

## 1. Measurement of the Economy at the Macro Level

*References:*  
Williamson, Chs. 1-3.

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## Assignment (Changed!)

- Read Chapters 1-2 of Will
- Prep for Quiz on Wed 9/2 by answering the following questions from the end of the chapters:
  - Ch.1: 1 (a-b), 4-7
  - Ch.2: 3, 5, 6

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## Outline of today's discussion

1. Look at some data
2. Think about what the data tells us
  - a. About the behavior of the economy
  - b. About the welfare of households
3. Discuss macroeconomics *models*
  - a. Why?
  - b. How?
  - c. Examples.

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## Gross Domestic Product (GDP)

- “Market value of goods and services produced within a countries borders during some specified period of time.”
- An important (but not the only!) measure of economic activity.
- *Is it a measure of standard of living (welfare)?*

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## Time series data

- <http://research.stlouisfed.org/fred2/>

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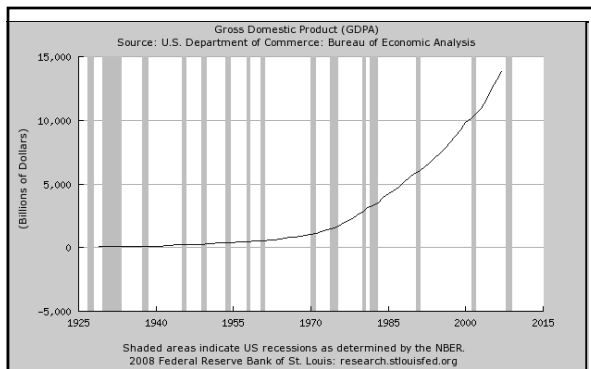
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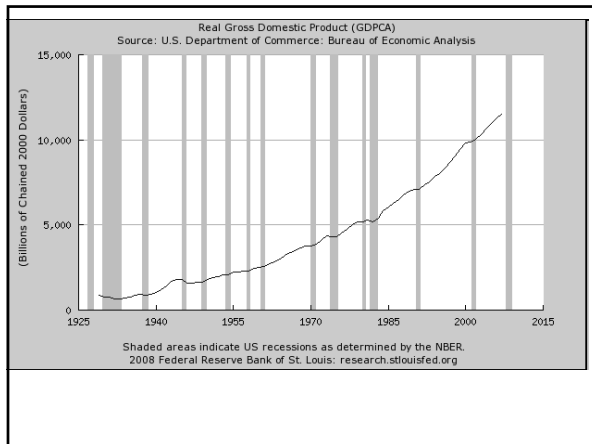
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**GDP and households' welfare?**

- Is it a sufficient summary?
- What other aspects of the economy do people care about?

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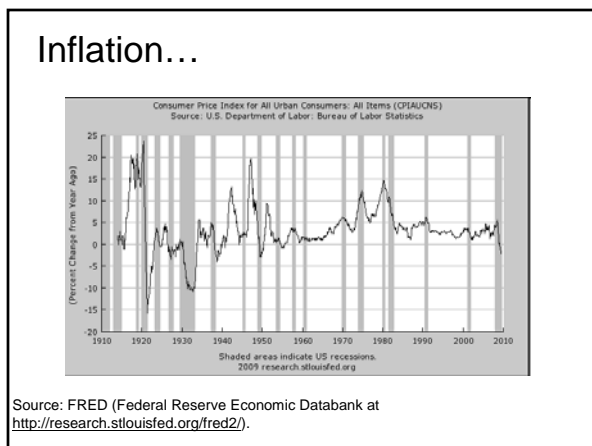
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## Interest rates...



Source: FRED (Federal Reserve Economic Databank at <http://research.stlouisfed.org/fred2/>).

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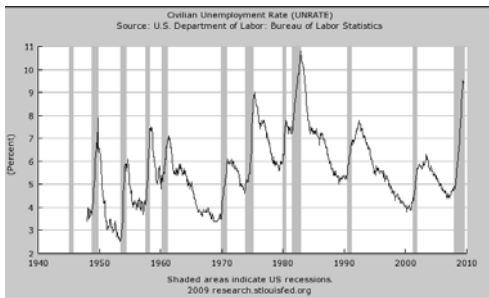
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## Unemployment rate...



Source: FRED (Federal Reserve Economic Databank at <http://research.stlouisfed.org/fred2/>).

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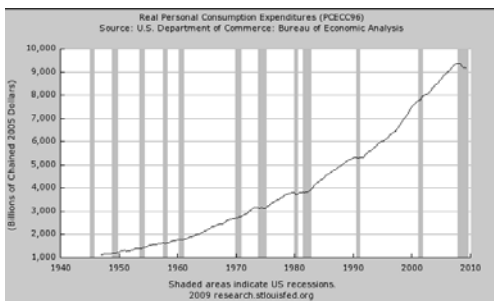
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## Total consumption...



Source: FRED (Federal Reserve Economic Databank at <http://research.stlouisfed.org/fred2/>).

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## Notice

1. Fluctuations are *correlated*, but GDP does not fully summarize the stuff households care about.
2. Some episodes were particular "bad" in multiple dimensions:
  - Great depression of 1929-1939.
  - High inflation and unemployment of 1973-75 recession
  - High inflation, unemp, and interest rates during recession 1980 and '81-82 recessions.
  - Current recession may be one for the books!
3. Despite ups and downs ("cycles") some real variables show long-term growth (e.g., GDP and consumption).

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## Digression on Growth Rates and (natural) Logarithms

- If  $g$  is close to zero,
 
$$\ln(1+g) \text{ approximately } = g.$$
 so if
 
$$g = [y(t)-y(t-1)] / y(t-1)$$
 then
 
$$g = \ln[y(t)/y(t-1)]$$

$$= \ln[y(t)] - \ln[y(t-1)].$$
- Thus, if  $y(t)$  shows a constant growth rate, a plot of  $\ln[y(t)]$  over time should be a straight line with slope  $g$ ! That is,
 
$$\ln[y(t)] = \ln[y(0)] + g \cdot t .$$

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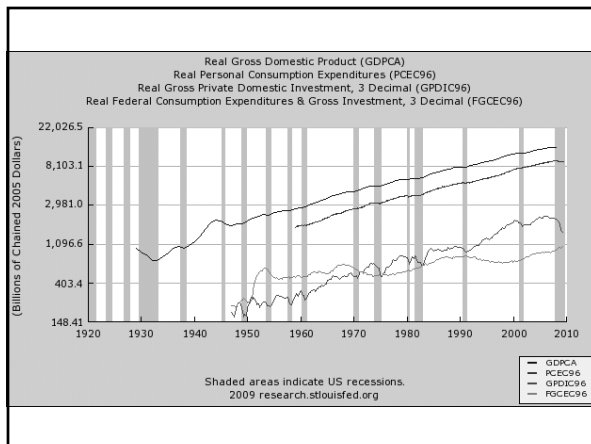
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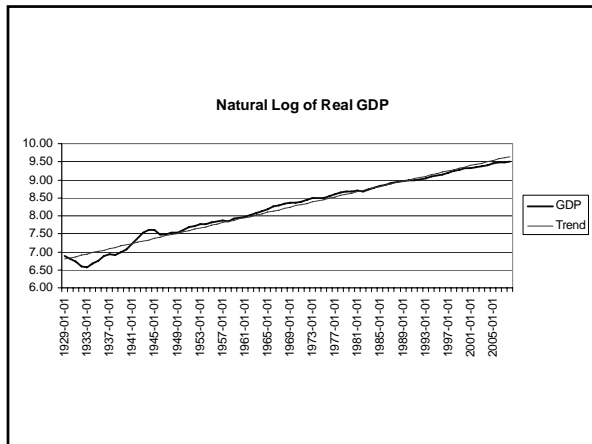
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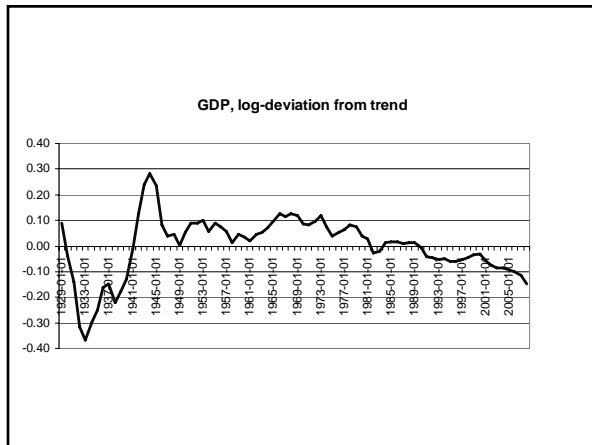
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**Decomposition of Time series into Trend and Cycle**

- Study of trend is useful for study of long-run economic growth
- Study of the cycle is used to understand the nature of business cycles -- why are there such fluctuations!?!

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## Basic Questions in Macro

*Regarding long-run growth:*

- What causes sustained economic growth?
- Could growth continue indefinitely, or is there some limit?
- Is there anything that governments can or should do to alter the rate of growth?

*Regarding business cycles:*

4. What causes business cycles?
5. Should governments try to smooth out business cycles?

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## Economic Models

- A model is an abstraction of a more complicated reality.
- No model can be both comprehensible and “right”.
- Theory models v. statistical models.

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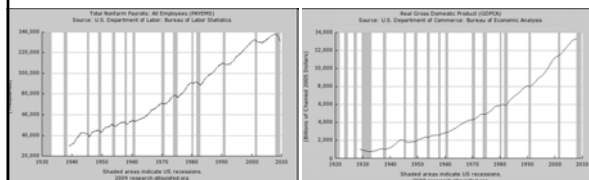
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## Example: Output (GDP) as a function of employment



- $Y(t) = a \cdot N(t) + z(t) ???$
- $\text{Log}(Y(t)) = a \cdot \text{log}(N(t)) + z(t) ???$

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## Simple Examples

1. Decomposition of log-GDP(t) into linear "trend" and "cycle" components.
2. Decomposition of log-GDP(t) into more flexible "trend" and "cyclical" components.
3.  $GDP(t) = F(K(t), L(t))$ .
4.  $GDP(t) = Z(t) * F(K(t), L(t))$ .
5. Models with explicit assumptions about behavior and resource allocation.

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## Typical Macroeconomic Model

Make assumptions about

1. What motivates consumers and firms.
2. Available production technologies and resources.
3. The outcome as a function of actions taken by consumers and firms.
4. A notion of "equilibrium" that determines what actions are taken (and what outcome obtains as a result).

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