ME2720 Macroeconomics for Business

Lecture 4

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November 8, 2017

Outline

Introduction to Business Cycles

- We did recently study long-run growth
  - → Clearly, a key determinant of welfare
- Now we look at business cycles (BCs), one of the most controversial literatures in econ research. Why?
  - ⋆ Little agreement on what explains BCs
  - ⋆ No consensus on how governments should respond
- Our aims:
  - ⋆ What are BCs?
  - ⋆ What causes BCs?
  - ⋆ How are BCs propagated through the economy?
  - ⋆ Should be a policy response to BC?
  - ⋆ If so, how should policymakers respond?

What are Business Cycles?

Business Cycles

Business cycles are short-run fluctuations in aggregate economic activity around its long-run growth path.

Characteristics:

- **Not a "modern"** phenomenon: documented throughout time
  - ⋆ Famines during Biblical times, Middle Ages, etc.
- **Short-run** phenomenon: $0-5$ years approx.
  - ⋆ > 5 years, domain of long-run
- **Recurrent** but *not* periodic
  - ⋆ Neither occur at regular intervals nor have determined length
- **Persistent**: declines followed by further declines, growth by more growth
- **Virtuous**- vs. **vicious** cycles
- **Fluctuations around the trend**

Hectic- vs. "quiet"- periods:

- ⋆ **Expansion**: machines overused and/or labor force works overtime
- ⋆ **Recession**: machines and/or labor force do not work at full capacity

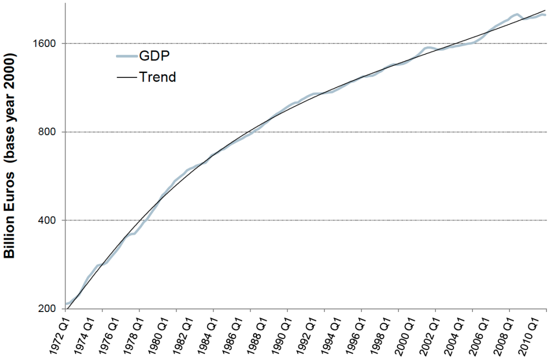


Figure: Italy, 1972-2010

Output gap: difference between current- and potential- output

$$y_t^{gap} = y_t^{observed} - y_t^{trend}$$

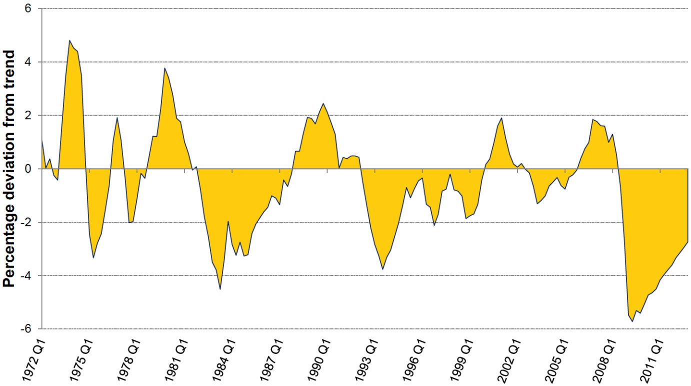


Figure: Italian output gap, 1972-2010

Measuring the output gap:

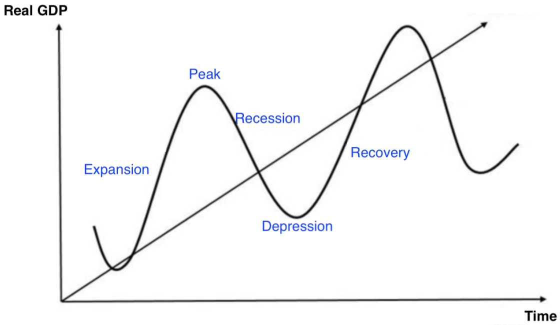
- From *simplistic* (our formula) to *more-advanced* (estimates from the production function or survey data) calculations
- Interested in output gaps? Look at the OECD Economic Outlook, production-function approach
- At the national level, e.g. Sweden, the method used depends on the forecaster
- Differences between measures

The output gap is closely connected to monetary variables:

- Positive output gap associated with inflation
  - ⋆ more investment in machines
  - ⋆ overtime more costly than std. hours
  - ⋆ upward pressure on prices
- Negative output gap associated with deflation
  - ⋆ if demand is too low, firms will cut investment
  - ⋆ higher unemployment
  - ⋆ downward pressure on prices

Business cycles understood as 4-stage processes:

1. Expansion, also referred as "boom"
2. Peak
3. Contraction, also referred as recession or "slump"
4. Low Point/Depression



Business Cycles' Stages

1. **Expansion**: a period of significant increase in the level of economic activity
   - Could also be the recovery of a recession
   - Usually lasting 6 months or more
   - Marked by widespread expansion in many sectors
2. **Peak**: the maximum level that aggregate economic activity reaches

$$\text{Peak} := \max\left(\{y_t^{gap}, \ldots, y_{t+n}^{gap}\}\right)$$

   - Growth comes to a *halt*!
   - Known *a posteriori*

Business Cycles' Stages

3. **Contraction**: a period in which GDP declines

Two Definitions of Recessions

(a) **Popular definition** (UK): two consecutive quarters of negative economic growth.

(b) **Most-frequently used definition** (NBER): a significant decline in economic activity spread across the economy, lasting more than a few months, normally visible in real GDP, real income, employment, industrial production, and wholesale-retail sales.

4. **Depression**: A recession that is major in both scale and duration
   - ⋆ Large unemployment
   - ⋆ Negative growth comes to a halt!
   - ⋆ Lowest point of activity in the economy

$$\text{Lowest activity point} := \min\left(\{y_t^{gap}, \ldots, y_{t+n}^{gap}\}\right)$$

   - ⋆ How long the cycle will remain at this low point varies from a matter of weeks to even years, e.g. Great depression

Cyclical Behavior of Key Macro Variables

Macroeconomic variables can be classified by:

1. **Direction**
   - ⋆ Procyclical: moves in the same direction, e.g. investment, consumption
   - ⋆ Countercyclical: moves in the opposite direction, e.g. unemployment
   - ⋆ Acyclical: no clear pattern, e.g. real interest rates?
2. **Timing**
   - ⋆ Leading: moves in advance, e.g. residential investment, physical investment, stock prices, etc.
   - ⋆ Coincident: moves at about the same time, e.g. production, consumption, employment
   - ⋆ Lagging: moves afterwards, e.g. inflation, interest rates
3. **Volatility**
   - ⋆ Highly volatility, e.g. investment
   - ⋆ Low volatility, e.g. consumption

Business Cycle Indicators

Table: Business Cycle Indicators

Variable	Volatility
Labor hours (manufacturing)	High
Claims for unemployment insurance	Moderate
Car sales	Moderate
Retail sales	High
Consumer sentiment	Moderate
Consumer Price Index (CPI)	Moderate
Durable goods orders	High
Non-durable goods order	Low
S&P 500 Composite Stock Index	Moderate-High

Figure: Manufacturing labor hours, 1962-2017

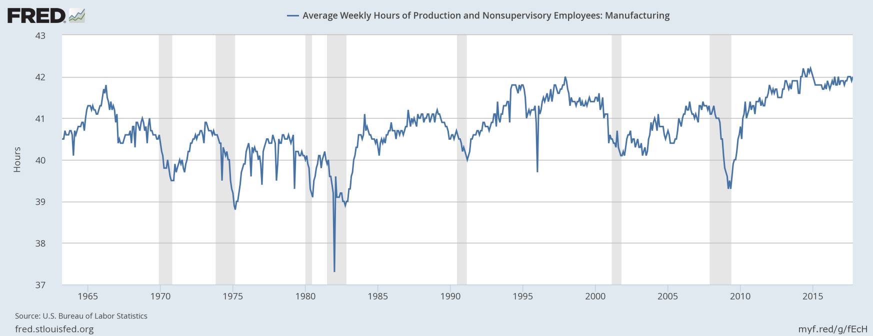


Figure: Claims for unemployment insurance, 1967-2017

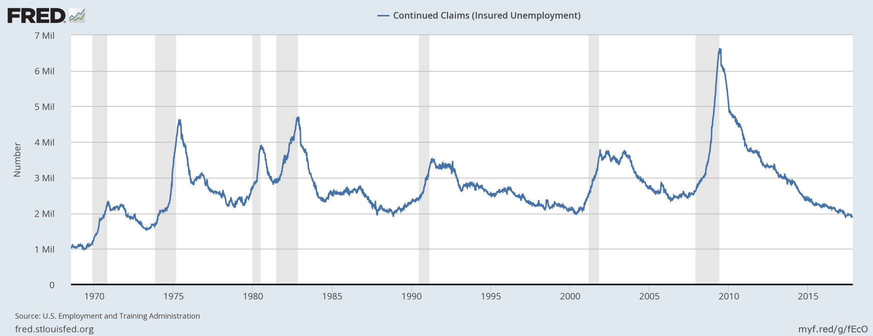


Figure: Vehicle sales, 1976-2017

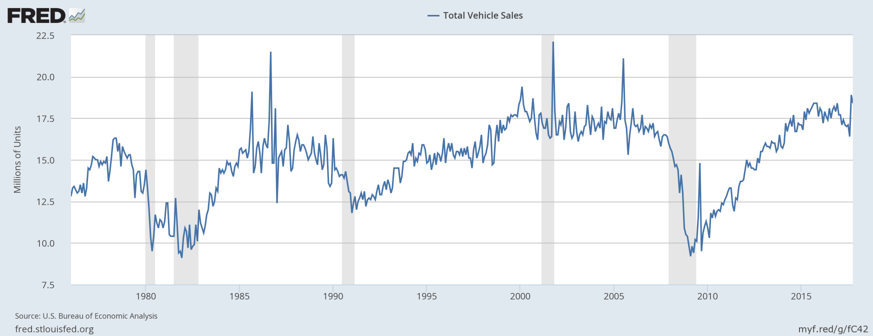


Figure: Retail sales, 1992-2017

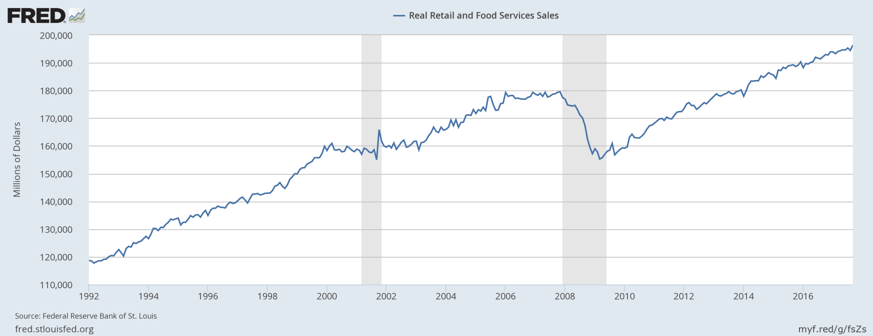


Figure: Consumer sentiment, 1976-2017

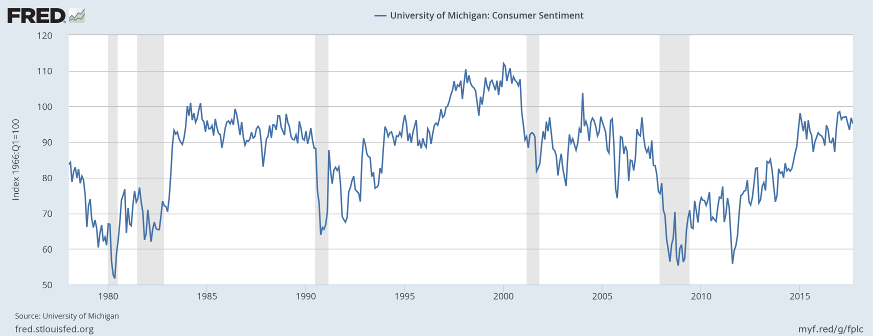


Figure: Consumer Price Index (CPI), 1960-2016

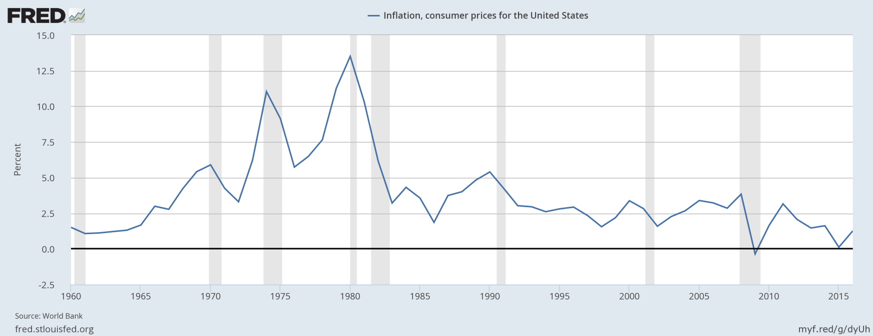


Figure: Durable goods orders, 1992-2017

Figure: Non-durable goods orders, 1970-2017

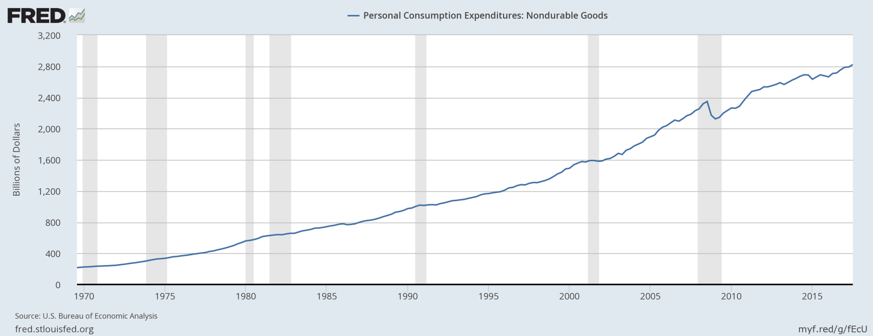
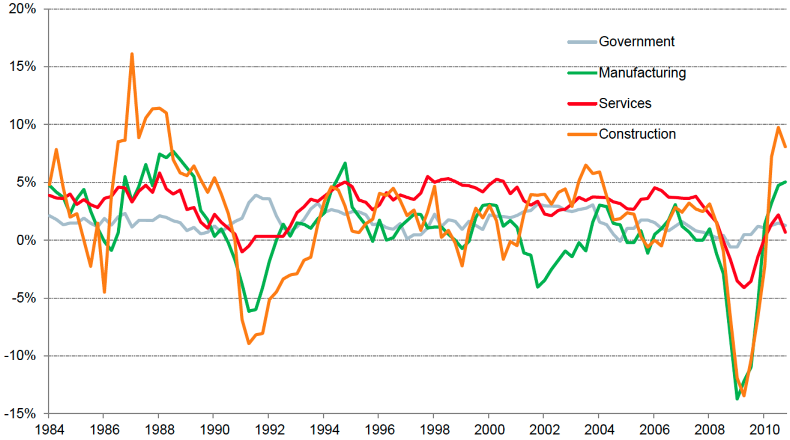


Figure: S&P500, 1976-2017

Lucas (1977), Zarnowitz (1992), Ryan (2002):

1. High coherence (same direction) of output movements across all sectors of the economy



Stylized Facts

2. Cycles of durable goods, i.e. investments, are more pronounced
3. Cycles of non-durable goods, i.e. consumption, less volatile than output

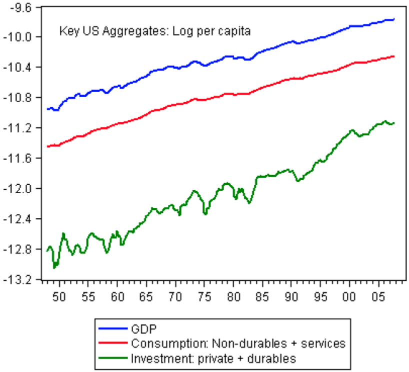


Figure: US aggregates, 1945-2010

Stylized Facts

4. Time series of prices and production in primary sector (agriculture) conform below average

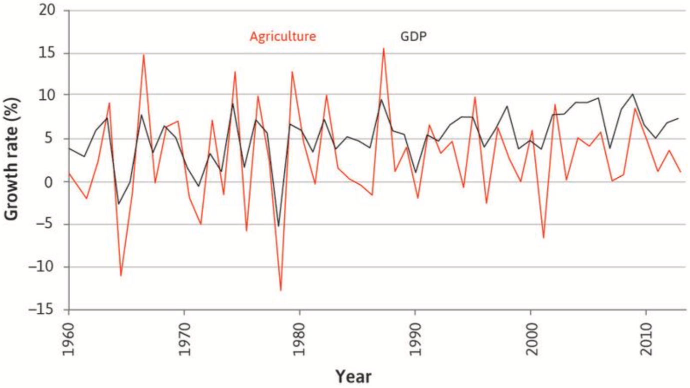


Figure: India, 1960-2011

5. Prices series are procyclical

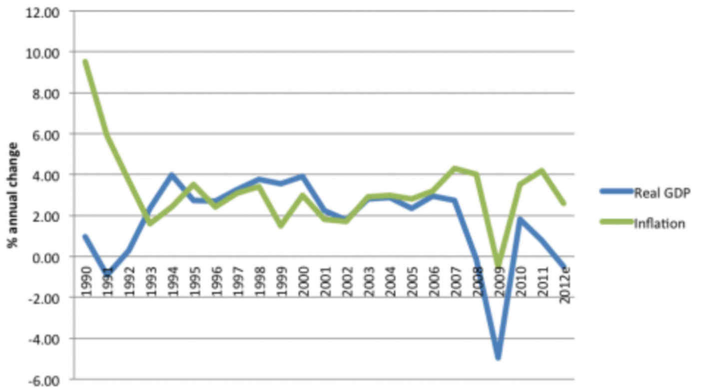


Figure: UK, 1990-2012

6. Labor hours, strongly procyclical, fluctuate as much as output

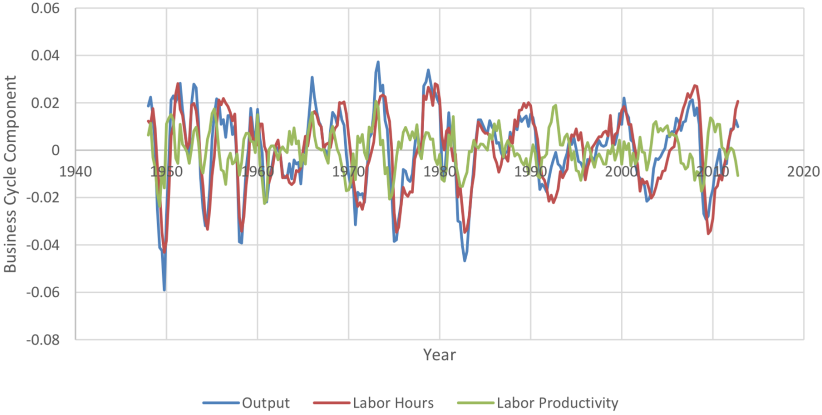


Figure: US, 1940-2012

7. Profits are procyclical

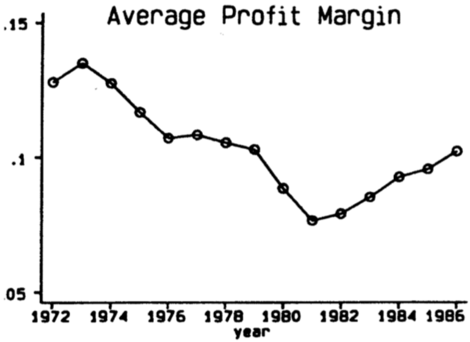


Figure: UK, 1972-1986

Stylized Facts

8. Unemployment develops anti-cyclically

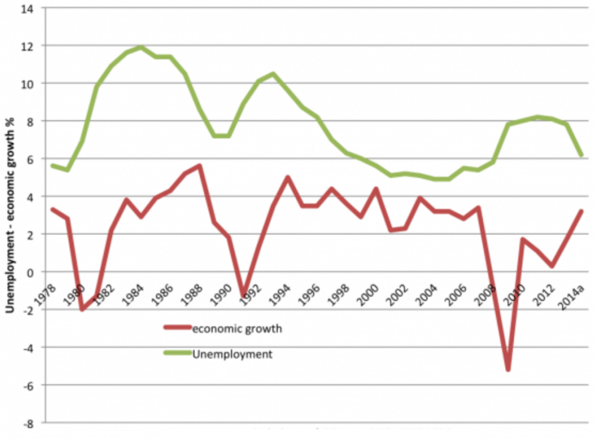


Figure: UK, 1978-2014

Okun's (1962) Law, as originally stated

For every 1% increase in unemployment, a country's (US) GDP will be approximately 2% below potential output.

$$y_t^{gap} = \alpha + \beta u_t^{gap} + \varepsilon_t$$

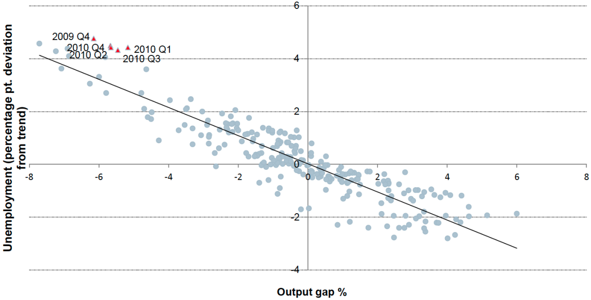
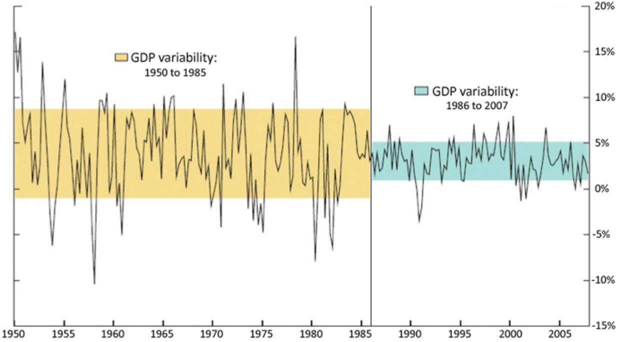


Figure: Okun's Law for the US, 1949-2011

On the Nature of Business Cycles

- As emphasized earlier, BCs recorded throughout history. . .
- However, GDP volatility tended to fall over time
  - ⋆ Better understanding of monetary and fiscal policy
- The great moderation and crises as "past phenomena"



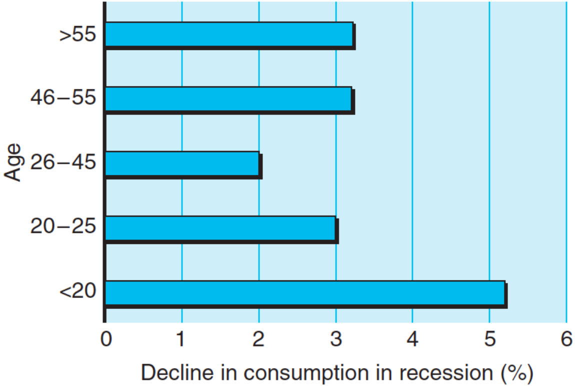
- . . . 2007! Do not forget crises are **recurrent phenomena**!

Should We Care About BCs?

- Lucas (1987): NO!
  - ⋆ Cost of BCs is very low: about 1/5 of the cost of having 10% inflation
  - ⋆ Long-run growth is all that matters!
- Societal point of view: YES!
  - ⋆ Some sectors/individuals are hit disproportionally high $\rightarrow$ welfare implications
  - ⋆ BCs may (also) influence long-run growth: potentially lower long-run investment rate
  - ⋆ Unemployment and depreciation of human capital, i.e. skills
- **Theory ambiguous** in general ... maybe because Schumpterian growth is a very likely option!
- Nevertheless, **BCs perceived as bad** and that's why we observe efforts to stabilize the economy!

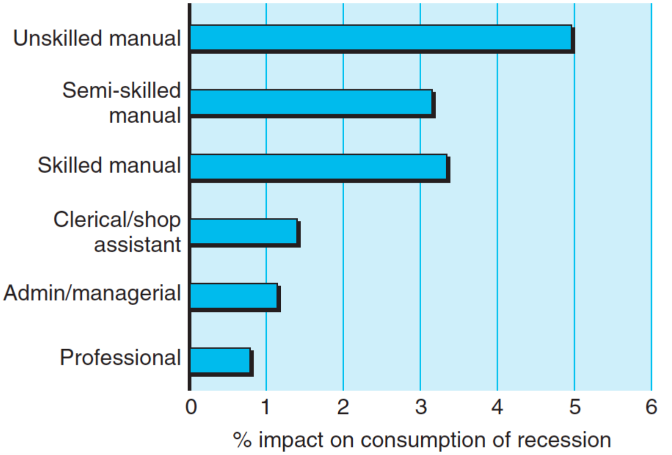
Should We Care About BCs?

Even though consumption costs are distributed across the population, recessions hit the young harder!



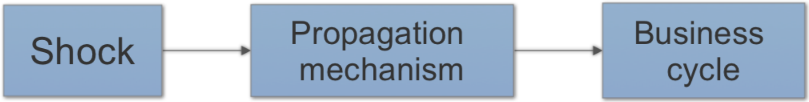
Should We Care About BCs?

. . . and also the poor!



The Frisch-Slutsky Paradigm

- Three components in BCs:
  1. **Shock**: driving force behind economic fluctuations, i.e. original cause of the cycle
  2. **Propagation mechanism**: translates small, short-lived shocks into large, persistent economic fluctuations
  3. **Business cycle**: the 4-stage process we just studied!



Shocks

Shocks that have received special attention in econ research:

- **Technology shocks**: new technologies cause disruptions, adoption not always smooth, initial productivity falls
- **Weather shocks & Natural disasters**: some industries (agriculture, tourism) weather-dependent; natural disasters (earthquakes, hurricanes) wipe out regions
- **Monetary shocks**: money supply and interest rates as a source of fluctuation
- **Political shocks**: taxes, antitrust regulations, government expenditure, etc.
- **Taste shocks**: shifts in preferences, e.g. apparel-, music-, movie-industry.

Propagation Mechanisms

- Unlikely that shocks themselves are large enough to explain yearly output drops of $\geq 3\%$
- Seems likely that some mechanisms amplify and propagate shocks
- Some candidates:
  - **Intertemporal substitution**: shocks with negative impact on productivity lower MPs. If MPs fall, consumer's might prefer to work less. If labor input falls, shock is amplified!
  - **Sticky prices**: price adjustments do not take place in the short-run unemployment, output losses
  - **Financial frictions**: small shocks can cause bankruptcies $\rightarrow$ firms and banks* connected.

Business Cycle Models

Roughly subdivided in 2 categories:

1. **Keynesian Economics**:
   - Animal spirits guide human behavior: hysteria vs. inaction
   - Market failures (labor- and product- market, financial sector, etc.)
     - ⋆ If markets are efficient, prices and wages should adjust...
     - ⋆ ...but rather, sticky wages and prices!
   - Multiple equilibria: stable equilibrium w/ high unemployment possible (all firms invest vs. no firm invest)
   - Aggregate demand is key ⇒ government intervention
   - **Criticism**: theoretical (lack "microfoundations", the Lucas' critique) and practical (stagflation in 1970s)

Business Cycle Models

2. **Real Business Cycle (RBC) Theory**:
   - Microfoundations
   - Rationality: economic actors optimize
   - Supply shocks: technology, TFP, input factors, etc.
   - BCs as "efficient market" responses to unavoidable shocks
     - ⋆ **Positive shock**, e.g. technology: MPs high, high employment, raising inflation
     - ⋆ **Negative shock**, e.g. oil crises: MPs low, high unemployment, downward pressure on prices
   - Prices adjust instantaneously to clear out markets
   - **Criticism**: labor supply not very responsive to wage changes

Business Cycle Models

- There is some truth in both models
- Today **New Keynesian** (DSGE) **Models** seem to dominate:
  - ⋆ Some logic of Keynesian approach but RBC apparatus
  - ⋆ Microfoundations: behavior of individuals and firms formally derived
  - ⋆ Competitive economy but ...
    - ◦ nominal rigidities: sticky prices, menu costs and efficiency wages
    - ◦ information assymmetry and financial frictions
  - ⋆ Both demand- & supply- shocks are allowed
  - ⋆ Monetary policy affects the real economy through expectations
  - ⋆ Predominant models in academic research and Central Banks

Recap!

- **Definiton** and **characterization** of business cycles
  - ⋆ Documented throughout time
  - ⋆ Short-run phenomenon
  - ⋆ Reccurent
  - ⋆ Persistent
  - ⋆ Self-reinforcing
  - ⋆ Predictable
- **Output gap** and its relation with monetary variables
- **Stages of a BC**: expansion, peak, contraction, depression
- **2 definitions of recession**: popular vs. frequently used
- Cyclical behavior of macroeconomic variables: **direction**, **timing** and **volatility**

Recap!

- BC Indicators
- **Stylized facts**
- **Okun's Law**: negative relationship between unemployment and output
- Are BCs important? Should the government act?
- **BCs hit especially hard the young and the poor!**
- The **Frisch-Slutsky** paradigm
  - ⋆ Major shocks
  - ⋆ Main propagation mechanisms
- 2 radically-different **BC Models**...
  - ⋆ New Keynesian (DGSE) models reconcile theory and evidence

Thank you for your attention!