

Course Evaluations

Please fill out the Course Evaluation form. Chad will return in 10 minutes.

Thanks!



Session 18: Wrap-Up

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Outline: Wrap Up

- Things to read?
- Future of U.S. and world growth?
- Q & A Session

Things to Read

- My “Not a Blog”

● My Latest Not-a-Blog Listings ([complete list](#)): Things I've read and enjoyed...

My Diigo

- The Future Economy: An Interview with Joel Mokyr | City Journal
- Banks and funds stash record \$2tn overnight at Fed facility | Financial Times
- Brazil's Pix 'much cheaper' than card payments, paper by central bank economists shows | Reuters
- Tom Friedman | Why Do We Swallow What Big Oil and the Green Movement Tell Us? - The New York Times
- What Is the Federal Reserve's Role in the Economy? Bernanke Knows. - The New York Times

`http://web.stanford.edu/~chadj/#diigo`

- The Economist, FT, WSJ, NYT of course



Discussion Questions:

LR: What considerations impact U.S. and global growth over the next two decades? What's your forecast for the future growth rate?

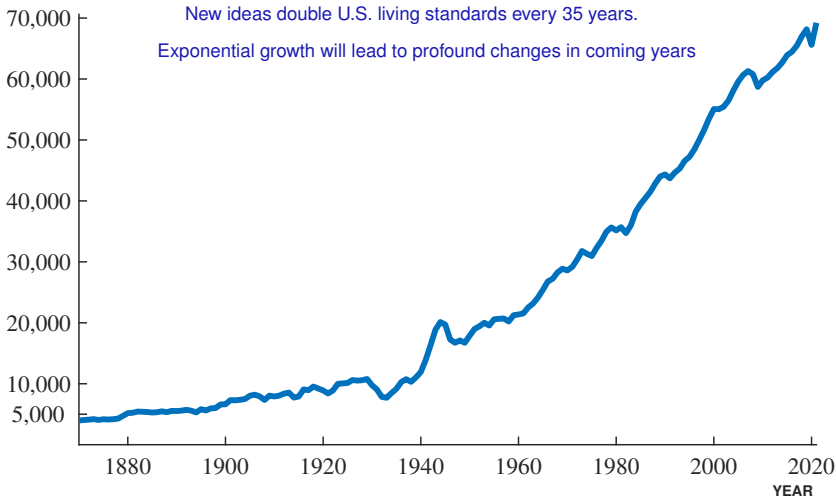
SR: What does COVID-19 imply about the next several years?

Five Touch Points

- ① New ideas double U.S. living standards every 35 years
- ② China and India
- ③ Budget constraints must be respected
- ④ Recovering from the COVID-19 crisis
- ⑤ The seeds of the next “golden era”...

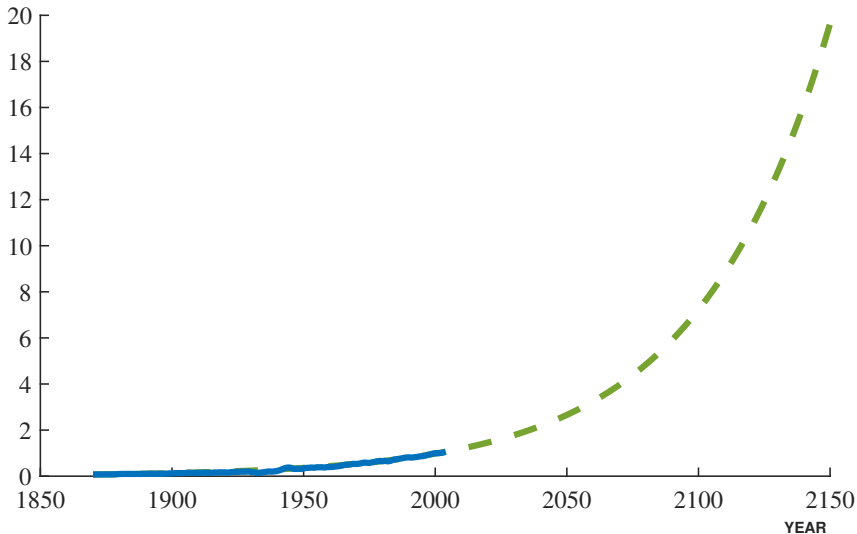
1. Per Capita GDP in the United States

PER CAPITA GDP (2021 DOLLARS)



Per Capita GDP in the Future?

NORMALIZED, 2000 = 1

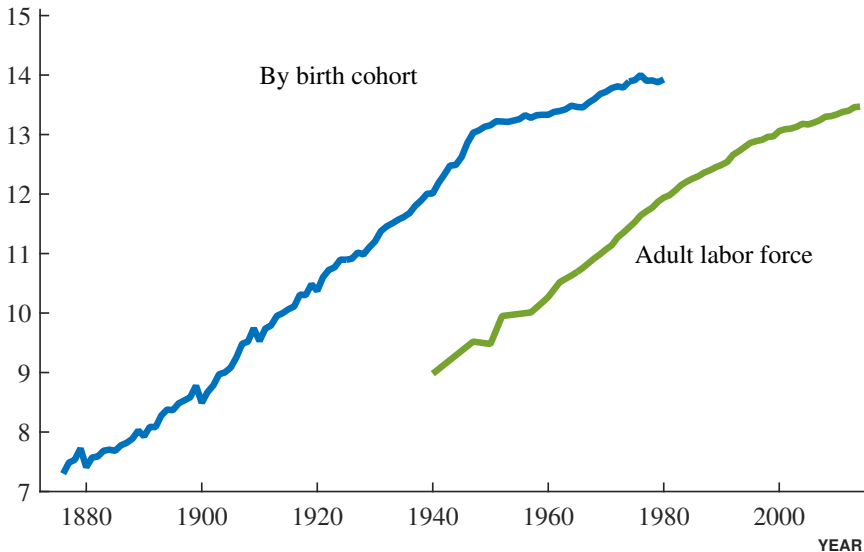


Planning under Exponential Growth

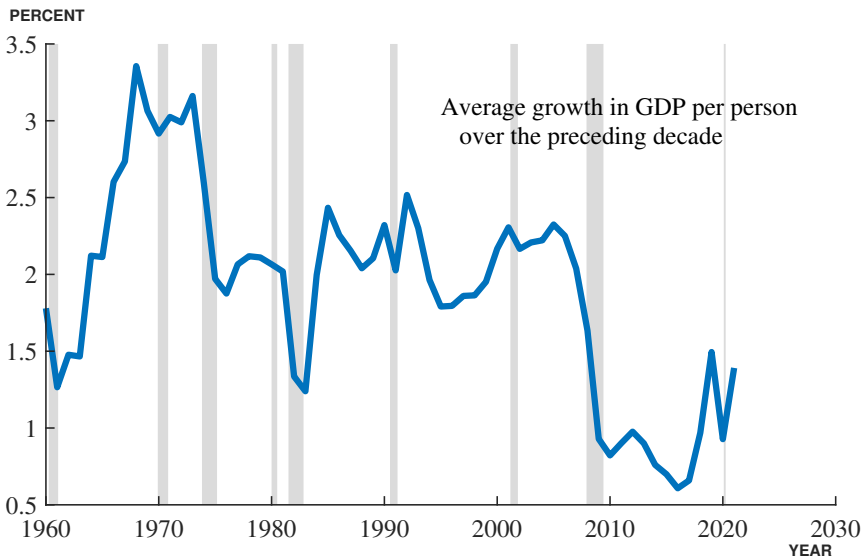
- Doubles every T years
- Any given level gets reached much sooner than you might expect.
Consider world population:
 - A million years to reach 1 billion
 - 100 years to reach 2 billion
 - 50 years to reach 3 billion
 - 15 years to reach 4 billion.
- Imagine a company w/ employment doubling every year.
 - A new office building is 3/4 empty 2 years before it fills
 - Half empty one year before it fills

U.S. Educational Attainment by Birth Cohort

YEARS OF SCHOOLING

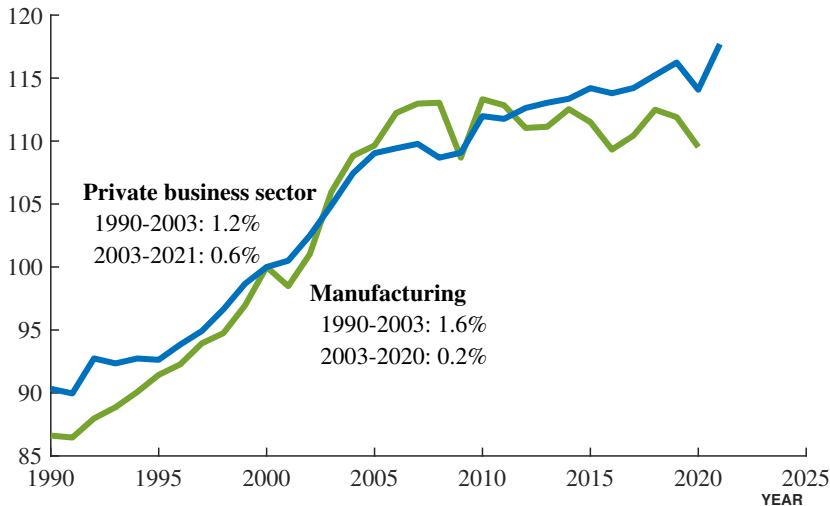


Recently, growth has slowed!

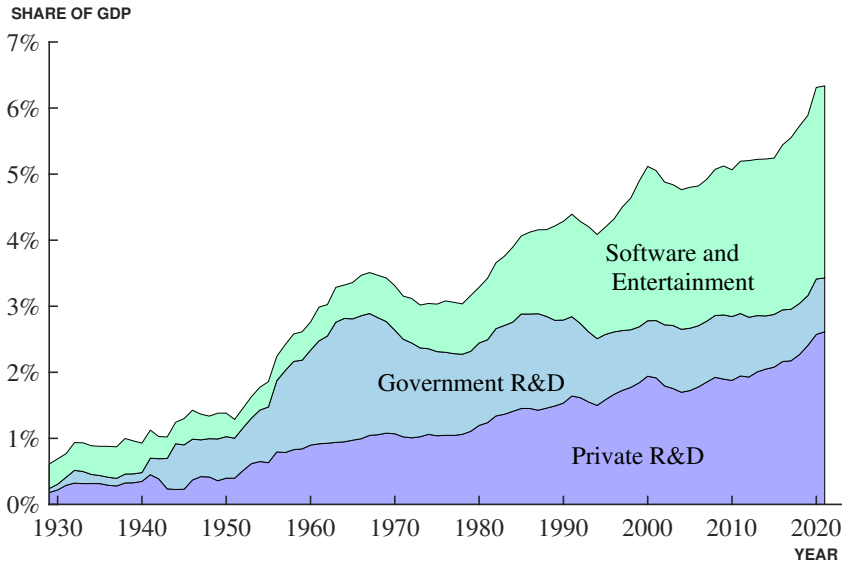


U.S. Total Factor Productivity

TOTAL FACTOR PRODUCTIVITY (2000=100)



Public vs Private R&D?

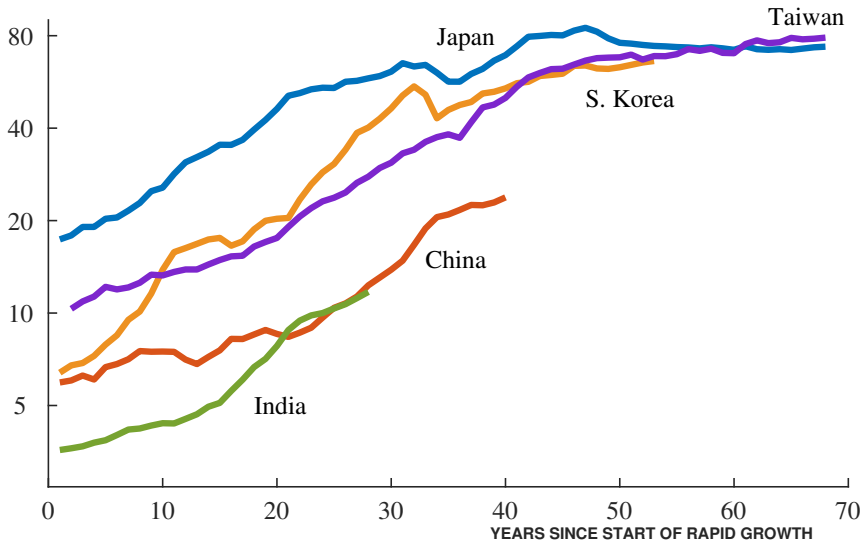


2. China, India, and Beyond

- **China:** Extremely rapid “catch-up” growth is possible
 - Growth rate (per capita) since 1980: 8% per year
 - 10 times richer today than in 1980!
 - 1 generation, more than 1 billion people
- **Openness:** Competing in world markets and engaging the world of ideas is the best development strategy.
 - Competition is good.
- **Finding Missing Edisons and Doudnas**
 - China and India: More people each than US/Euro/Japan
 - Only 12 percent of U.S. patents are filed by women
 - Double the world's number of entrepreneurs and researchers in 50 years?

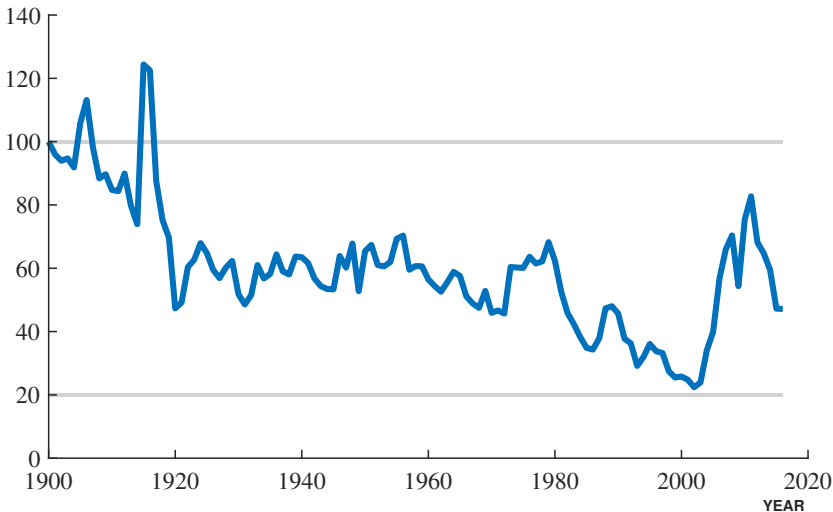
The Dynamics of Catch-Up Growth

GDP PER PERSON (US=100)



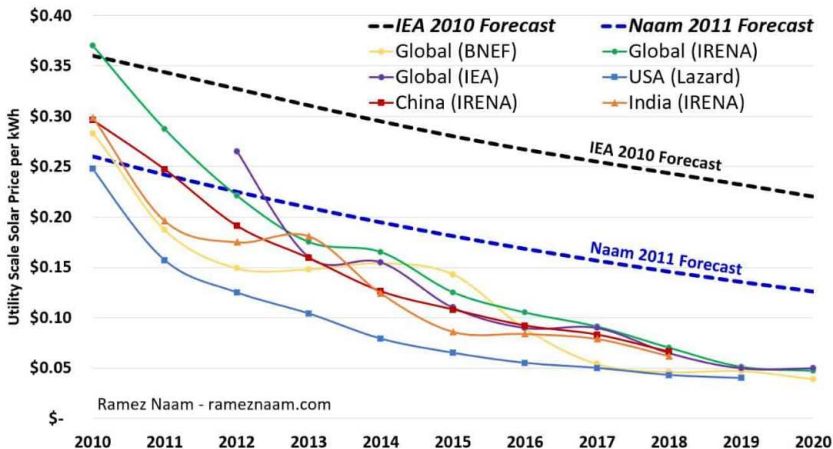
Commodity Prices over the Long Run

EQUALLY-WEIGHTED PRICE INDEX (INITIAL VALUE IS 100)



Solar Innovation

Solar Costs A Fraction of 2010-2011 Forecasts



3. Budget constraints must be respected

- Problems with government budget constraints (or net foreign asset position) are the cause of hyperinflation, defaults, and financial crises.
- European debt crisis
 - Banks / Government / Competitiveness
- U.S. (and world) financing of rising health spending.
- Could the COVID-19 crisis + Expanding Fed balance sheet + entitlement spending problems be the seed for an even more severe financial crisis in the future?

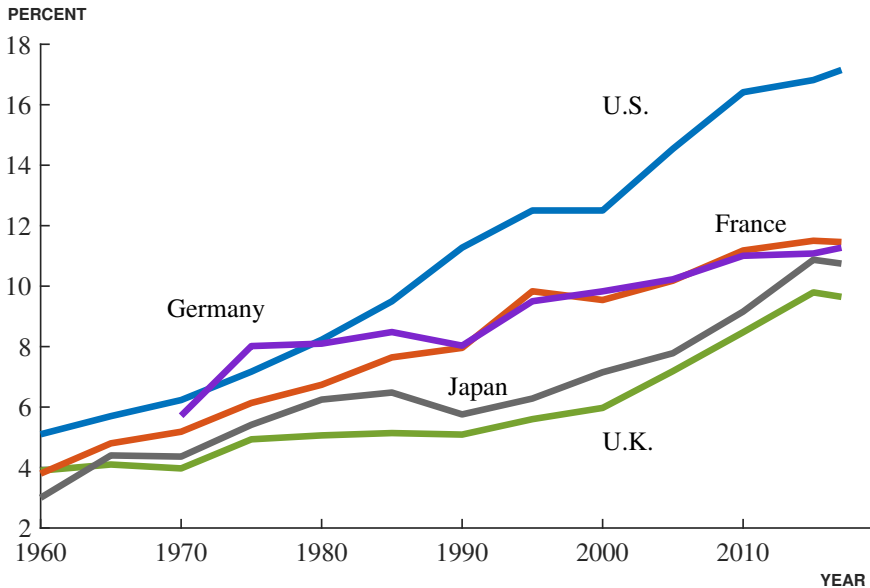
U.S. Debt-GDP Ratio

Already $\approx 100\%$ for 2021

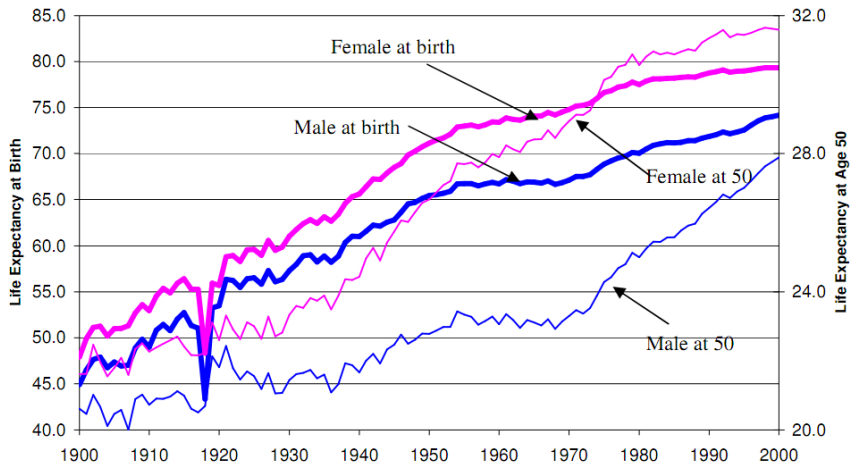
Percentage of Gross Domestic Product



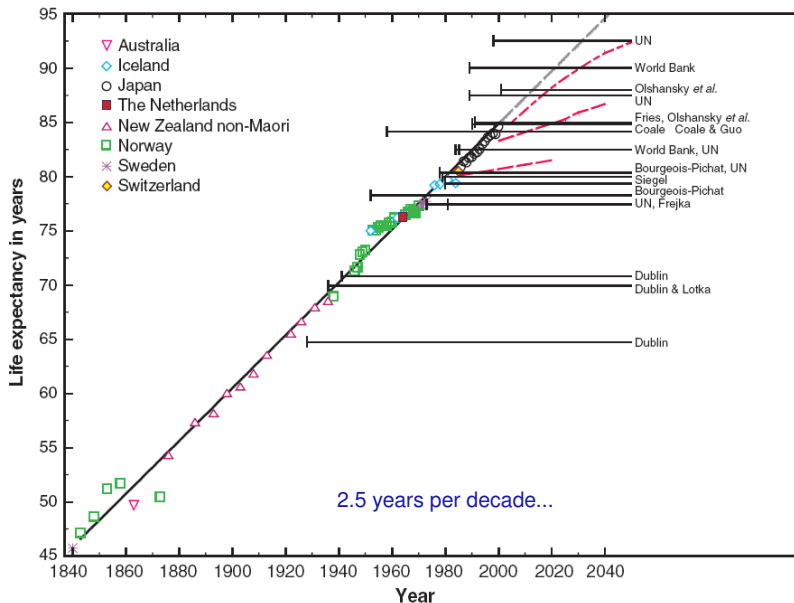
Health Spending as a Share of GDP



U.S. Life Expectancy



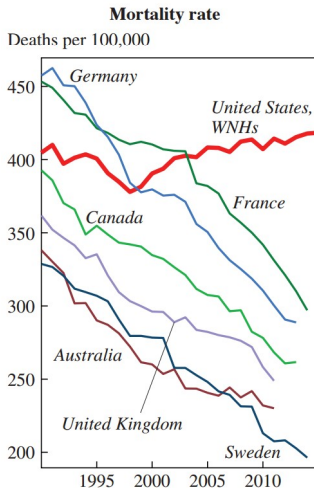
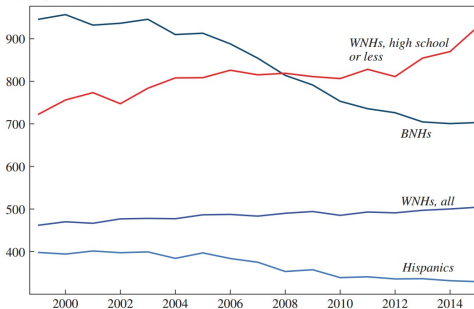
Record Life Expectancy (Oeppen and Vaupel, 2002)



The Opioid Crisis (Case and Deaton, 2017)

Figure 1. All-Cause Mortality by Race and Ethnicity for Age 50–54, 1999–2015

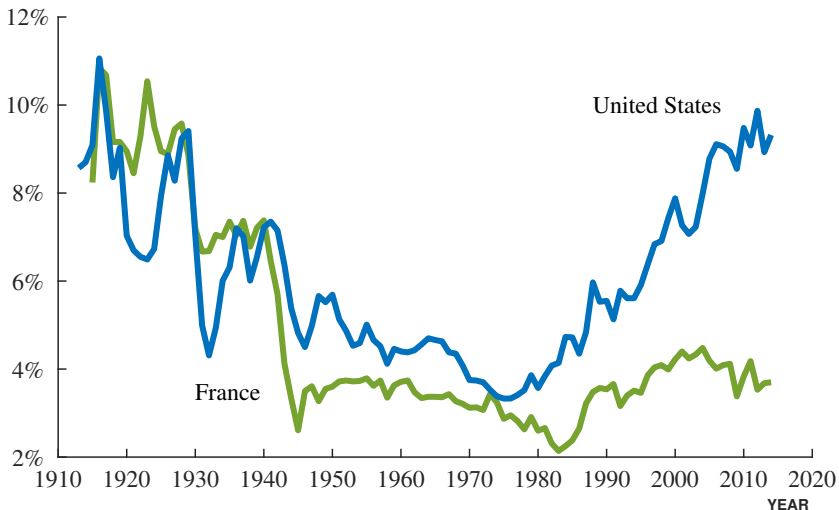
Deaths per 100,000



Source: <https://www.brookings.edu/wp-content/uploads/2017/08/casetextsp17bpea.pdf>

Income Share of the Top 0.1 Percent of the Population

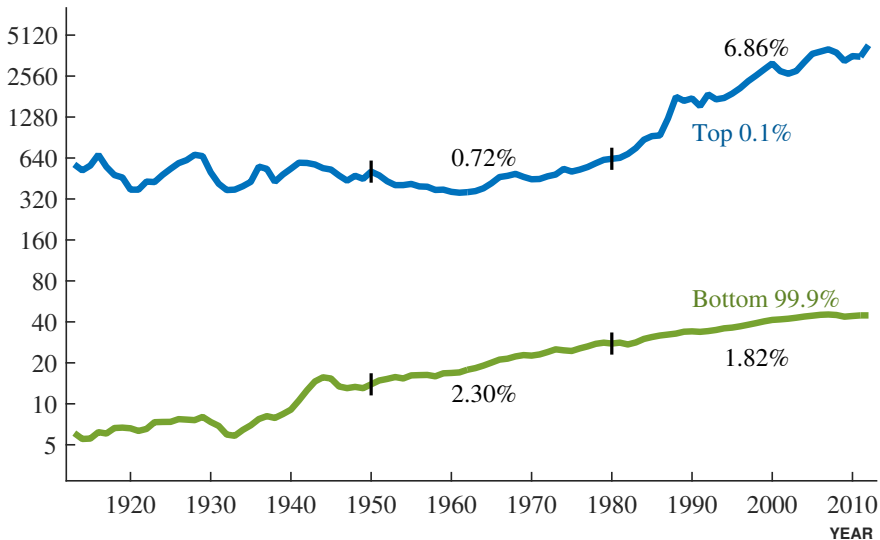
INCOME SHARE OF TOP 0.1 PERCENT



Source: Piketty and Saez, "Income Inequality in the United States, 1913-1998" (updated)

Economic growth by inequality

THOUSANDS OF 2009 CHAINED DOLLARS

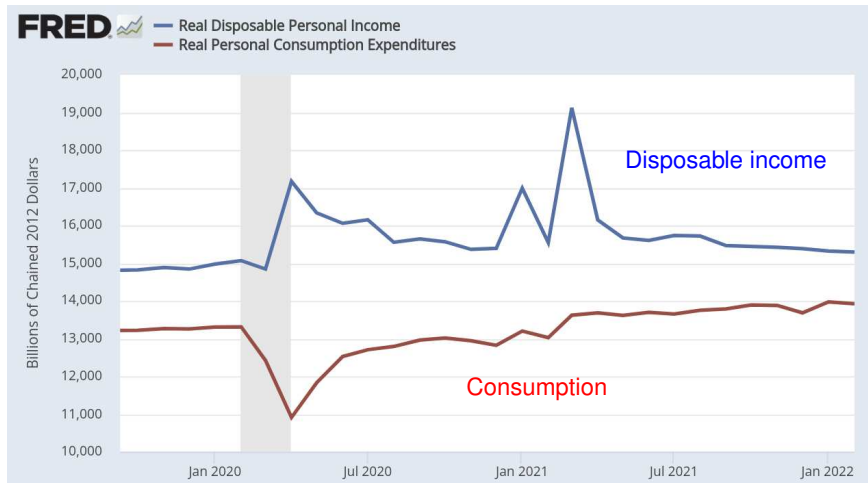


Source: Maddison + BEA + Piketty/Saez

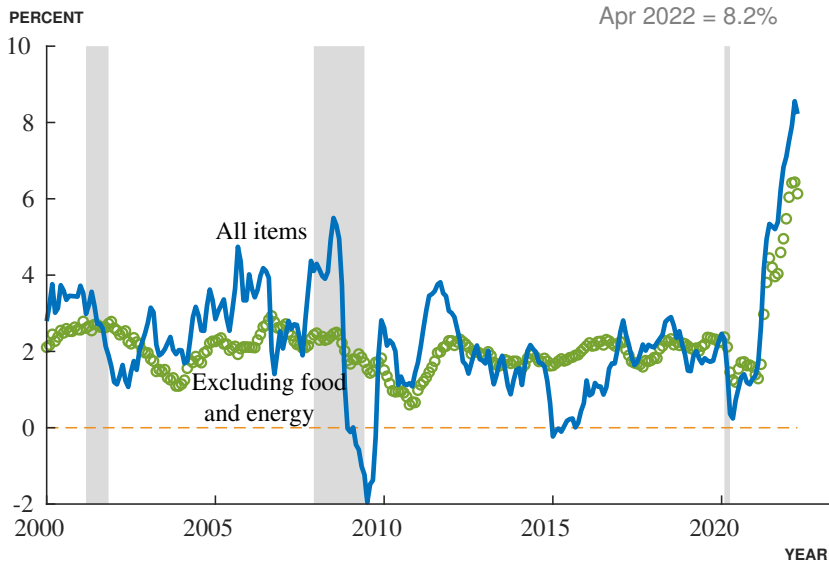
4. Recovering from the COVID-19 Crisis

- Variants and vaccinating the world?
 - Main risk to recovery in coming years
 - IMF: \$50b investment saves \$9t in lost lives and GDP! ([source](#))
- Inflation, expectations, stagflation?
 - Will Fed and CB's around the world manage a “soft landing”?
 - Will high inflation become entrenched in expectations and cause problems for 5+ years?

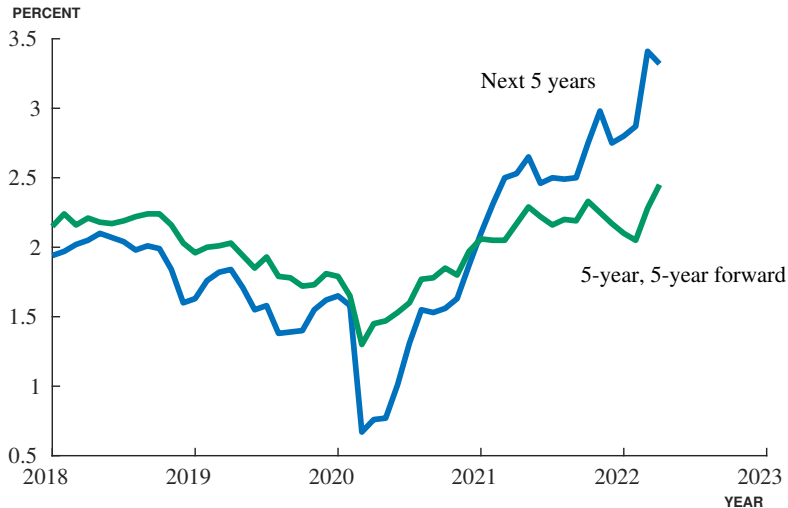
Consumption and Disposable Personal Income



Recent CPI Inflation



Expected CPI Inflation in the U.S. (from TIPS)

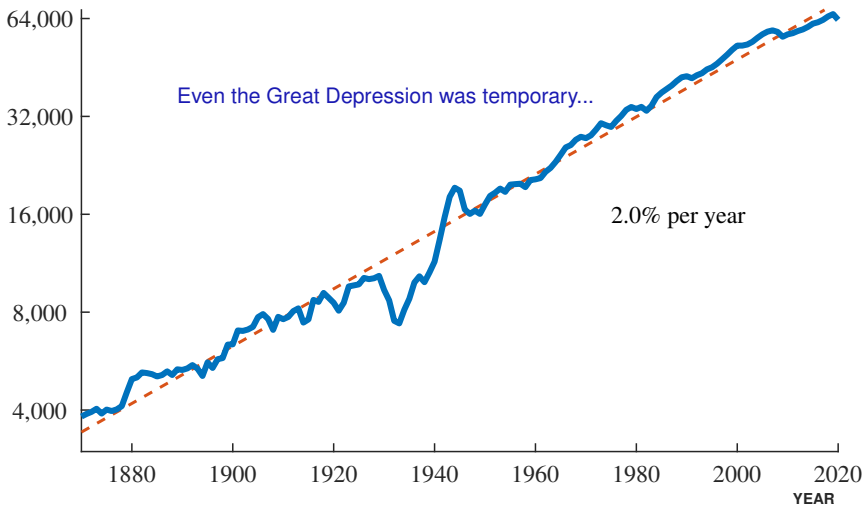


5. The seeds of the next “golden era”...

- Microsoft was founded at the end of a recession in 1975.
- Apple released the iPod in the recession of 2001.
- “During the [Great Depression], the U.S. economy was, in fact, experiencing a period of technological and organizational creativity that, in the aggregate, remains as yet unmatched.” — Alexander Field, 2011
 - 1929–1941 featured rapid TFP growth, and numerous innovations
 - Television, nylon, conveyor belts, stainless steel, chrome plating, new plastics, electron microscope, FM radio

U.S. Per Capita GDP

PER CAPITA GDP (RATIO SCALE, 2020 DOLLARS)



Q & A