ECON 3510 - Intermediate Macroeconomic Theory
Fall 2015
Mankiw, *Macroeconomics, 8th ed.*, Chapters 1-2

Chapter 1: Introduction

- What is macroeconomics?

    - Macro = large
    - Study economy as a whole
    - Microeconomics = study individual decisions
    - Macroeconomics = study all these decisions in aggregate
    - Usually focus on macroeconomic aggregates like gross domestic product/income, unemployment rate, interest rates
    - Can divide topics into two main areas:
        1. Long-run issues:
            * Economic growth
            * Structural changes to economy like secular changes in labor-force participation, capital/labor ratios
        2. Short-run issues: Economic fluctuations - i.e., business cycles
    - Note: LR and SR are vague terms. Think of long-run in terms of decades for growth, short-run years (e.g. barely recovered from rescission that started almost 8 years ago (December 2007 was peak).
    - Economists think in terms of models
        * A model is an abstraction from reality that helps you focus your thoughts on the key moving pieces
            · Think about a model as a map
            · Different models to highlight different relationships
        * We'll see lots of models in this book - starting with those focused on long-run issues and moving towards those focused on short-run issues.
        * Models will relate variables to one another
            · Exogenous variables will be the variables we take as given
            · Endogenous variables are the variables determined in the model
        * Models are composed of mathematical equations. We'll look at both the equations and their graphical representation.

Chapter 2: Data

- Key points:

    - Know how GDP, unemployment, and inflation are calculated
    - Understand the circular flow model
    - Know the difference between stocks and flows
    - Know the difference between nominal and real variables

- Interesting note: Data releases of these statistics are big events for financial markets - even move computers to DC to be closer.

- Gross Domestic Product (GDP)
  - Calculated by the Bureau of Economic Analysis (BEA - part of the Census Bureau - which is a part of the Dept of Commerce)
  - GDP is defined in two ways, which should be equilvalent:
    1. Total income of everyone in the country (not just citizens, but physically inside the boundaries)
    2. Total expenditure on the economy's output of final goods and services
       * You don't want to count intermediate goods and services, else would double count lot of stuff (e.g. sale of tire to auto-assembly plant would be counted again when car sold)
  - Computing GDP
    * Use market prices to add up "amounts" for different goods
      · e.g. Apples and oranges
      · GDP $= (P_{apples} \times Q_{apples}) + (P_{oranges} \times Q_{oranges}) = (0.5 \times 100) + (1 \times 50) = 50 + 50 = 100$
    * Doesn't include sales of used goods (those change hands, but are not something newly created)
    * Includes inventory of storable goods
    * Includes investments that increase production later on
    * Doesn't include intermediate goods
      · Note: Just about two years ago (July 2013), the BEA changed how it counted many things as intermediate goods. E.g. artistic productions were only counted at sale (e.g. tickets to movies), but now many are counted also as final products themselves- e.g. a movie production now shows up as an investment.
      · Most significant impact of changes were to count R&D spending as investment instead of treating as intermediate good and not counting
    * Imputes the value of some non-market goods
      · e.g. Home ownership, government services
      · But leaves out others like home production, black market
  - Circular flow model
    * Shows the flow between firms and households
    * DRAW model - firms on left, HH on right, arrows from HH to firms for labor (hours) and expenditures ($). arrows from Firms to HH for income ($) and goods (pizzas)
    * What goes into a sector = what goes out
      · Expenditure = income
  - National Income Accounts Identity
    * Breaks down the components of spending that comprise GDP
    * Given by: $Y = C + I + G + NX$, where:
      · $Y =$ GDP
      · $C =$ Consumption
      · $I =$ Investment
      · $G =$ Government purchases
      · $NX =$ Net exports = Exports - Imports
- Consumption: (2/3 of GDP)
  - Dfn: The value of all goods and services bought by households
  - 3 categories:
    1. Durable goods (e.g. cars, refrigerators - NOT homes (they are investment))
    2. Non-durable goods (e.g. food, clothes)

3. Services (largest component $\sim 40\%$ of GDP) (e.g. dry-cleaning, air travel)

- <u>Investment</u>: (1/6 of GDP)

    - Dfn: Spending on capital and goods for use in the future
    - Categories:
        * Business fixed investment (largest investment category) - spending on plant and equipment used in production
        * Residential fixed investment - spending on housing
        * Inventory investment - change in the value of all firms' inventory
    - Capital accumulation
        * Capital is a <u>stock</u>, investment is a <u>flow</u>
        * $\rightarrow$ stock - a quantity at a given point in time (e.g. the capital stock on January 1, 2005 was $26 trillion)
        * $\rightarrow$ flow - a quantity measured in units of time (e.g. investment in 2005 was $3 trillion)
        * $\rightarrow$ Bathtub example: amount of water in the tub is a stock (gallons). The amount of water pouring from the the faucet is a flow (gallons per minute).
        * $\rightarrow$ What is: Your GPA? (stock) GDP? (flow) Employment? (stock) Inflation? (flow)
        * Capital accumulation equation:
        * $\rightarrow k_t$ is capital at the beginning of period t
        * $\rightarrow \delta$ is the depreciation rate (how fast that capital falls apart)
        * $\rightarrow i_t$ is investment in period t
        * $\rightarrow \Rightarrow k_{t+1} = k_t - \delta k_t + i_t$ or $k_{t+1} = (1-\delta)k_t + i_t$
        * $\rightarrow \rightarrow$ Capital at the end of the period equals what you start with, less depreciation, plus investment

- <u>Government Purchases</u>: (1/6 of GDP)

    - Includes all gov't spending on goods and services
        * e.g. mail delivery, fighter jets
    - Excludes transfer payments
        * e.g. unemployment benefits, social security payments
        * This just moves income from one person to another - no change in total resources

- <u>Net Exports</u>: (usually a slight negative on GDP - about minus 5%)

    - Exports - Imports
    - Count exports because made here (and want to get the total *product*)
    - Subtract imports off because counted them in C, I, G, but need to subtract off those produced elsewhere
    - Negative entry every year since the mid-1970's (i.e. the U.S. has run a trade deficit)

- Note: These ratios vary a lot by country. Smaller countries typically have more percent of GDP from NX (e.g. it's about 60% for Korea). China has about 50% of GDP from investment.

- $Y = C + I + G + NX$ in 2012:

    - $Y = \$16.2$ trillion
    - $C = \$11.1$ trillion
    - $I = \$2.5$ trillion
    - $G = \$3.2$ trillion

- NX = -$0.5 trillion

- Forecast for 2015 GDP is $17.8 trillion – it was $17.3 trillion in 2014 (about 2.5% growth)

- Does that mean we are more productive/better off?

  - Could be more stuff (good)
  - Could be higher prices (bad - or at least not good)

Real vs. Nominal GDP

- GDP is the value of all final goods and services produced

- nominal GDP measures these values using current prices

- real GDP measures the these values using prices in a base year (keeps prices constant)

- Example: TABLE HERE

Table 1: Add caption

	2014		2015	
	P	Q	P	Q
pizza	$30	5	$36	6
beer	$10	7	$10	8
Nominal GDP:	=(30x5)+(10x7)		=(36x6)+(10x8)	
	=150+70		=216+80	
	=220		=296	
Real GDP (2014 dollars):	=220		=(30x6)+(10x8)	
			=180+80=260	

- Real GDP controls for inflation by keeping prices constant

- Change in nominal GDP can be due to:

  1. Change in quantities produced
  2. Change in prices

- Changes in real GDP can only be due to changes in quantities (since hold prices fixed)

- SHOW real GDP graphs - in levels and pct changes

GDP Deflator

- Allows one to turn nominal GDP into real GDP

- A price index of all good and services included in GDP

- GDP deflator $= 100 \times \frac{\text{Nominal GDP}}{\text{Real GDP}}$

  - $\Rightarrow$ Real GDP $= 100 \times \frac{\text{Nominal GDP}}{\text{GDP Deflator}}$

- Deflates GDP, i.e. removes inflation from GDP

Table 2: Real vs. Nominal GDP	2014	2015
GDP	220	296
Real GDP	220	260
GDP Deflator	1	=296/260
		=x>1
		=1.138

- Example: TABLE HERE

Inflation

- Dfn: The inflation rate is the percentage increase in the overall level of prices (not just price of one good increasing!)

- To calculate the inflation rate, one needs to know the overall level of prices

- Many measures:

  - GDP Deflator
  - Consumer price index (CPI)
  - Personal consumption expenditure index (PCE)
  - Producer price index (PPI), others... (e.g. Billion Prices project)

CPI

- Price index of all consumption goods

- Calculated by the Bureau of Labor Statistics (BLS)

- CPI $= 100 \times \frac{\text{cost of basket in current year}}{\text{cost of basket in base year}}$

- CPI vs. GDP deflator:

  - CPI excludes investment goods (-I)
  - CPI includes foreign goods we consumer (+imports)
  - CPI has a fixed weight basket (Laspeyres index)
    * e.g. 5% of basket is comprised of computers each year
  - GDP deflator has a basket that changes (Paasche Index)

- Calculating CPI, for example:

  - use 2014 as base year
  - 2014 "basket" = 5 pizzas, 7 beers
  - price of 2014 basket in 2014 = ($30x5)+($10x7)=150+70=220
  - price of 2014 basket in 2015 = ($36x5)+($10x7)=180+70=250
  - 2014: CPI $= \frac{220}{220} \times 100 = 100$

Table 3: CPI Example:

	2014		2015	
	P	Q	P	Q
pizza	$30	5	$36	6
beer	$10	7	$10	8

* Index will always equal 100 in base year
- 2015: CPI = $\frac{250}{220} \times 100 = 113.6$

- What's the inflation rate between 2014 and 2015?

    - % change in price level
    - = % change in prices = $\frac{\text{prices}_{2015} - \text{prices}_{2014}}{\text{prices}_{2014}} = \frac{113.6 - 100}{100} = 13.6\%$

- Problems with the CPI:

    - Has an upward bias when measuring inflation
    - Three reasons for this bias:
        1. Substitution (baskets change as goods become relatively cheaper/more expensive)
        2. New products
        3. Quality improvements
    - This bias has been estimated to be about 1 percentage point per year overstatement in CPI (significant)

- SHOW inflation graph

Employment/Unemployment

- 2 surveys: both by the BLS

- Establishment survey (about 160,000 businesses)

    - Job growth numbers come from here
    - When hear "the economy has added 200,000 jobs this month", this is where it comes from
    - Asks employers how many are on their payrolls

- SHOW jobs graph

- Household survey (about 60,000 households)

    - The actual survey is the Current Population Survey
    - Puts individuals into categories (rather, asks them which they are in):
        1. In the labor force
            * employed (or seasonally unemployed)
            * unemployed (not working, but looking for work)
        2. Not in the labor force (not working and not looking for work)
            * e.g. student, home-maker, retired, "discouraged"
    - Note: Total labor force = employed + unemployed

- SHOW unemp graph

- 2 important labor statistics:

  1. unemployment rate $= \frac{\text{\# unemp}}{\text{\# in labor force}}$

  2. labor force participation rate $= \frac{\text{\# in labor force}}{\text{\# adults}}$

- SHOW labor force participation rate graph