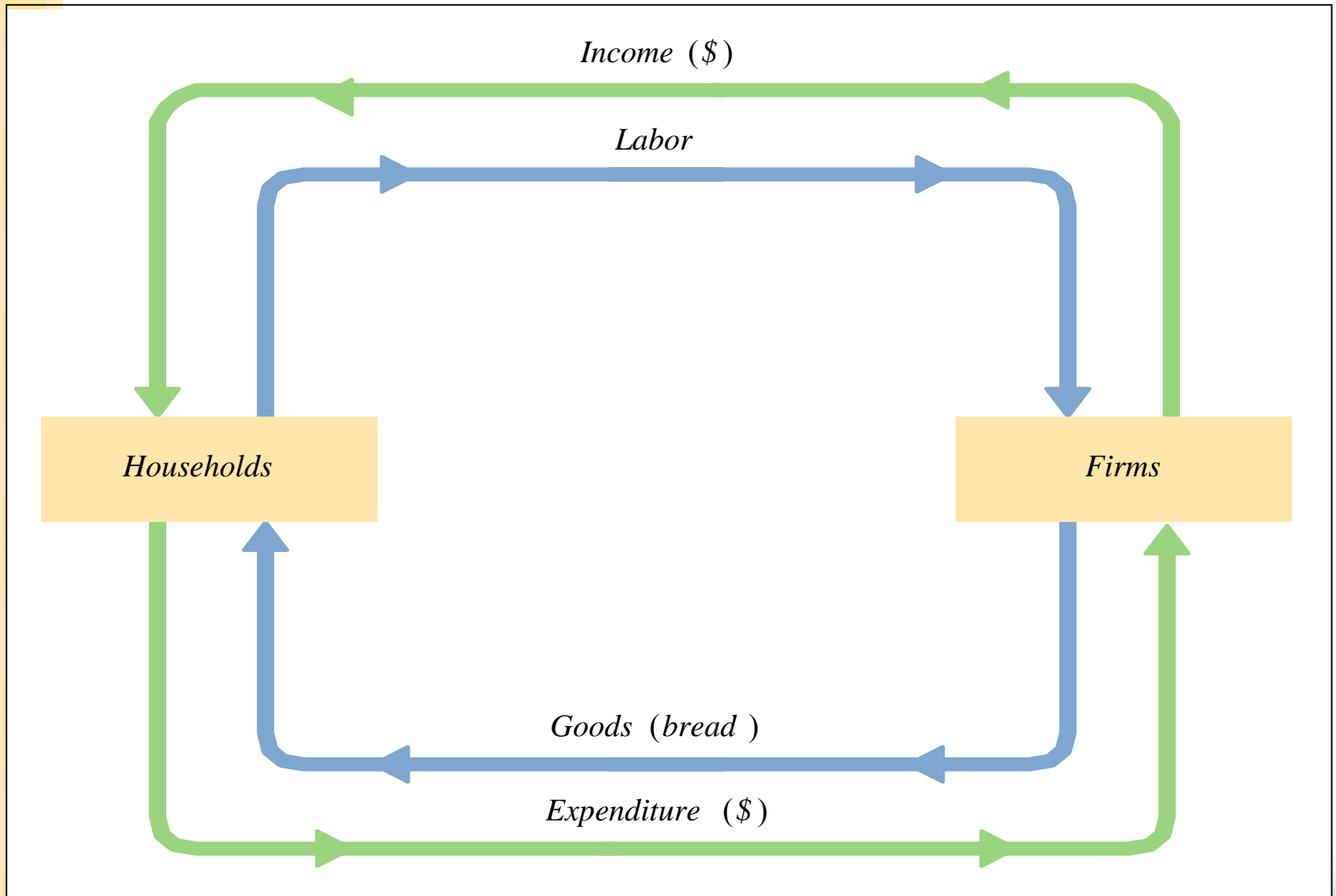

September 14, 2005

Announcements

- The homework has been posted
- Feedback
- Outline:
 - Data
 - Math Review

The Circular Flow



GDP

- Recall that the primary measure we use is Gross Domestic Product
- GDP can be considered both income and output... and I will interchange the two words freely throughout this class
- $Y = C + I + G + NX$

Line		
15	Personal consumption expenditures (3-3)	8,214.3
16	Durable goods	987.8
17	Nondurable goods	2,368.3
18	Services.....	4,858.2
19	Gross private domestic investment.....	1,928.1
20	Fixed investment (6-2)	1,872.6
21	Nonresidential.....	1,198.8
22	Structures	298.4
23	Equipment and software	900.4
24	Residential.....	673.8
25	Change in private inventories (6-4).....	55.4
26	Net exports of goods and services	-624.0
27	Exports (5-1).....	1,173.8
28	Imports (5-6)	1,797.8
29	Government consumption expenditures and gross investment (4-1 and 6-3).....	2,215.9
30	Federal.....	827.6
31	National defense	552.7
32	Nondefense	274.9
33	State and local.....	1,388.3
34	GROSS DOMESTIC PRODUCT	11,734.3

Components of GDP

- Consumption consists of good and services bought by households (Durables, Non-Durables, Services)
- Investment consists of goods bought for future use (Residential, Business, Inventory)
- Government Purchases are goods and services bought by federal, state, and local governments (military equipment, highways, and government worker services...transfers not included)
- Net Exports are value of goods and services exported minus the value of goods and services imported

Calculating GDP

- Add the final value of all goods and services by the appropriate price

ie.

$$\sum_i p_i x_i$$

Nominal vs Real GDP

- We multiply by price so that we can “add apples and oranges”
- By doing so, we must deal with nominal vs. real values of GDP....that is, what prices are we to use?
- Thought Exercise: suppose that prices double; should stated output double?

Real vs. Nominal GDP

NOMINAL GDP: Add the value of all goods and services using *current* prices when creating a GDP series

$$\sum_i P_{i,current} x_{i,current}$$

REAL GDP: Add the value of all goods and services using a designated *base year* price when creating a GDP series

$$\sum_i P_{i,base} x_{i,current}$$

GDP Deflator

The GDP Deflator is calculated as:

$$\text{GDP Deflator} = \frac{\text{Nominal GDP}}{\text{Real GDP}}$$

- Used to convey the relationship between real and nominal GDP
- This is a Paasche Index (tends to understate)

ChainWeighted Measures

As of 1995, the new prices are not simply base years. In fact, prices are the average of the year before and the year prior. The GDP is calculated using this common price. Repeated over every pair of consecutive years, we get a chain weighted measure of GDP

Benefits: Limits the outdating of prices

Drawbacks: Still not perfect

The Price Level and Inflation

Price level: the overall level of prices in a country, as usually measured empirically by a price index

- There are many indices of the price level
- The most commonly cited is the CPI

$$\frac{\sum_i P_{i,current} x_{i,current}}{\sum_i P_{i,base} x_{i,current}}$$

The Price Level and Inflation

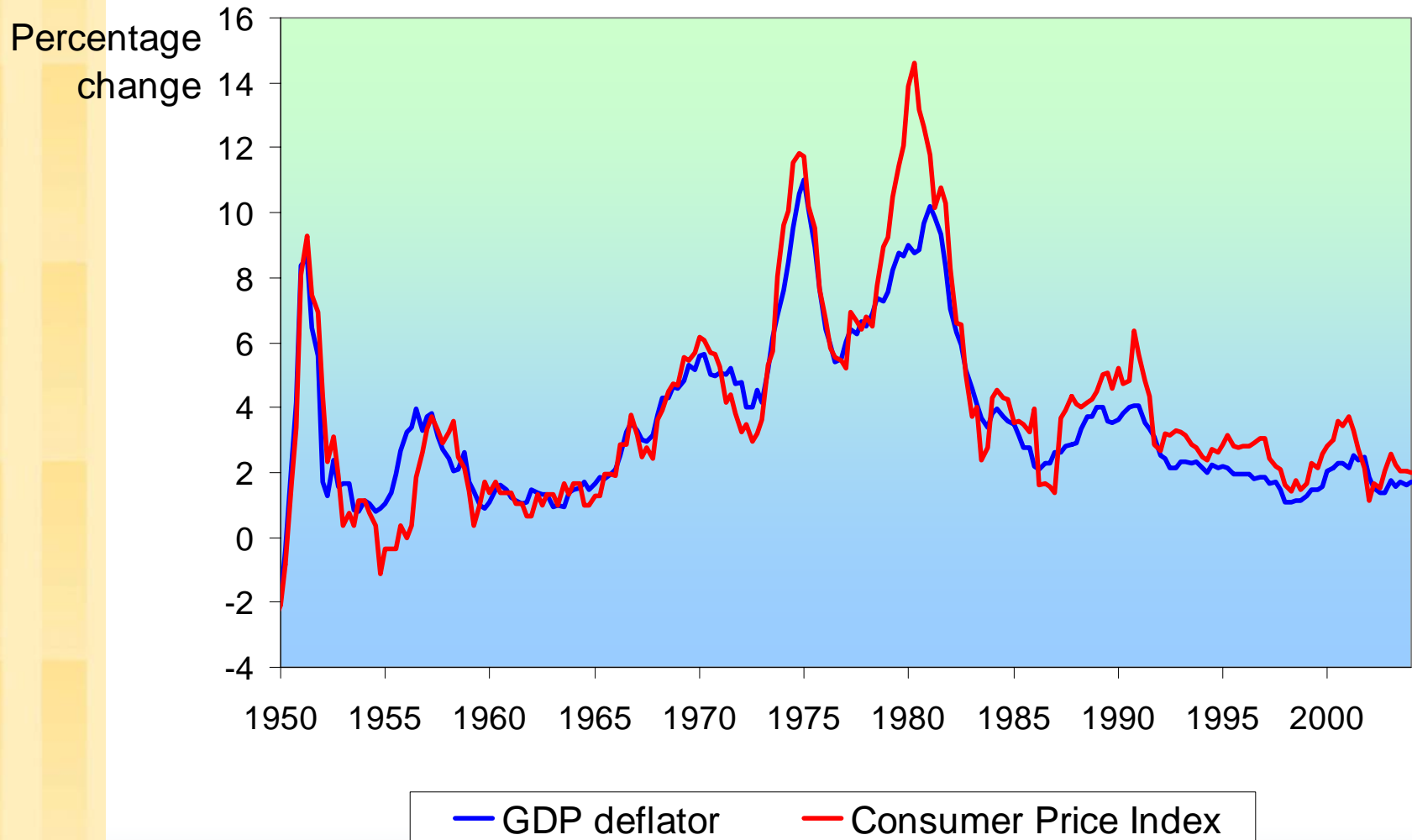
Inflation: A measure of how fast the overall price level is rising.

For instance...

- If the inflation rate is 5% this year, generally, things will cost 5% more this year than it did last year in terms of 'sticker' price (nominal terms)
- Also, the price level has risen by 5% this year.

$$\pi = \frac{\Delta P}{P}$$

Two measures of inflation



CPI vs. GDP deflator

prices of capital goods

- included in GDP deflator (if produced domestically)
- excluded from CPI

prices of imported consumer goods

- included in CPI
- excluded from GDP deflator

the basket of goods

- CPI: fixed
- GDP deflator: changes every year

Math Review:

Exponents & Natural Logs

- Basic Properties of exponents

- $x^1 = x$; $x^{(-1)} = 1/x$; $x^0 = 1$

- $x^a * x^b = x^{(a+b)}$

- $(x^a)/(x^b) = x^{(a-b)}$

- $(x/y)^a = (x^a)/(y^a)$

- *If $x^a = y^b$; then $x = y^{(b/a)}$; and $x^{(a/b)} = y$*

Math Review:

Exponents & Natural Logs

- Basic Properties of natural logs
 - $\text{Log}_e(x)$; shorthand $\text{Ln}(x)$
 - $\text{Ln } 0 = -\text{infinity}$; $\text{Ln } 1 = 0$
 - $\text{Ln}(xy) = \text{Ln}(x) + \text{Ln}(y)$
 - $\text{Ln}(x/y) = \text{Ln}(x) - \text{Ln}(y)$
 - NB. $\text{Ln}(x \pm y) \neq \text{Ln}(x) \pm \text{Ln}(y)$
 - $\text{Ln}(x^a) = a * \text{Ln}(x)$
 - NB. $(\text{Ln}(x))^a \neq a * \text{Ln}(x)$
 - $\text{Ln}(e^x) = x$; $e^{\text{Ln}(x)} = x$ where $e = 2.7183...$

Math Review: Algebra

A generalized function is typically written in the following form:

$$Y = F(K, L)$$

where Y refers to output and is equal to a function based on the parameters K and L , which stand for capital and labor, respectively

A specified function differs in that the actual mathematical mapping is given...

$$Y = AK^\alpha L^\beta$$

where A , α and β are exogenous parameters