SOUND AT END OF 2019

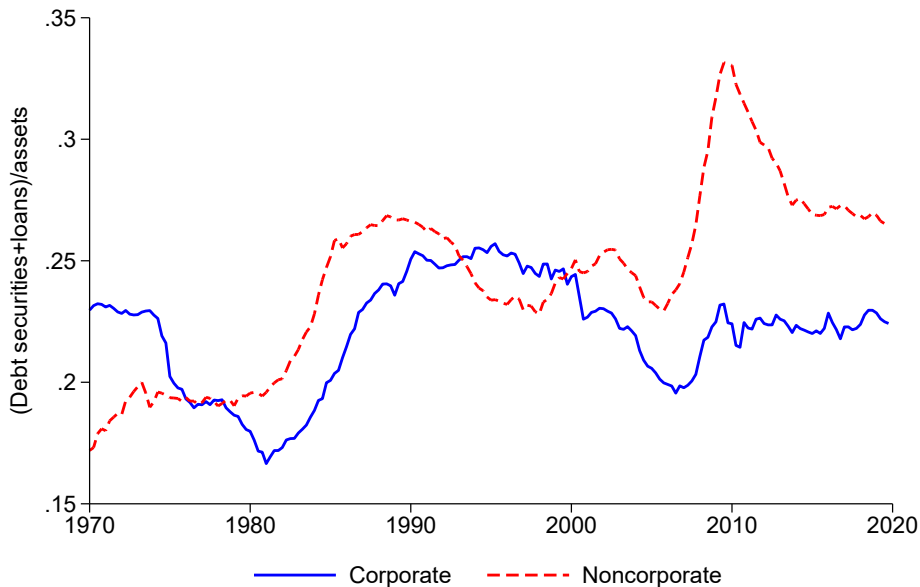
Sources:

- ① Financial Accounts of the United States (FAUS).
- ② Compustat.
- ③ Federal Reserve Bank of New York summary of Y-9 Bank regulatory filings.
- ④ Office of Management and Budget (via St. Louis FRED).

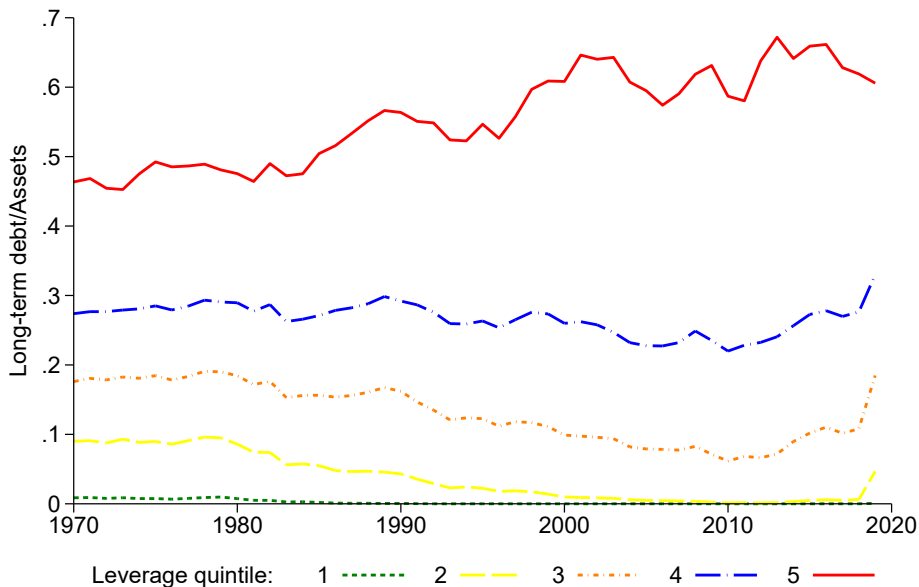
HOUSEHOLD LEVERAGE



NONFINANCIAL FIRM LEVERAGE



NONFINANCIAL FIRM LEVERAGE

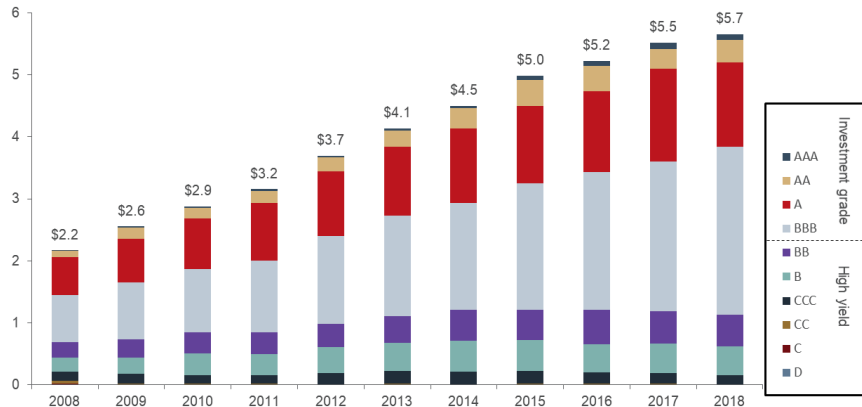


BUT...

Chart 2

U.S. Nonfinancial Corporate Bonds by Rating, 2008–18

Trillions of U.S. dollars

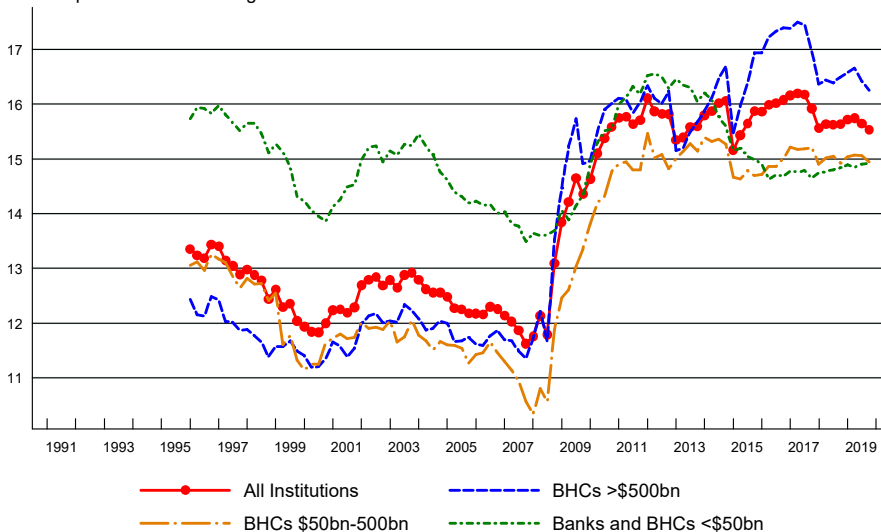


NOTE: Data are calculated using the ICE (Intercontinental Exchange) investment-grade and high-yield bond indexes, excluding the issues of financial firms, as of Dec. 31 for each year shown.

SOURCE: Bloomberg.

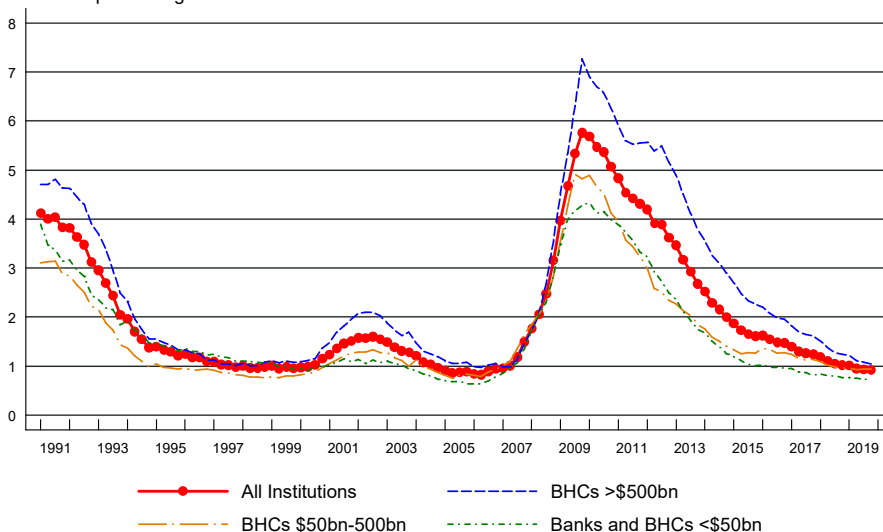
BANK CAPITAL

Total capital as % of risk-weighted assets

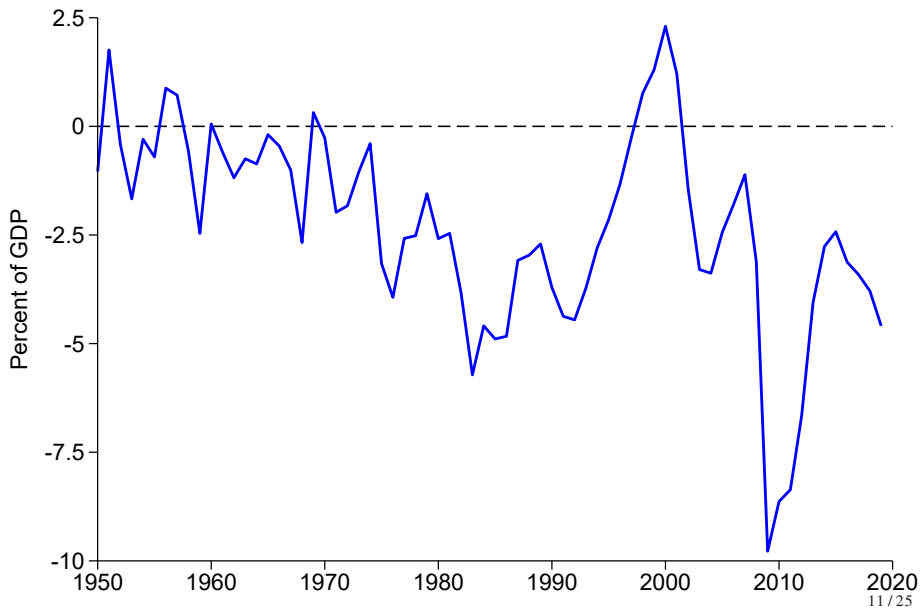


NON-PERFORMING LOANS

Total non-performing loans as % of total loans



FEDERAL SURPLUS/DEFICIT

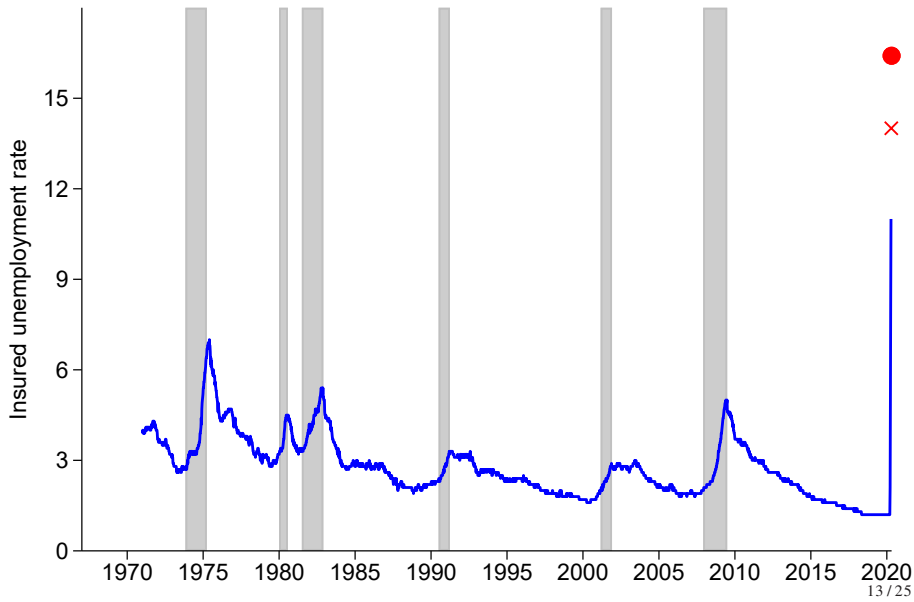


2. ECONOMY CONTRACTING AT UNPRECEDENTED RATE

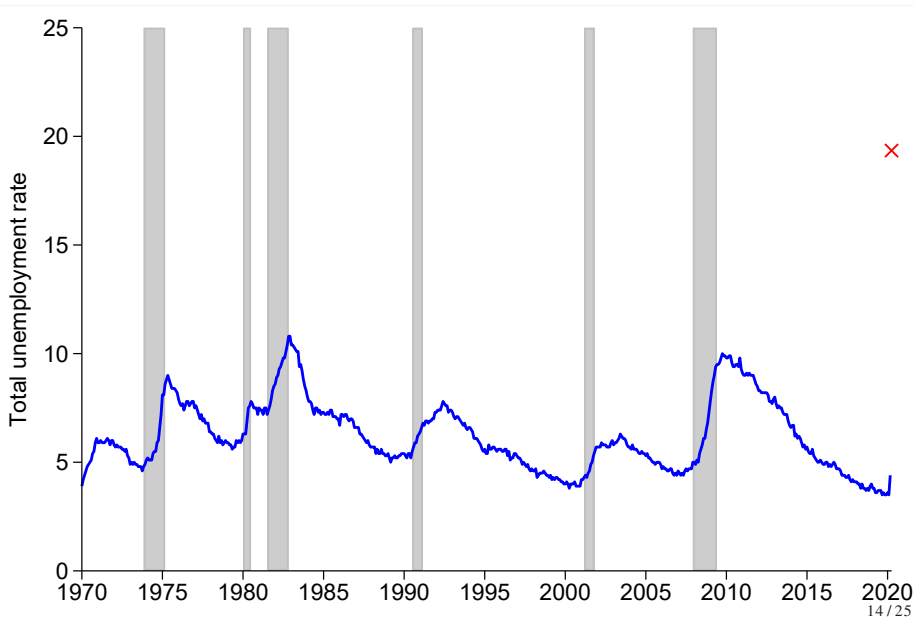
Sources:

- ① Department of Labor Weekly Claims Report.
- ② Current Population Survey.

UI CLAIMS



UNEMPLOYMENT RATE

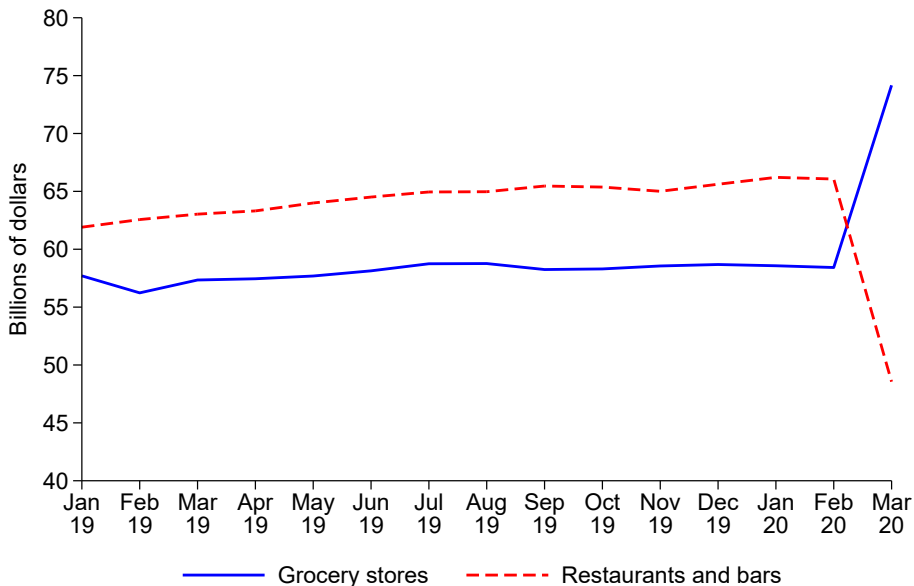


3. REALLOCATION COMPONENT

Sources:

- 1 Census Bureau Retail Sales.

RETAIL SALES

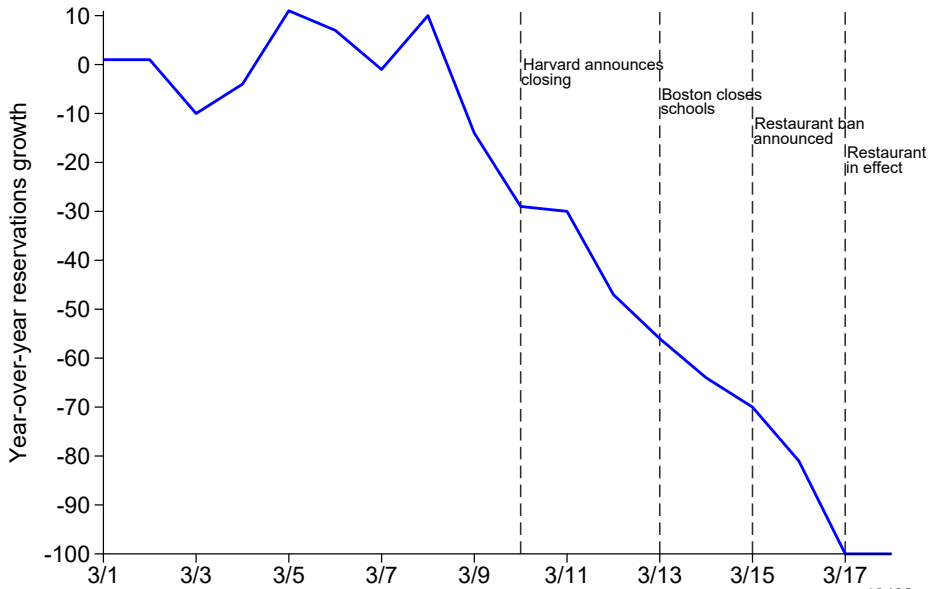


4. NOT ONLY DUE TO FIAT

Sources:

- 1 OpenTable.

BOSTON OPENTABLE RESERVATIONS



MAIN ELEMENTS OF CARES AND ENHANCEMENT

- Recovery rebate: direct payment of \$1200 per qualifying adult, with income phase out.
- Federal Pandemic Unemployment Compensation (FPUC): increase weekly UI benefit by \$600 through July 31.
- Pandemic Unemployment Assistance (PUA): expansion of eligibility for UI to “gig” economy.
- Pandemic Emergency Unemployment Compensation: extend UI duration by 13 weeks.
- Paycheck Protection Program (PPP): forgivable loans of up to \$10M to small businesses.
- Federal Reserve Main Street New Loan Facility (MSNLF): new 4 year loans with deferred interest of \$1M-\$25M to firms with <10,000 employees/\$2.5 billion revenue, 5% retained by lender, 95% bought by Federal Reserve.
- Federal Reserve Main Street Expanded Loan Facility (MSELF): upsized 4 year loans with deferred interest of \$1M-\$150M to firms with <10,000 employees/\$2.5 billion revenue, 5% retained by lender, 95% bought by Federal Reserve.

ADDITIONAL FEDERAL RESERVE PROGRAMS

- Municipal Liquidity Facility: purchase up to \$500 billion of short term (<2 year) notes from states and selected local governments.
- Paycheck Protection Program Liquidity Facility (PPPLF): loans to banks collateralized by PPP loans.
- Term Asset-Backed Securities Loan Facility (TALF): loans to banks collateralized by highly rated asset-backed securities.
- Primary/Secondary Market Corporate Credit Facility (P/SMCCF): purchase investment grade or recently downgraded corporate bonds at issuance/on secondary market and participate in loan syndicates.
- Money Market Mutual Fund Liquidity Facility (MMLF): loans secured by high-quality assets purchased by the borrower from money market mutual funds.
- Primary Dealer Credit Facility (PDCF): up to 90 day loans to primary dealers against broad range of collateral.
- Commercial Paper Funding Facility (CPFF): purchase from eligible issuers three-month U.S. dollar-denominated commercial paper.
- Central bank liquidity swap lines: ease dollar shortage in other countries.

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EPIDEMIOLOGY DISCLAIMER

- By far, most important unknown about recovery is course of disease, vaccine, and treatment.
- Without vaccine/treatment, social distancing continues and return to pre-COVID normalcy is impossible.
- Forecasting course of disease not economists' traditional comparative advantage, although there is a “curve fitting” aspect to it that has led to a lot of work.

OPTIMISTIC SCENARIO: V-SHAPED RECOVERY

- Recall neoclassical growth model:

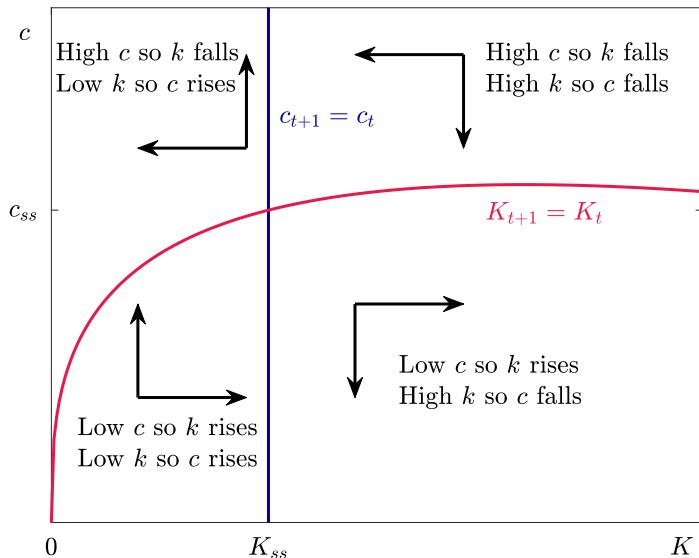
$$\begin{aligned}c_{t+1} &= [\beta (1 + F_{K,t+1} - \delta)]^\sigma c_t, \\ K_{t+1} &= (1 - \delta)K_t + F(K_t, 1) - c_t.\end{aligned}$$

- Balanced growth path:

$$\begin{aligned}c_{t+1} = c_t &\Rightarrow & \beta^{-1} &= 1 + F_{K,bgp} - \delta, \\ F_{K,bgp} = \alpha K^{\alpha-1} : & & K_{bgp} &= \left(\frac{\alpha}{\beta^{-1} - 1 + \delta} \right)^{\frac{1}{1-\alpha}}, \\ & & c_{bgp} &= K_{bgp}^\alpha - \delta K_{bgp}.\end{aligned}$$

- If COVID doesn't change capital elasticity α , patience β , or depreciation δ , then K_{bgp} unchanged. Economy converges back to this level (saddle path stable.)

NEOCLASSICAL MODEL DYNAMICS



CONCERNS

- Neoclassical environment is frictionless.
- Household balance sheets irrelevant because perfect capital markets.
 - ▶ Empirical *MPC* evidence suggests credit constraints important.
- Firm balance sheets irrelevant because perfect capital markets, no adjustment costs to investment.
 - ▶ Empirical evidence of investment cash-flow sensitivity suggests internal funds important.
- Labor market clears at competitive wage.
 - ▶ Search frictions cause frictional unemployment.
- Prices completely flexible.
 - ▶ Sticky prices and effective lower bound \Rightarrow demand-driven recessions.

CBO PROJECTION (AS OF APRIL 23, 2020)

	Q1	Q2	Q3	Q4	2020	2021
Real GDP (Percentage change from preceding quarter) ^a	-0.9	-11.8	5.4	2.5	n.a.	n.a.
Real GDP (Percentage change, annual rate) ^a	-3.5	-39.6	23.5	10.5	-5.6 ^b	2.8 ^b
GDP (Trillions of dollars)	21.6	19.1	20.1	20.7	20.4	21.3
Unemployment Rate (Percent)	3.8	14.0	16.0	11.7	11.4	10.1
Interest Rate on Three-Month Treasury Bills (Percent)	1.1	0.1	0.1	0.1	0.4	0.1
Interest Rate on Ten-Year Treasury Notes (Percent)	1.4	0.6	0.7	0.7	0.8	0.7

GDP = gross domestic product; n.a. = not applicable.

a. Real values are nominal values that have been adjusted to remove the effects of changes in prices.

b. Data are shown on a fourth-quarter-to-fourth-quarter basis.