Course website: [http://econweb.ucsd.edu/~jhamilto/Econ110B.html](http://econweb.ucsd.edu/~jhamilto/Econ110B.html)

will eventually have:
- syllabus
- copies of lecture slides
- TA office hours
- problem sets
- announcements

Or Google James Hamilton teaching materials

Text:
UCSD custom edition is identical to regular edition for purposes of this course

Grading policy
Option 1:
- 30% first exam
- 30% second exam
- 40% on final

Option 2:
- 40% on best of first two exams
- 60% on final
Problem sets:
• Are not required
• Don’t count for your grade
• Are nevertheless a good idea
• Due before your discussion section meets

Problem Set 1:
Chapter 9, exercises 4 and 5, pages 248-259.
• Answers will be reviewed in discussion section next week (Jan 16)
• Discussion sections will not meet this week (Jan 9)

Chapter 9: An Introduction to the Short Run

U.S. real GDP, 1947-2016

Graph plots 100 times the natural logarithm relative to 1947 value
A 1-unit increase on vertical axis represents a 1% increase
Similar to “ratio scale” used in text

GDP rises over time
Why does GDP rise over time?
• Growing population
• Increasing capital stock
• Better technology

Examining how this works was focus of 110A


Why does GDP sometimes fall?
• Population shrinks?
  – No, have more people but they can’t find jobs

Unemployment rises when GDP falls

Why does GDP sometimes fall?
• Population shrinks?
  – No, have more people but they can’t find jobs
• Lose some capital stock?
  – No, factories and stores have excess capacity

Capital stock does not change much in a single year
Why does GDP sometimes fall?
- Population shrinks?
  - No, have more people but they can’t find jobs
- Lose some capital stock?
  - No, factories and stores have excess capacity
- We forget how to be productive?
  - Hard to make good case

Definition: the economy is said to be in recession if there is an extended period of falling GDP and rising unemployment
- Rough rule of thumb: if real GDP falls for 2 quarters in a row, economy is likely in a recession

Shaded periods represent economic recessions

2007:Q4 to 2009:Q2 has been called the “Great Recession”

Why does GDP sometimes fall?
- Factors other than population, capital stock, and technology are involved
Conclusion: short-run fluctuations (e.g., drops in GDP in 1974, 1982, 2009) may be due to factors that are different from those that determine long-run growth

Will use a different model to study different questions:
- Econ 110A: long-term model—what determines a country’s long-run growth? (answer was population, capital, technology)
- Econ 110B: short-term model—what governs a country’s deviation from long-run potential?
Definition: **potential GDP** is the level of GDP that would be predicted by the long-term model.

GDP falls below potential during recessions and takes time to get back.

**Congressional Budget Office** estimates potential GDP.

Does it make sense to say that GDP is “above potential”?
- Yes, potential = level predicted by long-run model.

Does it make sense to say that GDP is “above potential”?
- Yes, keeping GDP above potential may not be sustainable
  - People work overtime, but only for a while
  - Equipment may be used more intensely, but wears out more quickly
  - People may change prices, wages, and that could bring about other changes.
• Long-run model (Econ 110A): Explains level of output (called “potential output” and denoted $\bar{Y}_t$) in terms of population, capital and technology
• Short-run model (Econ 110B): Explains why actual real GDP (denoted $Y_t$) would differ from potential output

Definitions:
• Potential output = level of output predicted by long-run model (also sometimes called “natural” level of output)
• Short-run output = percent difference between output and potential output
• When short-run output is positive, output is above potential
• When short-run output is negative, output is below potential

$Y_t = $ actual output
$\bar{Y}_t = $ potential output
$\tilde{Y}_t = $ short-run output
$\tilde{Y}_t = (Y_t - \bar{Y}_t)/\bar{Y}_t$

Short-run output is difference between actual and potential expressed as a fraction or % of potential.

$\tilde{Y}_t = (Y_t - \bar{Y}_t)/\bar{Y}_t$

$\ln(Y_t) - \ln(\bar{Y}_t)$ is practically the same number as $(Y_t - \bar{Y}_t)/\bar{Y}_t$.

In 110B we will be studying short-run output, or what happens both in recessions (when output falls below potential) and in expansions (when output rises above potential).

(1) What do we see happen during economic recessions?
a) Real GDP falls

\begin{align*}
\text{Quarter-to-quarter percent change in U.S. real GDP, } &1947:Q2-2016:Q3 \text{ (shaded regions are recessions)}
\end{align*}

b) The unemployment rate rises

\begin{align*}
\text{Unemployment rate (in percent), } &1948:M1-2016:M11 \text{ (shaded regions are recessions)}
\end{align*}

c) The number of people working falls

\begin{align*}
\text{Monthly percent change in U.S. employment, } &1947:M2-2016:M11 \text{ (shaded regions are recessions)}
\end{align*}

d) The inflation rate often falls

\begin{align*}
\text{Percent change in consumer price index from value preceding year, } &1948:M1-2016:M11
\end{align*}

(2) What limits how fast GDP can grow during an expansion?

(a) There is a limit on how much employment can grow in an expansion
- Finite population
- Some people don’t want jobs or low-paying jobs
- Some people not trained for available jobs

b) The inflation rate tends to rise at the end of expansions
Trying to maintain GDP above potential may cause inflation to rise