

Economics 302 (Sec. 001)
Intermediate Macroeconomic
Theory and Policy
(Fall 2010)

Instructor: Prof. Menzie Chinn

Lecture 2

Monday, Sep. 13, 2010

Outline

- National Income and Product Accounts
- National Savings Identity
- Employment, Unemployment

Accounting

$$C + I + G + X \equiv Y$$

$$S_p \equiv (Y + V + F + Q - T) - C$$

Where (.) is disp. inc; $S_g = (T - F - Q) - G$

$$\rightarrow Y + V \equiv C + S_p + (T - F - Q)$$

National Income Accounting

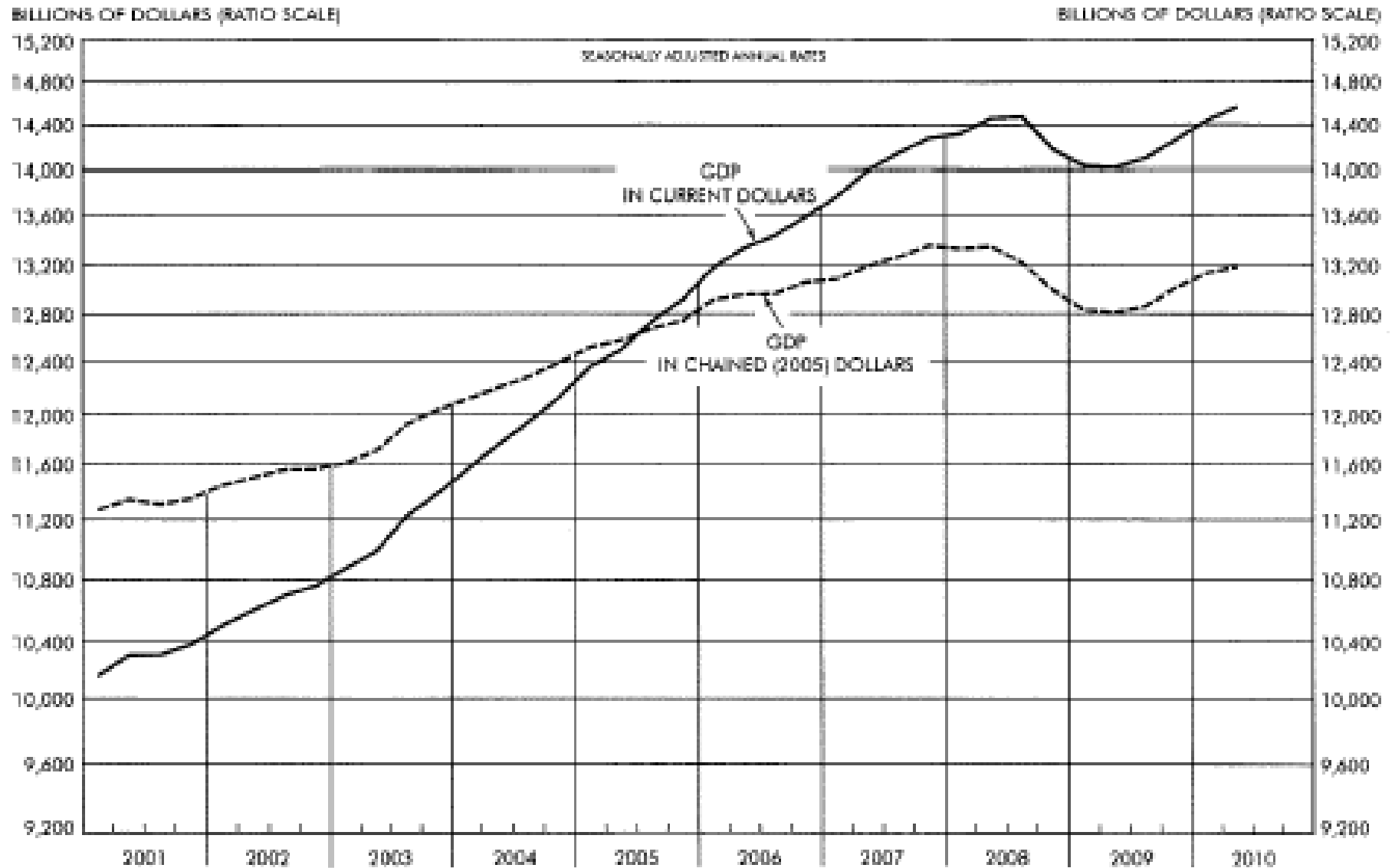
[Billions of current dollars; quarterly data at seasonally adjusted annual rates]

Period	Gross domestic product	Personal consumption expenditures	Gross private domestic investment	Exports and imports of goods and services			Government consumption expenditures and gross investment				Final sales of domestic product	Gross domestic purchases ¹	Addendum: Gross national product	
				Net exports	Exports	Imports	Total	Federal		State and local				
								Total	National defense					Non-defense
2000	9,951.9	6,830.4	1,772.2	-382.1	1,093.2	1,475.3	1,731.0	576.1	371.0	205.0	1,154.9	9,896.9	10,338.5	9,989.2
2001	10,286.2	7,148.9	1,661.9	-371.0	1,027.7	1,398.7	1,846.4	611.7	393.0	218.7	1,234.7	10,324.5	10,657.2	10,338.1
2002	10,642.3	7,439.2	1,647.0	-427.2	1,003.0	1,430.2	1,983.3	690.6	437.7	242.9	1,302.7	10,630.3	11,069.3	10,691.4
2003	11,142.1	7,804.0	1,729.7	-504.1	1,041.0	1,545.1	2,112.6	756.5	497.9	258.5	1,356.1	11,125.8	11,646.3	11,210.8
2004	11,867.3	8,235.1	1,968.6	-618.7	1,180.2	1,798.9	2,232.8	824.6	550.8	273.9	1,408.2	11,802.8	12,486.4	11,959.0
2005	12,638.4	8,819.0	2,172.2	-722.7	1,305.1	2,027.8	2,369.9	876.3	589.0	287.3	1,493.6	12,588.4	13,361.1	12,735.5
2006	13,389.2	9,322.7	2,327.2	-769.3	1,471.0	2,240.3	2,519.4	931.7	624.9	306.9	1,586.7	13,339.0	14,169.2	13,471.3
2007	14,061.8	9,806.3	2,290.2	-714.0	1,661.7	2,375.7	2,674.2	976.3	682.3	314.0	1,697.9	14,032.7	14,775.8	14,185.1
2008	14,369.1	10,104.5	2,096.7	-710.4	1,843.4	2,553.8	2,878.3	1,079.9	737.3	342.5	1,798.5	14,410.2	15,079.5	14,543.6
2009	14,119.0	10,001.3	1,589.2	-386.4	1,578.4	1,964.7	2,914.9	1,139.6	771.6	368.0	1,775.3	14,246.3	14,503.4	14,265.3
2007: I	13,789.5	9,632.9	2,277.4	-725.1	1,575.5	2,300.6	2,604.4	944.0	637.6	306.4	1,660.3	13,772.5	14,514.6	13,859.8
2007: II	14,008.2	9,753.2	2,329.6	-730.7	1,619.1	2,349.8	2,656.0	968.7	657.0	311.7	1,687.3	13,960.6	14,738.8	14,087.6
2007: III	14,158.2	9,850.9	2,313.4	-704.4	1,690.3	2,394.7	2,698.4	992.1	674.7	317.4	1,706.4	14,118.8	14,862.6	14,302.9
2007: IV	14,291.3	9,938.4	2,260.4	-695.7	1,761.3	2,457.5	2,738.2	1,000.6	679.9	320.7	1,737.6	14,278.8	14,987.0	14,489.9
2008: I	14,328.4	10,065.7	2,198.9	-733.5	1,819.9	2,558.4	2,902.3	1,033.4	702.1	331.3	1,768.9	14,342.1	15,066.8	14,520.7
2008: II	14,471.8	10,133.0	2,170.9	-731.9	1,925.3	2,677.2	2,969.8	1,065.2	724.9	340.3	1,804.6	14,495.1	15,223.7	14,647.3
2008: III	14,484.9	10,202.0	2,111.3	-763.1	1,927.3	2,690.4	2,934.7	1,105.5	762.1	343.4	1,829.2	14,514.3	15,248.0	14,689.2
2008: IV	14,191.3	9,967.2	1,905.8	-588.4	1,700.9	2,289.3	2,906.5	1,115.4	760.2	325.1	1,791.2	14,289.2	14,779.5	14,317.3
2009: I	14,049.7	9,913.0	1,640.4	-375.7	1,521.2	1,896.9	2,872.0	1,103.2	743.9	329.4	1,768.8	14,191.6	14,423.4	14,172.2
2009: II	14,034.5	9,920.1	1,530.2	-335.2	1,520.2	1,855.3	2,919.3	1,139.8	769.9	369.8	1,779.5	14,214.0	14,369.6	14,164.2
2009: III	14,114.7	10,040.7	1,548.5	-408.3	1,582.1	1,990.5	2,933.8	1,155.4	787.3	368.1	1,778.4	14,259.0	14,523.0	14,281.9
2009: IV	14,277.3	10,131.5	1,637.7	-426.4	1,689.9	2,116.3	2,934.5	1,139.9	785.4	374.5	1,774.7	14,321.5	14,708.7	14,442.8
2010: I	14,446.4	10,230.8	1,739.7	-479.9	1,757.3	2,237.6	2,955.7	1,178.1	796.3	381.8	1,777.6	14,396.4	14,926.3	14,637.6
2010: II*	14,375.0	10,279.6	1,838.7	-536.0	1,817.6	2,353.6	2,992.6	1,206.5	812.8	393.7	1,786.1	14,500.5	15,110.9	14,768.6

* GDP less exports of goods and services plus imports of goods and services.

Source: Department of Commerce, Bureau of Economic Analysis.

Real vs. Nominal GDP



SOURCE: DEPARTMENT OF COMMERCE

COUNCIL OF ECONOMIC ADVISERS

Real GDP

REAL GROSS DOMESTIC PRODUCT

[Billions of chained (2005) dollars; quarterly data at seasonally adjusted annual rates]

Period	Gross domestic product	Personal consumption expenditures	Gross private domestic investment			Exports and imports of goods and services			Government consumption expenditures and gross investment				Final sales of domestic product	Gross domestic purchases ¹	Addendum: Gross national product	
			Nonresidential fixed investment	Residential fixed investment	Change in private inventories	Net exports	Exports	Imports	Total	Federal						State and local
										Total	National defense	Non-defense				
2000	11,326.0	7,698.1	1,318.5	530.0	69.2	-451.6	1,188.2	1,639.9	2,097.8	698.1	493.9	244.4	1,400.1	11,167.5	11,681.4	11,268.8
2001	11,347.2	7,812.9	1,281.9	583.2	-41.8	-472.1	1,121.6	1,393.8	2,178.2	726.5	470.7	255.5	1,432.3	11,391.7	11,825.7	11,404.6
2002	11,553.0	8,021.9	1,180.2	613.8	12.8	-348.8	1,099.2	1,648.0	2,279.6	779.5	505.2	273.9	1,509.6	11,543.5	12,107.7	11,606.9
2003	11,840.7	8,247.6	1,191.0	664.2	17.3	-603.9	1,116.8	1,720.7	2,330.5	821.1	548.2	281.7	1,499.7	11,824.8	12,449.2	11,914.2
2004	12,263.8	8,532.7	1,263.0	729.5	66.2	-688.0	1,222.8	1,910.8	2,362.0	865.0	580.4	284.6	1,497.1	12,188.2	12,952.5	12,358.5
2005	12,638.4	8,819.0	1,347.2	775.0	50.0	-722.7	1,205.1	2,027.8	2,369.9	876.3	589.0	287.3	1,493.6	12,588.4	13,261.1	12,735.5
2006	12,978.2	9,072.5	1,453.9	718.2	59.4	-729.2	1,422.0	2,151.2	2,402.1	894.9	598.4	296.6	1,507.2	12,917.1	13,705.7	13,046.1
2007	13,228.9	9,289.5	1,502.0	584.2	27.7	-824.9	1,554.4	2,209.2	2,434.2	906.1	611.8	294.2	1,528.1	13,200.0	13,883.9	13,344.4
2008	13,228.8	9,268.0	1,506.6	444.2	-27.6	-504.1	1,647.7	2,151.7	2,502.7	971.8	637.7	314.0	1,532.6	13,268.1	13,729.4	13,388.7
2009	12,880.6	9,153.9	1,290.8	342.7	-113.1	-363.0	1,490.7	1,853.8	2,542.6	1,027.6	693.0	324.6	1,518.8	12,962.8	13,233.6	13,014.7
2007: I	13,089.3	9,235.2	1,489.0	631.2	17.3	-696.4	1,496.4	2,192.7	2,406.7	883.6	595.2	288.2	1,522.9	13,071.1	13,786.2	13,155.8
2007: II	13,194.1	9,270.2	1,539.1	611.4	44.9	-696.2	1,521.2	2,217.5	2,426.8	898.9	607.2	291.5	1,527.8	13,146.4	13,891.2	13,269.0
2007: III	13,268.5	9,310.0	1,574.1	370.6	26.1	-666.6	1,578.0	2,244.6	2,447.9	919.7	622.2	297.2	1,528.4	13,230.4	13,935.8	13,404.4
2007: IV	13,263.5	9,342.2	1,595.9	523.2	12.6	-560.4	1,622.0	2,182.4	2,455.2	922.2	622.4	299.8	1,533.3	13,252.2	13,922.4	13,548.5
2008: I	13,339.2	9,324.1	1,603.7	432.2	-8.2	-529.9	1,644.7	2,174.6	2,469.2	937.6	632.7	304.8	1,532.2	13,346.2	13,866.9	13,516.8
2008: II	13,359.0	9,326.2	1,587.0	464.4	-20.6	-493.8	1,696.6	2,190.4	2,488.4	955.3	643.4	311.9	1,535.1	13,382.4	13,850.1	13,519.7
2008: III	13,223.5	9,242.5	1,561.5	435.6	-27.4	-514.8	1,675.0	2,189.8	2,521.5	987.5	673.0	314.2	1,536.2	13,249.6	13,737.2	13,408.7
2008: IV	12,993.7	9,166.3	1,464.2	394.7	-94.2	-477.7	1,574.5	2,052.2	2,530.7	1,006.9	681.6	323.2	1,526.8	13,084.1	13,462.3	13,109.5
2009: I	12,882.6	9,154.1	1,313.7	352.7	-123.8	-389.2	1,451.6	1,840.8	2,511.5	994.1	666.8	327.3	1,520.1	12,964.2	13,212.6	12,945.5
2009: II	12,910.0	9,117.0	1,288.2	333.9	-161.8	-342.0	1,447.8	1,789.9	2,549.2	1,029.2	690.2	325.9	1,523.8	12,971.4	13,143.7	12,929.4
2009: III	12,860.8	9,161.6	1,282.9	342.4	-128.2	-390.8	1,490.0	1,890.8	2,559.2	1,043.5	708.2	325.2	1,520.0	12,934.5	13,239.8	13,012.8
2009: IV	13,019.0	9,182.9	1,278.2	341.7	-26.7	-330.1	1,578.5	1,903.6	2,550.2	1,043.6	703.8	329.8	1,511.2	13,031.1	13,338.2	13,170.1
2010: I	13,138.8	9,225.4	1,302.6	330.7	44.1	-338.4	1,616.4	1,934.8	2,540.2	1,048.4	704.4	344.0	1,496.8	13,085.5	13,467.6	13,212.0
2010: II	13,191.5	9,270.2	1,356.5	350.1	62.9	-444.9	1,652.9	2,097.6	2,566.8	1,071.2	716.8	354.5	1,501.1	13,117.6	13,620.9	13,267.7

¹ GDP less exports of goods and services plus imports of goods and services.

NOTE.—Because of the formula used for calculating real GDP, the chained (2005) dollar estimates for the detailed components do not add to the chained-dollar value of GDP or to any intermediate aggregates.

Source: Department of Commerce, Bureau of Economic Analysis.

Deflators: Nominal to Real

CHAINED PRICE INDEXES FOR GROSS DOMESTIC PRODUCT

[Index numbers, 2005=100; quarterly data are seasonally adjusted]

Period	Gross domestic product	Personal consumption expenditures			Gross private domestic investment		Exports and imports of goods and services		Government consumption expenditures and gross investment			
		Total	Goods	Services	Nonresidential fixed	Residential fixed	Exports	Imports	Federal			State and local
									Total	National defense	Non-defense	
2000	88.648	88.777	97.520	85.824	96.219	77.415	91.999	89.968	82.524	81.821	88.907	82.482
2001	90.654	91.488	97.429	88.428	95.789	80.994	91.627	87.762	84.261	83.484	85.612	85.019
2002	92.118	92.736	96.430	90.807	95.263	83.002	91.253	86.784	87.318	86.624	88.689	86.810
2003	94.099	94.622	96.380	93.692	95.235	86.953	93.216	89.796	91.024	90.659	91.774	90.425
2004	96.783	97.098	97.867	96.687	96.834	93.296	96.317	94.144	95.335	94.895	96.234	94.062
2005	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000
2006	102.267	102.746	101.508	103.411	103.584	106.081	103.447	104.144	104.107	104.421	103.468	103.276
2007	106.301	105.564	102.946	106.973	105.595	107.613	106.902	107.531	107.753	108.249	106.743	111.112
2008	108.589	109.061	106.262	119.366	106.994	106.361	111.874	113.883	111.119	112.109	109.077	117.349
2009	109.618	109.258	108.634	112.233	105.790	102.736	105.877	105.987	110.895	111.342	109.984	116.892
2007: I	103.366	104.311	101.626	105.754	103.293	107.793	103.319	104.892	106.848	107.113	106.321	109.033
II	106.189	105.212	102.799	106.910	103.596	107.480	106.465	105.936	107.773	108.191	106.926	110.445
III	106.709	105.813	102.997	107.330	103.499	107.300	107.134	106.671	107.882	108.434	106.735	111.644
IV	106.940	106.919	104.362	108.298	103.541	107.681	108.672	112.623	108.509	109.259	106.969	113.226
2008: I	107.454	107.954	103.670	109.191	103.686	107.296	110.719	117.728	110.230	110.975	108.695	113.451
II	108.295	109.183	106.929	118.413	106.248	107.012	113.353	122.345	111.515	112.678	109.122	117.335
III	109.488	110.367	108.807	111.234	107.481	106.268	113.137	122.999	111.958	113.245	109.294	119.075
IV	109.154	108.736	103.643	111.428	108.571	104.867	108.089	111.669	110.772	111.344	109.198	117.313
2009: I	109.465	108.290	102.039	111.579	107.726	104.094	104.841	103.127	110.979	111.262	109.794	116.356
II	109.333	108.810	102.974	111.894	106.162	102.303	105.031	103.719	110.743	111.063	110.096	116.779
III	109.759	109.598	104.403	112.355	104.768	101.637	106.212	103.879	110.716	111.153	109.822	116.998
IV	109.693	110.333	105.120	113.102	104.144	102.712	107.424	111.232	111.141	111.390	110.292	117.434
2010: I	109.939	110.901	105.784	113.620	103.639	102.869	108.771	114.314	112.373	113.046	110.997	118.760
II*	110.481	110.890	104.809	114.121	103.687	101.974	110.043	112.280	112.614	113.379	111.045	118.990

Source: Department of Commerce, Bureau of Economic Analysis.

TABLE 2.3 RELATION BETWEEN GDP AND NATIONAL INCOME
IN 2001 (BILLIONS OF DOLLARS)

Gross domestic product	10208.1
plus: Net factor payments	− 5.3
equals: Gross national product	10202.8
less: Depreciation	1351.4
equals: Net national product	8851.4
less: Sales and excise taxes	794
less: Business transfers	44.6
less: Statistical discrepancy	− 149.8
plus: Net subsidies to government business	54.8
equals: National income	8217.5

SOURCE: U.S. Department of Commerce, *Survey of Current Business*, May 2002, p. D-5.

**TABLE 2.4 NATIONAL INCOME, PERSONAL INCOME,
AND PERSONAL DISPOSABLE INCOME IN 2001
(BILLIONS OF DOLLARS)**

National income	8217.5
less: Contributions for social insurance	731.2
less: Corporate retained earnings	1321.4
plus: Nonbusiness interest	1409.9
plus: Transfer payments from government and business	1148.8
equals: Personal income	8723.5
less: Income taxes	1306.2
equals: Personal disposable income	7417.3

Note: Wage accruals less disbursements, a trivial accounting item, is omitted from the list of adjustments to national income.

SOURCE: U.S. Department of Commerce, *Survey of Current Business*, May 2002, pp. D-5 and D-7.

**TABLE 2.5 LABOR AND PROFIT SHARES OF NATIONAL INCOME
IN 2001 (BILLIONS OF DOLLARS)**

Compensation of employees	6010	Labor share 73 percent
Proprietors' income	743.5	
Rental income of persons	142.6	
Corporate profits	767.1	Profit share 27 percent
Net interest	554.3	
National income	8217.5	

SOURCE: U.S. Department of Commerce, *Survey of Current Business*, May 2002, p. D-6.

**TABLE 2.6 GROSS SAVING AND INVESTMENT, 2002
(BILLIONS OF DOLLARS)**

National saving ($S_p + S_g$)	1573.7
plus: Foreign saving (S_f)	495.6
equals: Investment (I)	2069.3

SOURCE: *Economic Report of the President*, 2003, Table B-32.

The National Savings Identity

$$C + I + G + X \equiv Y$$

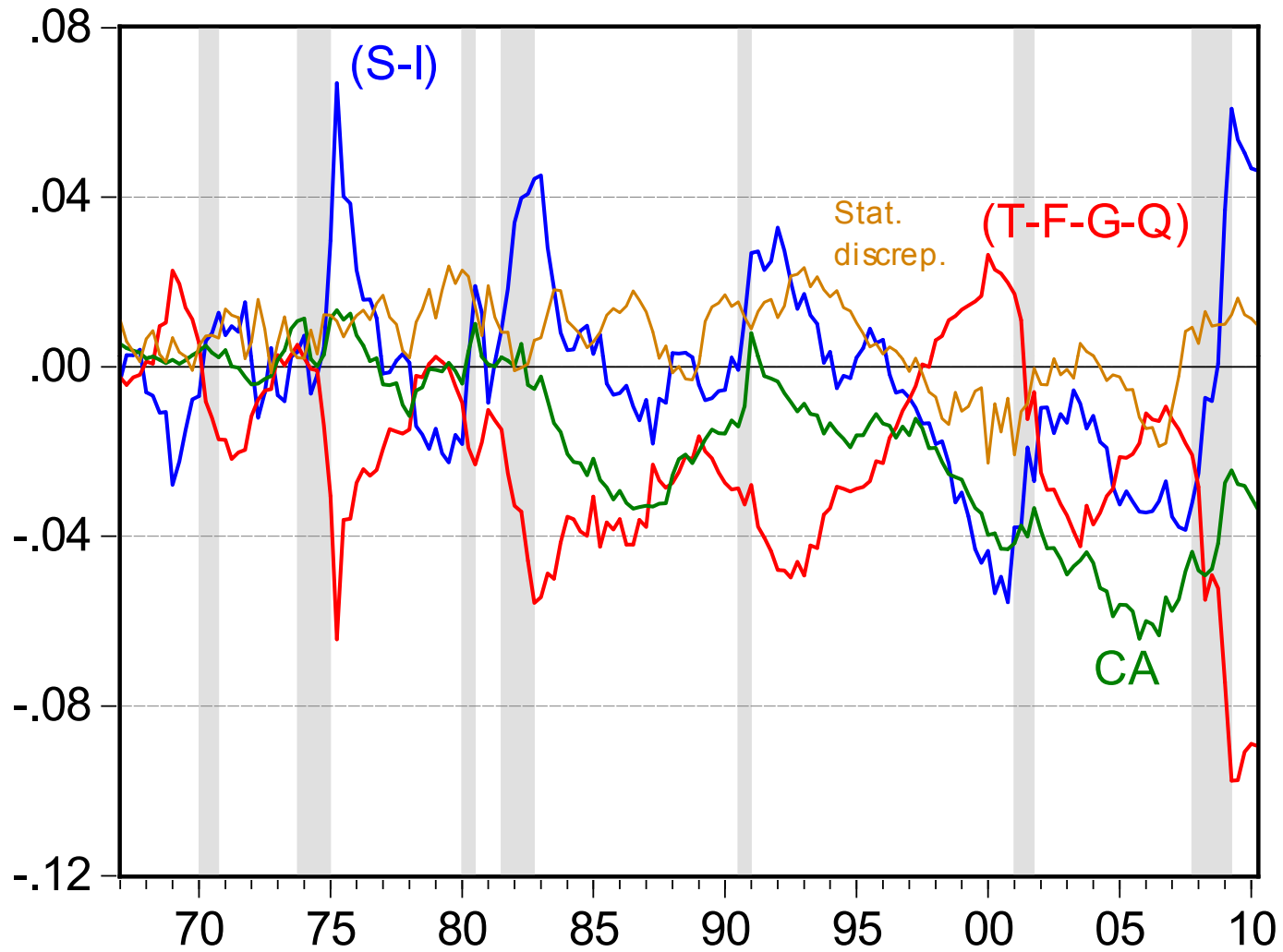
$$Y + V \equiv C + S_p + (T - F - Q)$$

$$C + I + G + X + V \equiv C + S_p + (T - F - Q)$$

$$CA \equiv X + V \equiv (S_p - I) + (T - F - Q) - G$$

S_g

The US Example



Source: BEA, 2010Q2 GDP 2nd release (Aug. 2010), NBER, author's calculations

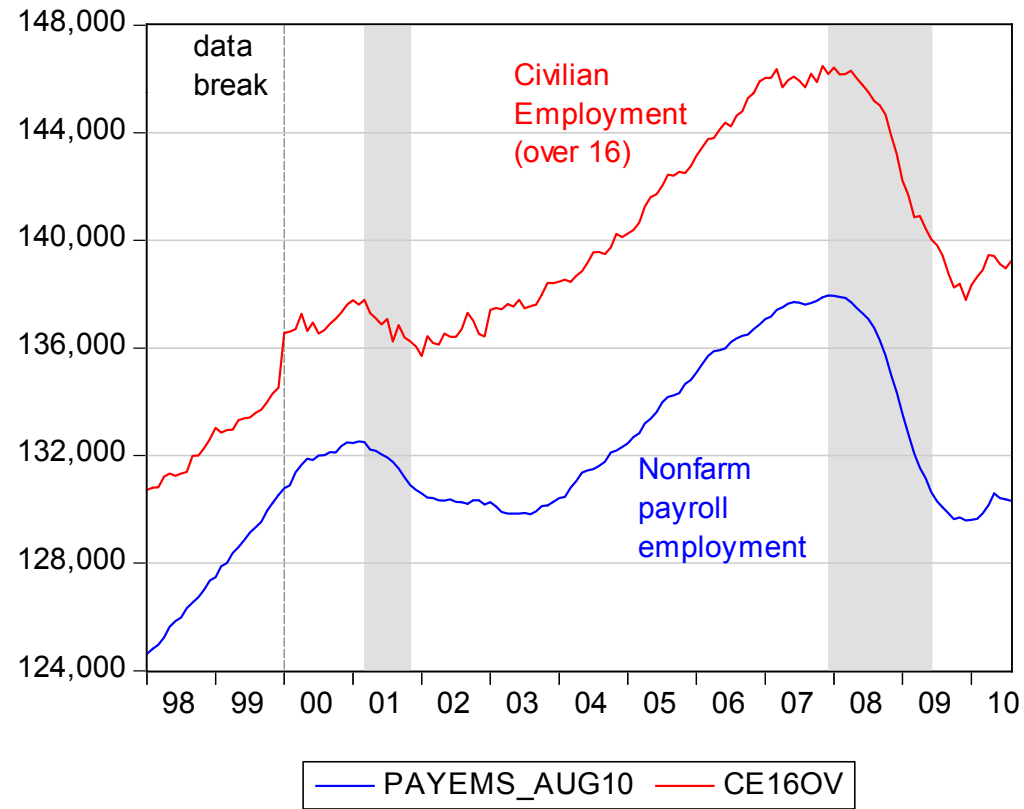
Employment and Unemployment

$U \equiv (L-N)/L$, “the unemployment rate”

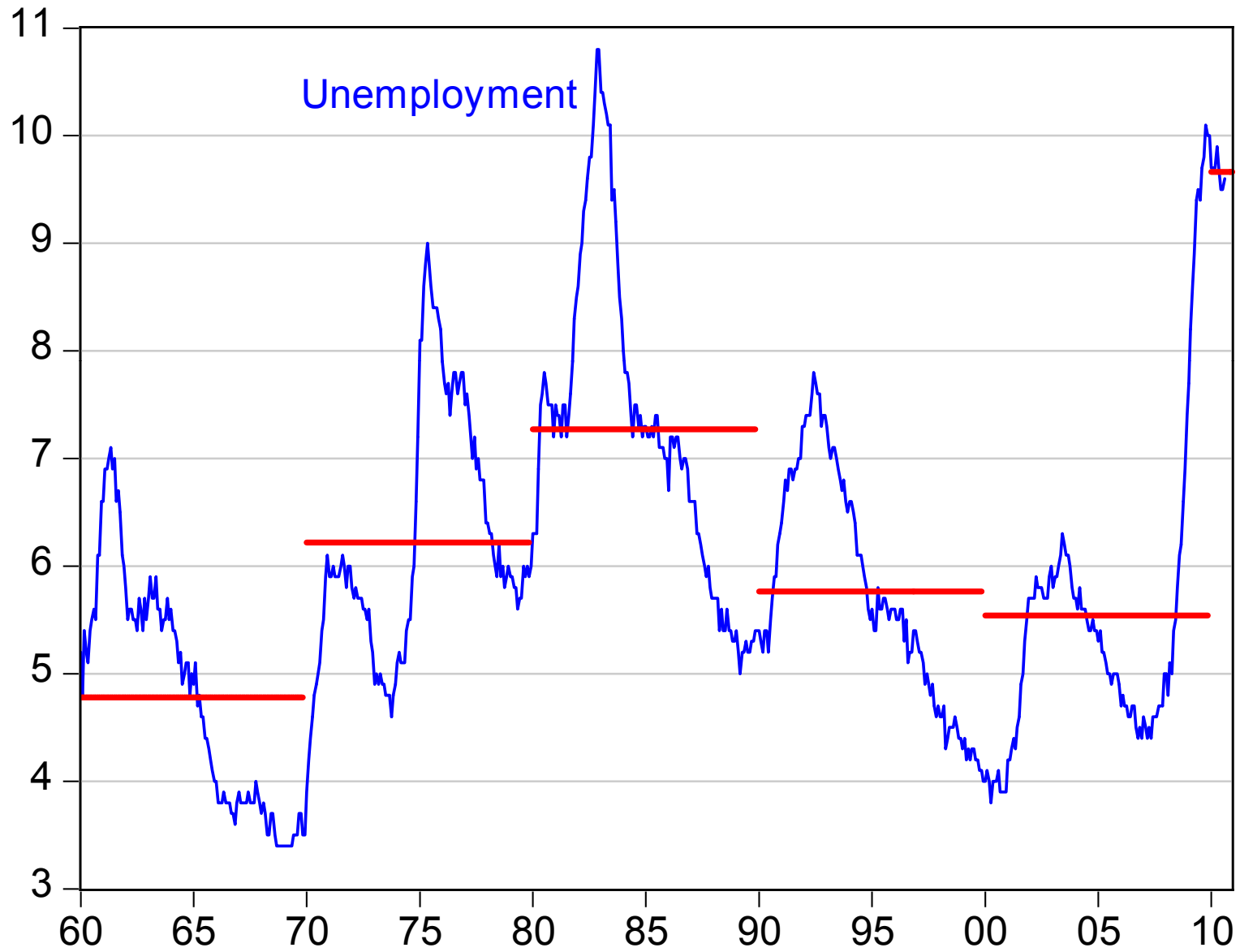
- L is the labor force, as measured by statisticians at Bureau of Labor Statistics
- N is employment, measured by BLS (using household survey)
- So U is an unemployment rate in %

Employment

- There are two series for employment:
- Household based (relies on estimates of total US population)
- Establishment based (relies on firm survey)
- Latter more reliable; former used for U



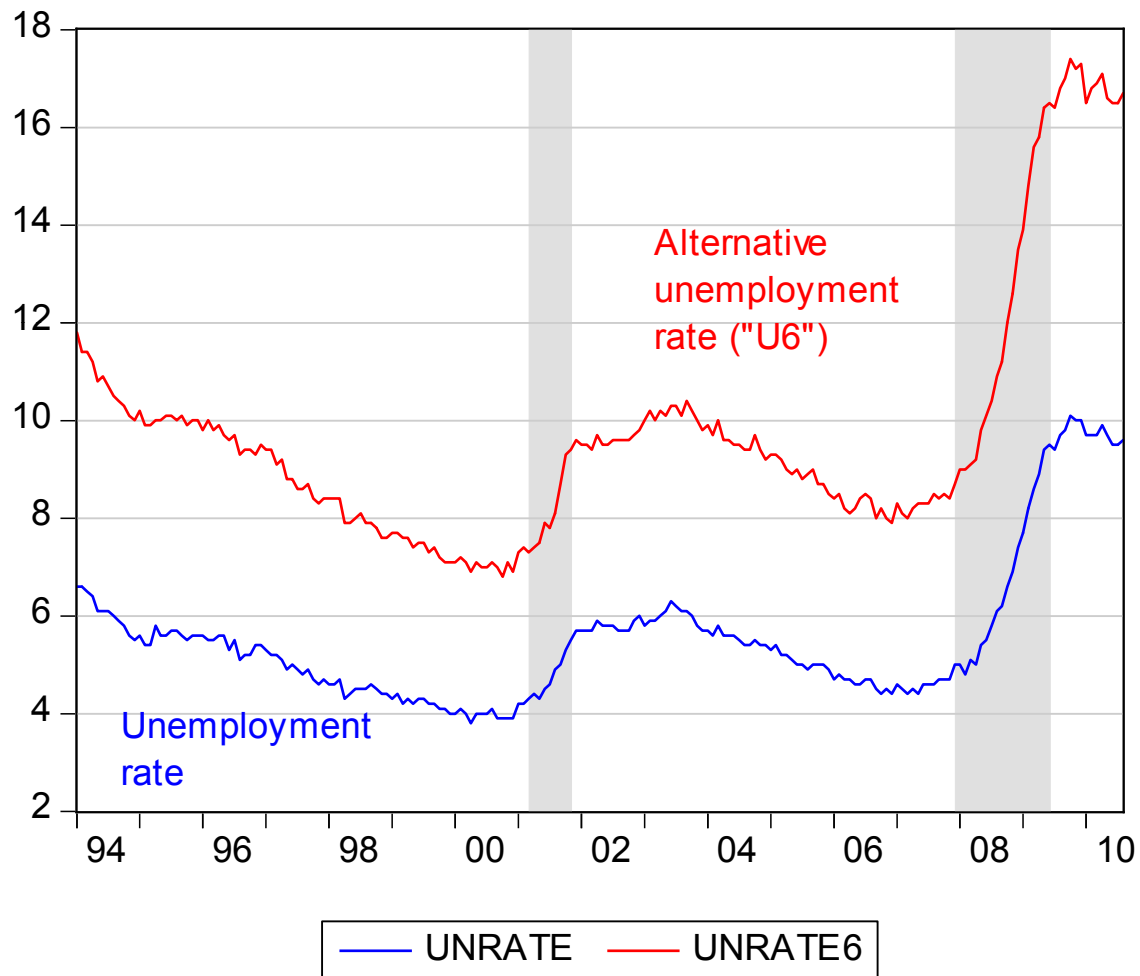
Updated Figure 3.1



Caveats

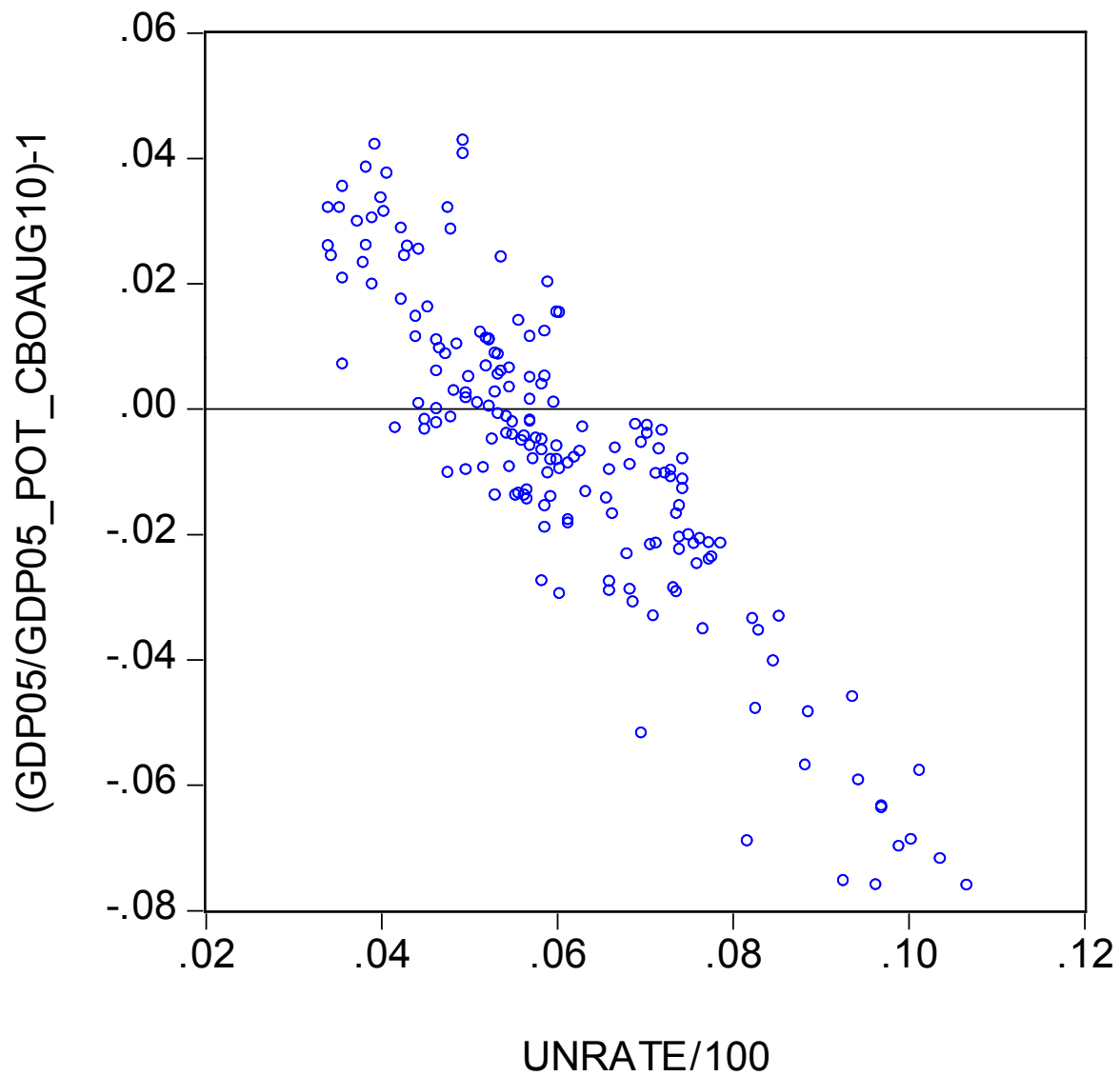
- The rate will be affected by both changes in L *and* N
- But the rate of job creation has been unnaturally slow in last recovery
- The standard unemployment rate does not take into account *underemployment*

Unemployment Rate: Official v. Alternative



Source: BLS, August Employment Situation.

Updated Fig. 3.6



Okun's Law

$$(Y - Y^*) / Y^* = -3 \times (U - U^*)$$

- Unemployment moves in opposite direction to output gap.
- When $U = U^*$, $Y = Y^*$

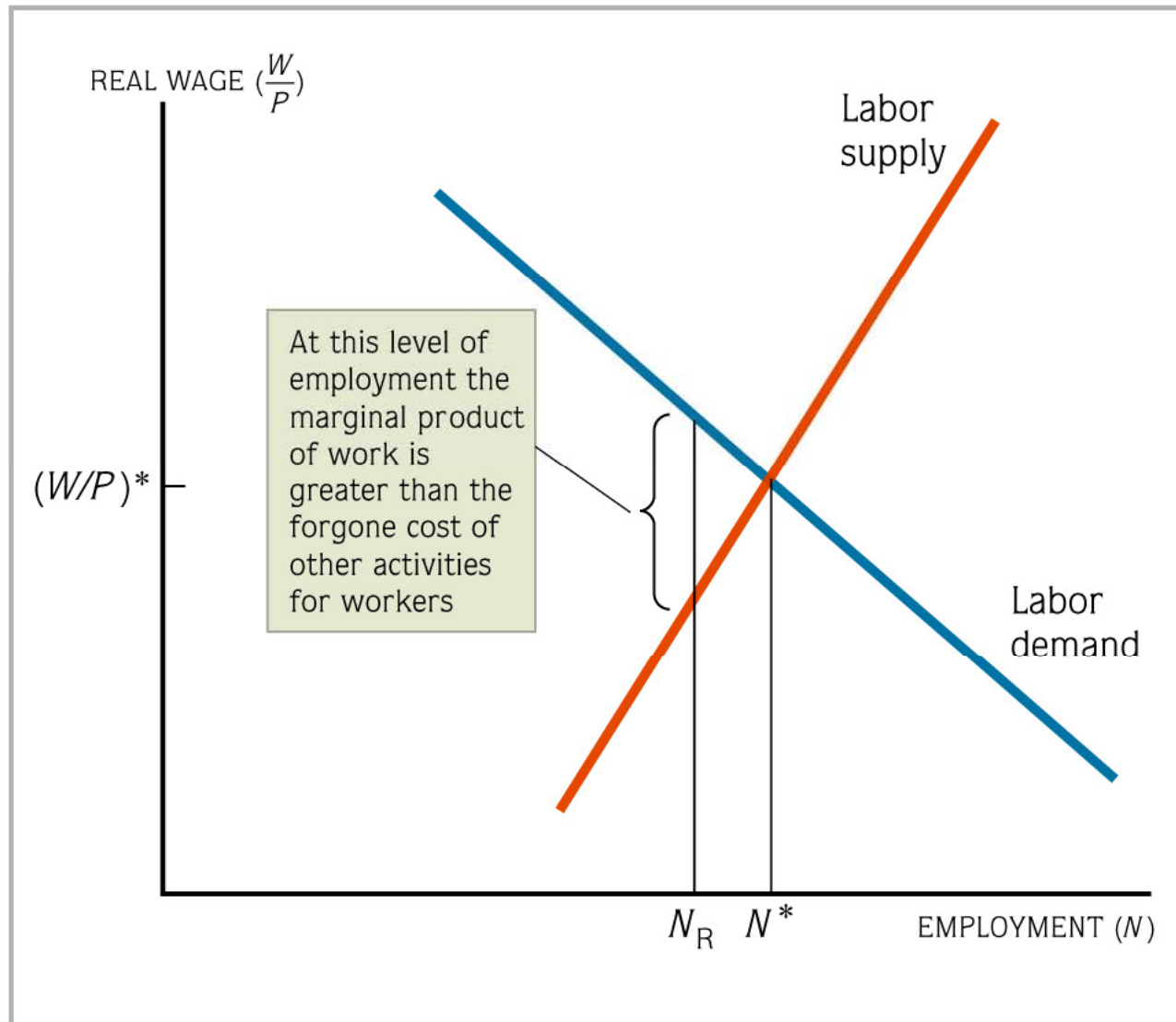


FIGURE 3.7 Incentives When Employment Is Below Equilibrium