

Part A.1 Macroeconomics and Finance

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Macroeconomics 110A
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Outline

Macroeconomics and Finance

1. What is macroeconomics?
2. Why is macroeconomics important?
3. Review of basic finance formulas
4. Business cycles
5. Economic indicators
6. Financial indicators
7. Macroeconomics and finance

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A.1 What is Macroeconomics?

- **Definition:**
 - Macroeconomics is the study of the structure and performance of national economies and of the policies that governments use to try to affect economic performance.
- **Focus:**
 - Business Cycles: a decline in aggregate economic activity (a contraction or a recession) followed by a recovery of activity (an expansion or boom).
 - Economic Growth: average growth rate of economic activity over longer time periods.

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• Important Questions

- Was the expansion of the 90's part of a business cycle or part of a new period of high average growth rates?
- What is the economic damage of using the September 11th disaster as an excuse for enormous pork barrel spending?
- Will the 11 reduction of the federal funds rate last year lead to inflation?
- Will the economic growth rate be high enough to prevent medicare and social security from going bankrupt?

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• Overview of Abel and Bernanke

- **Long run:**
 - Saving, capital accumulation and growth (Ch. 6)
- **Intermediate run:**
 - Aggregate capacity and the labor market (Ch. 3)
- **Short run:**
 - Commodities market (Chapters 4 & 5)
 - Financial market (Chapter 7)
 - Combining these markets (Chapters 9,10 & 11).
 - Macroeconomic Policy (Chapters 12, 14, & 15)

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110 A & B Sequence

- Introduction: 1, 8.1, 8.2, 8.3, & 2
- Model building blocks: 3, 4 & 7
- Business cycles: 9 & 11
- Macroeconomic policy: 12 & 14
- The new economy and growth: 3 & 6
- Microeconomic principles behind macroeconomics: Appendix of 4 and 15
- Open economy macro: 5 & 13

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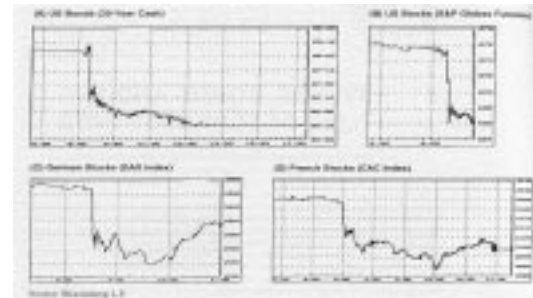
A.2 Why is macroeconomics important?

- Example: Financial markets and economic news
 - The Employment Report (Friday 7/5/96)
 - The numbers
 - Payroll up 239,000
 - Unemployment at a 6 year low of 5.3%
 - Wages up 9 cents an hour, largest rise in 30 years
 - Reaction
 - President: “most solid growth in a generation”
 - Markets: stocks and bonds fell sharply in a few minutes
 - » About \$500 billion losses across the world markets

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Figure A.1

Market Reaction to the Employment Report 7/5/96



• A.2 Why is macroeconomics important for managers?

- Understanding and predicting the environment of doing business:
 - Wages and other costs (oil prices)
 - Product demand
 - Cost and availability of funds (interest rates and monetary policy)
- Predicting the inflation rate and the real return on investment projects

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• A.2 Why is macroeconomics important for consumers?

- Predicting future wage (income) growth
- Determining when to buy a house and consumer durables.
- Determining how to finance purchases of houses and consumer durables
 - Fixed-rate mortgage?
 - Flexible-rate mortgage?
 - Low rate and high points?
- How much to save for retirement
 - Predicting the average return on financial investments
 - How much to expect from the government

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• A.2 Why is macroeconomics important for politicians?

- Understanding whether an economic downturn is an optimal response to circumstances out of the control of the government or not
- Understanding when and how the government could influence business cycles
- Understanding what taxes do for incentives, economic activity, and tax revenues
- Understanding what kind of institutions foster long-term economic growth
- Understanding what kind of institutions result in a reduction in the amplitudes of business cycle movements in real activity
- Understanding the effects of government debt
- Understanding the causes and effects of inflation

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A.3 Review of Basic Finance Formulas

- Understanding prices of financial assets
 - What determines the price of stocks, bonds and other financial instruments?
 - What are the market fundamentals?
 - Discount rate (time preference & risk)
 - earnings
 - How do fundamentals change with the state of the economy (over the business cycle)?
 - How does economic policy affect economic performance?

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A.3 Review of Basic Finance Formulas

- Net present value
 - Measures the current value of future payments
 - Depends on the nominal discount rate
 - Higher discount rates lower the present value of a future payment

$$PV_t = \frac{x_{t+1}}{(1+i)} + \frac{x_{t+2}}{(1+i)^2} + \frac{x_{t+3}}{(1+i)^3} + \dots + \frac{x_{t+N}}{(1+i)^N}$$

$$PV_t = \sum_{s=t}^N \frac{x_{t+s}}{(1+i)^s}$$

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A.3 Review of Basic Finance Formulas Computing Present Values

- Risk-free payment in one year of \$13,200
- Discount rate = risk-free rate, $i = 10\%$
- Present value
 - $P = \$13,200 / (1 + 0.1) = \$12,000$
- If $i = 20\%$

$$P = \$13,200 / (1.2) = \$11,000$$

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A.3 Review of Basic Finance Formulas Computing Present Values

- A share is expected to pay these dividends

Date	1	2	3	>3
Dividend	55	60.5	66.55	0

- Discount rate $i = 10\%$ per year
- Net present value of the share

$$P = \frac{55}{1.1} + \frac{60.5}{1.1^2} + \frac{66.55}{1.1^3} = 150$$

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A.3 Review of Basic Finance Formulas Financial Valuation of a Project

Date	1	2	3
Revenue	105	110.5	116.55
Costs	50	50	50
Net income	55	60.5	66.55

- Discount rate = 10%
- Project's current value

$$P = \frac{55}{1.1} + \frac{60.5}{1.1^2} + \frac{66.55}{1.1^3} = 150$$

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A.3 Review of Basic Finance Formulas NPV and Stock Prices

Earnings: $E_{t+1} = (1+g)E_t$

$$P_t = \frac{E_{t+1}}{(1+i)} + \frac{E_{t+1}(1+g)}{(1+i)^2} + \frac{E_{t+1}(1+g)^2}{(1+i)^3} + \dots = \frac{E_{t+1}}{1 - \frac{1+g}{1+i}} = \frac{E_{t+1}}{i-g}$$

Depends on

- Expected future earnings (profits)
 - Business cycle conditions
- Expected changes in discount rates
 - Monetary policy and the Federal Reserve

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A.3 Review of Basic Finance Formulas NPV and Bond Prices

- Bond prices
 - Bonds are loans from investors to government (treasury bonds) or to firms (corporate bonds)
 - Issuer promises to repay
 - Principal (face value): usually \$1000
 - Coupon payments (percentage on the principal)
 - Bond prices are usually different from the principal
 - Usually quoted as a percentage of the principal (ex. 98)

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A.3 Review of Basic Finance Formulas NPV and Bond Prices

- Bond prices
 - equal the present discounted value of the expected future payments

$$P_t = \sum_{s=1}^N \frac{C_{t+s}}{(1+i)^s} + \frac{FV_{t+N}}{(1+i)^N}$$

- depend on
 - Expected nominal discount rates
 - Monetary policy and the Federal Reserve
 - Changes in the inflation rate

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A.3 Review of Basic Finance Formulas NPV and Bond Prices

- 3 Year bond

Date	1	2	3
Coupon	10	10	10
Principal	-	-	100

- Nominal interest rate = 10%
 - Real return required = 5%
 - Inflation expectations = 5%
- Bond price

$$P = \frac{10}{1.1} + \frac{10}{1.1^2} + \frac{110}{1.1^3} = 100$$

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A.3 Review of Basic Finance Formulas NPV and Bond Prices

The nominal discount rate for one-period income security equals the nominal interest rate. Why?

- Suppose the nominal risk-free interest rate on a one year certificate of deposit (CD) is equal to 5%
- Bring \$X to the bank \Rightarrow get $\$X(1.05)$
- A bond that promises to pay a principal of \$1,000 and a coupon payment of \$60 should be worth \$1,009.50. Why?
- Bring \$1,009.50 to the bank \Rightarrow get \$1,060

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A.3 Review of Basic Finance Formulas NPV and Bond Prices

- Yield is the discount rate for which the NPV of a bond is equal to the observed price
 - Two-year bond, two \$60 coupons, \$1,000 principal
 - Price = \$1,018.6
 - Yield = 0.05 because
 - $\$1,018.6 = \$60/1.05 + \$1,060/(1.05)^2$

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A.3 Review of Basic Finance Formulas Real and Nominal Discount Rates

- Suppose that there is only one commodity
- Suppose that receiving 100 commodities now is worth the same to you as receiving 105 commodities next year \Rightarrow
- Annual real discount rate = 5%

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A.3 Review of Basic Finance Formulas Real and Nominal Discount Rates

- Suppose the current commodity price = \$2.
- Suppose your expect next year's price = \$2.2

\$200 now ~ 100 commodities now ~
105 commodities next year ~ \$231 next year \Rightarrow

\$200 now ~ \$231 next year \Rightarrow

Nominal discount rate = $(231-200)/200 = 15.5\%$

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A.3 Review of Basic Finance Formulas Real and Nominal Discount Rates

In general: $(1+i) = (1+r)(1+\pi)$

- i : nominal discount rate
- r : real discount rate
- π : expected inflation rate

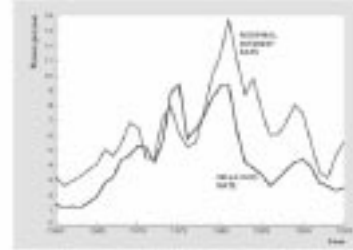
Approximately: $i = r + \pi$

!!! Typically the expected inflation rate is not known

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A.3 Review of Basic Finance Formulas Real and Nominal Discount Rates

Inflation and the Nominal Interest Rate in the United States



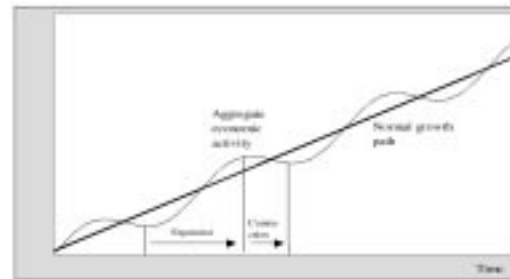
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A.4 Business Cycles

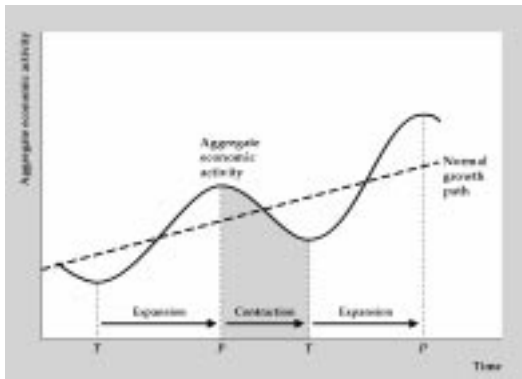
- Definitions
 - Fluctuations in aggregate economic activity
 - GDP, employment, financial markets
 - Recurrent expansions and contractions
 - Deviations from long run growth
 - Persistent but of variable length
 - Usually last from 1 to 8 years
 - Recession
 - GDP growth is negative for 2 consecutive quarters

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A.4 Business Cycles



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A.4 Business Cycles

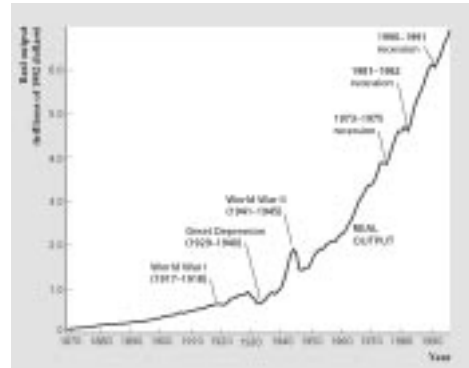
- All business cycles are similar but not quite identical
- Variables are classified according to
 - Direction of movement
 - procyclical or countercyclical
 - Timing of movement
 - leading, coincident or lagging variables

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A.4 Business Cycles

- The American experience
 - Average duration of business cycles
 - Before WW II
 - Recessions: 21 months
 - Expansions: 25 months
 - After WW II
 - Recessions: 11 months
 - Expansions: 50 months

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A.4 Business Cycles

Real GDP growth (annualized) over the Business Cycle

Phase	Normal low	Average	Normal high
Recession	-3.6%	-1.7%	0.3%
Recovery	3.5%	5.4%	7.2%
Near peak	1.3%	2.5%	3.8%
Average	1.1%	3.2%	5.3%

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A.4 Business Cycles

Through	Expansion (months)	Peak	Contraction (months)
Nov 1927	21	Aug 1929	43
Mar 1933	50	May 1937	13
Jun 1938	80	Feb 1945	8
Oct 1945	37	Nov 1948	11
Oct 1949	45	Jul 1953	10
May 1954	39	Aug 1957	8
Apr 1958	24	Apr 1960	10
Feb 1961	106	Dec 1969	11
Nov 1970	36	Nov 1973	16
Mar 1975	58	Jan 1980	6
Jul 1980	12	Jul 1981	16
Nov 1982	92	Jul 1990	8
Mar 1991			

120 March 2001

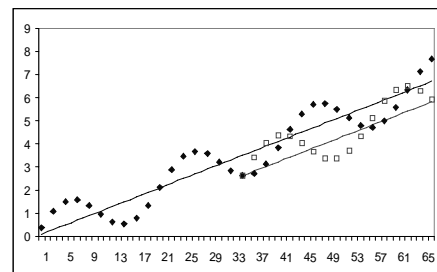
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A.4 Business Cycles

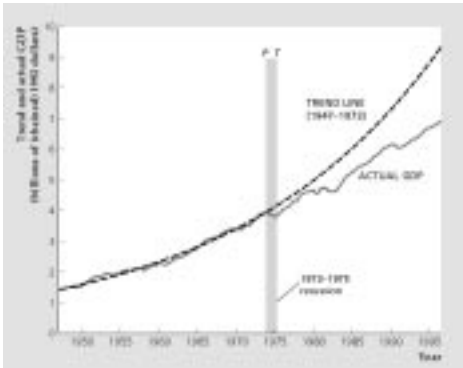
- Are business cycles temporary events?
 - Does the economy recover from a recession and return to its normal level?
 - Is the economy permanently affected by the effects of the recession?
- Some evidence suggests that most macroeconomic variables are permanently affected by the cycles
 - Much of the drop in output in 1973-75 became permanent
 - It is possible that about 30% of the drops in output during recessions become permanent

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A.4 Business Cycles



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A.5 Economic Indicators

- Examples
- Definitions
- Index of Leading Indicators
- Calendar
- Recent

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A.5 Economic Indicators Examples

- Employment
- Industrial Production
- Vacancies
- Money Stock (M2)
- Stock Prices

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A.5 Economic Indicators Definitions

- Seasonally adjusted and unadjusted data
- Stocks and Flows
- Real and Nominal Indicators
- Direction: Cyclical, Procyclical, acyclical, countercyclical
- Timing: Leading, Coincident, Lagging

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A.5 Economic Indicators Definitions: Seasonal Adjustment

- Seasonal adjustments
 - Economic variables fluctuate for non-economic reasons
 - Christmas shopping
 - Summer vacations
 - Decreased Winter construction etc.
 - Economic indicators must
 - Be seasonally adjusted
 - Be compared only with the same weeks/months/quarters in previous years if not adjusted

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A.5 Economic Indicators Definitions: Direction and Timing

Variable	Direction	Timing	Volatility
GDP	Procyclical	Coincident	Average
Consumption	Procyclical	Coincident	Low
Investment	Procyclical	Leading	High
Government spending	Procyclical	-	Low
Net exports	Countercyclical	Lagging	High

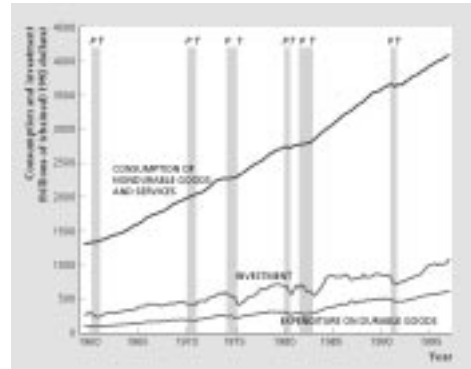
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A.5 Economic Indicators

Definitions: Direction and Timing

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Government spending	Procyclical	-	Low
Net exports	Countercyclical	Lagging	High

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A.5 Economic Indicators

Definitions: Stocks and Flows

Stock: Measured at one point in time

Examples: capital stock, wealth, money stock

Flow: Measured over a certain time period

Examples: investment, income, seignorage

Flows are changes in stocks

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A.5 Economic Indicators

Definitions: The General Price Level (Ch 2.4)

- Y = Nominal Output
 - Current market value of output produced
- Nominal Output $Y = P * y$
- P = Output deflator
- y = real output or quantity of goods produced

QUESTION: HOW TO CALCULATE P?

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A.5 Economic Indicators

Definitions: The General Price Level

- Price growth = inflation: $\pi_{t+1} = \frac{P_{t+1} - P_t}{P_t}$

- Real output growth: $g_{t+1}^y = \frac{y_{t+1} - y_t}{y_t}$

- Nominal output growth:

$$g_{t+1}^Y = \frac{Y_{t+1} - Y_t}{Y_t} = g_{t+1}^y + \pi_{t+1} + g_{t+1}^y * \pi_{t+1} \approx g_{t+1}^y + \pi_{t+1}$$

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A.5 Economic Indicators

Definitions: Calculating the General Price Level

	Base Year	This Year	Change
Quantity			
Balls	60,000	80,000	+20,000
Tees	40,000	80,000	+40,000
Unit Price			
Balls	\$3.00	\$5.00	+\$2.00
Tees	\$0.50	\$1.00	+\$0.50
Value			
Balls	\$180,000	\$400,000	+\$220,000
Tees	\$20,000	\$80,000	+\$60,000
Total (\$ GDP)	\$200,000	\$480,000	+\$280,000

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A.5 Economic Indicators

Definitions: Calculating the General Price Level

Calculate Real Output:

- Real Output for the base year = \$200,000
- Real Output for the current year =
current quantities * base-year prices =
 $80,000 * \$3.00 + 80,000 * \$0.50 =$
\$280,000

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A.5 Economic Indicators

Definitions: Calculating the General Price Level

$$\text{year } t \text{ price level} = \frac{\text{value of year } t \text{ output at current prices}}{\text{value of year } t \text{ output at base - year prices}}$$

$$\text{Value of current output at current prices} =$$
$$80,000 * \$5.00 + 80,000 * \$1.00 = \$480,000$$

$$\text{Value of current output at base-year prices} =$$
$$80,000 * \$3.00 + 80,000 * \$1.00 = \$280,000$$

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A.5 Economic Indicators

Definitions: Calculating the General Price Level

$$\text{Price Level or Output deflator for current period} = \$480,000 / \$280,000 = 1.7143$$

$$\text{Price Level or Output deflator for base year} =$$
$$\$200,000 / \$200,000 = 1.00$$

$$\text{Inflation rate} = 71.142\%$$

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A.5 Economic Indicators

Definitions: Calculating the General Price Level

$$\text{Real output growth} =$$
$$(\$280,000 - \$200,000) / \$200,000 = 40\%$$

$$\text{Nominal output growth} =$$
$$(\$480,000 - \$200,000) / \$200,000 = 140\%$$

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A.5 Economic Indicators

Definitions: Calculating the General Price Level

Real growth + inflation \approx Nominal growth

- Bad approximation for large changes
 - $0.4 + 0.71142 + 0.4 * 0.71142 = 1.40$
 - $0.4 + 0.71142 = 1.11142 \lll 1.40$
- Good approximation for large changes
 - $0.04 + 0.071142 + 0.4 * 0.71142 = 0.11399$
 - $0.04 + 0.071142 = 0.11142 \approx 0.11399$

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A.5 Economic Indicators

The Index of Leading Indicators

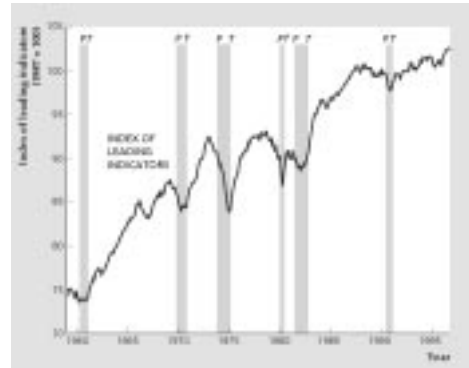
- Average of ten macroeconomic variables that
 - Lead the cycle
 - Are made available promptly and frequently
- Published by the Conference Board
 - <http://www.conference-board.org>
- Empirical performance
 - Index has been fairly successful in predicting the large majority of turning points
 - A few problems: false alarms

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A.5 Economic Indicators The Index of Leading Indicators

- Leading indicators
 - Average weekly hours of production
 - Average weekly initial claims for unemployment insurance
 - New orders of manufacturing goods
 - Delays reported in obtaining goods from suppliers
 - New orders for nondefense capital
 - Authorized new private housing units
 - S&P 500
 - M2
 - Interest rate spread between 10 year Treasury bonds and Federal funds rate
 - Consumer expectations

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A.5 Economic Indicators Calendar

<http://www.economy.com/dismal>

Week	Monday	Tuesday	Wednesday	Thursday	Friday
1	NAPM	Leading Indicators		Jobless Claims Money Supply	Employment
2				Jobless Claims Money Supply	Retail Sales PPI
3		CPI	Housing Starts IPI	Jobless Claims Money Supply Trade Balance	Consumer Sentiment
4		Durable Goods		Jobless Claims Money Supply	GDP (quarter)
5		Consumer Expectations		Jobless Claims Money Supply	

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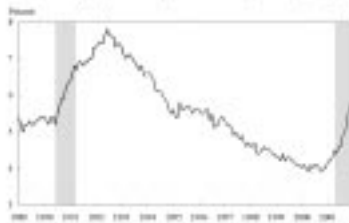
A.5 Economic Indicators Recent: Unemployment Rate

- Last Friday (January 4th) the Labor Department announced that the U.S. unemployment rate rose to 5.8 percent in December, but the number of job cuts slacked off, pointing to a possible stabilization in the labor market. In particular, employers cut 124,000 jobs from non-farm payrolls last month after a revised loss of 371,000 jobs in November.

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A.5 Economic Indicators Recent: Unemployment Rate

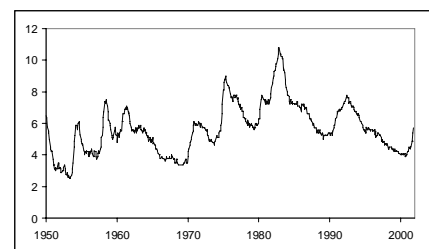
Civilian unemployment rate, 1985-2001 (seasonally adjusted)



Source: Bureau of Labor Statistics, "Current Population Reports."
Note: Shaded and hatched areas represent recession periods as defined by the NBER in its release of the report.

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A.5 Economic Indicators Recent: Unemployment Rate



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A.5 Economic Indicators

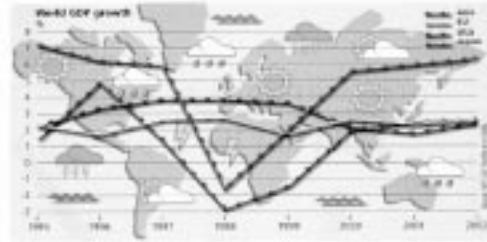
Recent: The Index of Leading Indicators

The Conference Board's U.S. leading index rose 0.5% in November, the largest increase in the index since May. The increase marks the second straight month of positive gain in the leading index, and suggests that the chances of an economic recovery are rising. However, these gains must be read with some caution, as October's reading was revised downward from 0.3% to 0.1%. Gains in the financial, housing, and expectations components were the principal drivers of the leading index's gain in November.

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A.5 Economic Indicators

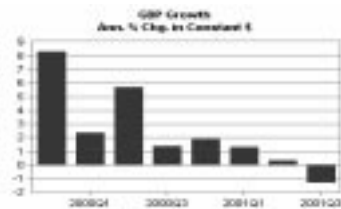
Recent: per capita GDP growth



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A.5 Economic Indicators

Recent: per capita GDP growth



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A.5 Economic Indicators

Recent: % change gdp components (annual rate)

	99q4	00q1	00q2	00q3	00q4	01q1	01q2	01q3
consumption	5.7	5.9	3.6	4.3	3.1	3.0	2.5	1.0
investment	5.8	15.8	12.2	7.1	1.0	-0.2	-14.6	-8.5
export	12.1	9.0	13.5	10.6	-4.0	-1.2	-11.9	-18.8
government	8.5	-1.1	4.4	-1.8	-1.8	5.3	5.0	0.3

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A.5 Economic Indicators

Recent: Inflation (CPI)

CPI-U 12-month changes, 1991 to present



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A.5 Economic Indicators

Recent: Wages and Benefits

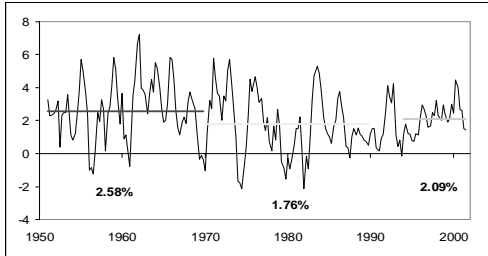
Employment Cost Index for civilian workers, 1992-2001
Changes in wages and salaries and benefit costs
12-month percent change



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A.5 Economic Indicators

Recent: Productivity



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A.5 Economic Indicators

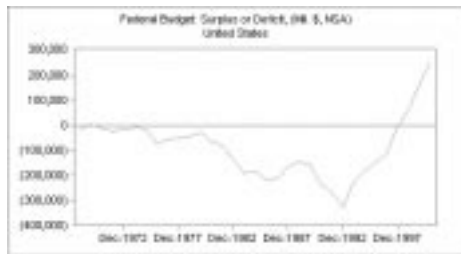
Recent: Signs of Slowdown

- Jobless claims up
- Industrial production down
- Sharply falling investment, inventories and exports
- Moderating consumer spending

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A.5 Economic Indicators

Recent: Budget Deficit



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A.5 Economic Indicators

Recent: 2002 Budget Deficit

- Now very unclear. Watch State of the Union Address!
- Maybe small surplus for total budget (including social security)
- But federal government will run a deficit and social security a surplus
- Six months ago CBO, based on optimistic growth predictions, had predicted a 174 billion surplus.

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A.5 Economic Indicators

Recent: 2001 federal funds rate targets

- November 6: 2.00 Easier
- October 2: 2.50 Easier
- September 17*: 3.00 Easier
- August 21: 3.50 Easier
- June 27: 3.75 Easier
- May 15: 4.00 Easier
- April 18*: 4.50 Easier
- March 20: 5.00 Easier
- January 31: 5.50 Easier
- January 3-4*: 6.00 Easier

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A.5 Economic Indicators

Recent: FOMC meeting December 11 2001

- The FOMC lowered the federal funds rate target by an expected 25 basis points to 1.75%.
- The discount rate was also lowered 25 basis points to 1.25%.
- Policy remains biased towards future easing, although the statement released with the FOMC's actions noted tentative signs of more stable economic conditions.
- Given expectations of a further improvement in the economy by the next FOMC meeting January 30th, this will hopefully be the last cut in interest rates during this cycle.

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A.5 Economic Indicators

Recent: Short-Term Interest Rates



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A.5 Economic Indicators

Recent: Other Interest Rates



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A.6 Financial Indicators

- Stock prices
 - Market indicators
 - Dow Jones Industrial Average (DJIA)
 - Value-weighted indexes
 - Standard & Poor's 500 (S&P 500)
 - Wilshire 5000
 - Russell 1000
 - Russell 2000
 - Russell 3000

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A.6 Financial Indicators

- The Dow-Jones Industrial Average
 - Created on February 16, 1885 with 12 stocks
 - It includes 30 stocks since 1928
 - Price-weighted index

$$DJIA = \frac{\sum_{i=1}^{30} P_i}{d}, \quad d \approx 0.20$$

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A.6 Financial Indicators

- The Dow-Jones Industrial Average
 - Denominator is adjusted for stock splits over time
 - The firms in the DJIA account for about 20% of total stock market capitalization
 - Of the 10 largest US firms only Microsoft and Intel are not included in the index
 - The “blue chips”

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A.6 Financial Indicators

- Value-weighted indexes
 - Index is computed adjusted for stock market capitalization of the firm

$$I = \frac{\sum_{i=1}^N N_i P_i}{O.V.} - 10$$

N_i = number of shares outstanding

P_i = price of the share

O.V.= original value of index in 1941-43

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A.6 Financial Indicators

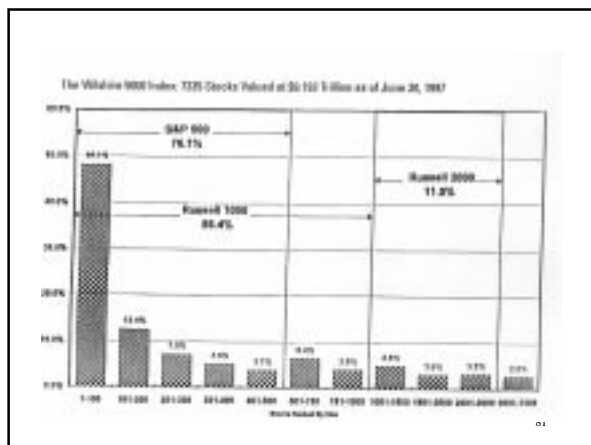
- Value-weighted indexes
 - S&P 500
 - The second most widely used index
 - Includes most (but not all) of the 500 largest stocks
 - Accounts for about 75% of total stock market capitalization
 - Wilshire 5000
 - Now includes more than 7000 stocks
 - Excludes over 20,000 infrequently traded

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A.6 Financial Indicators

- Value-weighted indexes
 - Russell 1000
 - The top 1000 firms (in market cap) in the Wilshire 5000 (86% of total market cap)
 - Russell 2000
 - The next 2000 firms after the first 1000 (11%)
 - Russell 3000
 - All firms in the Russell 1000 and 2000

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A.6 Financial Indicators

- Other indexes
 - Specific exchanges
 - NYSE composite: trade in NYSE listed stocks
 - AMEX: stocks traded in the American Stock Exchange
 - NASDAQ: traded over the counter (electronic)
 - Specific sectors
 - Dow Transportation
 - Should confirm the information on DJIA
 - “Industries make and transports take”
 - Dow Utilities
 - Provides information on interest rate expectations
 - » Utilities are usually heavy borrowers
 - Leading indicator of broad market

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A.7 Macroeconomics and Finance

- Finance indicators and the business cycle
- Macroeconomic events and financial asset prices

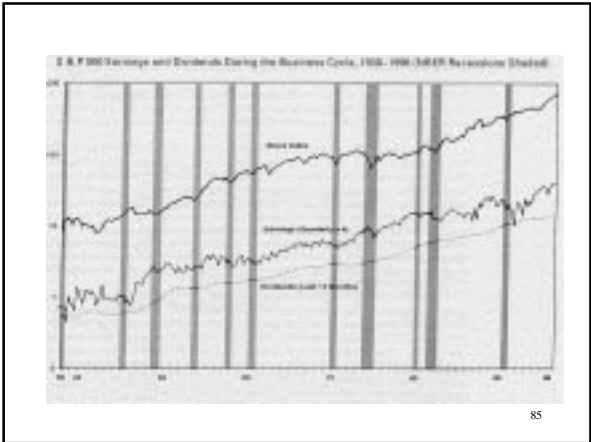
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A.7 Macro Economics and Finance

Financial Variables and the Business Cycle

- Financial variables
 - Stock prices
 - Very procyclical and leading
 - It can however provide false alarms
 - Earnings
 - Procyclical and coincident
 - Dividends
 - Fairly acyclical

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A.7 Macro Economics and Finance

Stock Returns and Recessions

Recession	Lead Time (months)	Decline (between peaks)	Decline (total)
1948-49	6	8.8%	8.9%
1953-54	7	3.9%	7.2%
1957-58	1	5.1%	13.9%
1960-61	4	8.3%	8.2%
1970	13	12.2%	25.5%
1973-75	11	16.2%	40.1%
1980	0	0%	8.9%
1981-82	8	4.08%	14.2%
1990-91	0	0%	13.9%
Average	5.6	6.5%	15.6%

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A.7 Macro Economics and Finance

Stock Returns and Expansions

Recession	Lead Time (months)	Rise (between peaks)
1948-49	5	15.6%
1953-54	9	29.1%
1957-58	4	10.3%
1960-61	4	21.3%
1970	5	21.9%
1973-75	6	35.6%
1980	4	22.6%
1981-82	4	33.1%
1990-91	5	25.3%
Average	5.1	23.9%

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- ### A.7 Macroeconomics and Finance
- #### Stock Prices and Inflation
- For simplicity consider a two-period world
 - For simplicity assume that all commodity prices in/decrease with the same percentage \Rightarrow we can pretend there is only one commodity
 - The real discount rate = 3%
 - The inflation rate = 5%
 - The nominal discount rate = 8.15%
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A.7 Macroeconomics and Finance

Stock Prices and Inflation

	period 1	period 2
price level	\$2	\$2.1
real value firm	$30,900/1.03 = 30,000$	30,900
nominal value firm	$\$64,890/1.0815 = \$60,000$	\$64,890

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- ### A.7 Macroeconomics and Finance
- #### Stock Prices and Inflation
- Suppose that inflation is equal to 10% instead of 5%
 - No reason for real discount rate to change
 - Prices will be higher in period 2 \Rightarrow
 - Nominal value firm will be higher in period2, but
 - Nominal discount rate will increase to 13.3%
 - Current-period nominal and real stock prices are not affected
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A.7 Macroeconomics and Finance
Stock Prices and Inflation

	period 1	period 2
price level	\$2	\$2.2
real value firm	$30,900/1.03$ =30,000	30,900
nominal value firm	$\$67,980/1.133$ =\$60,000	\$67,980

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A.7 Macroeconomics and Finance
Bond Prices and Inflation

- What is the big difference???????
- For bonds next period's nominal value is fixed
- Suppose principal equals \$1,000
- Zero-coupon bond

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A.7 Macroeconomics and Finance
Bond Prices and Inflation

- Period 1 price when inflation equals 5%:
 - Discount rate equals 8.15%
 - $\$9,246 = \$10,000/1.0815$
- Period 1 price when inflation equals 10%:
 - Discount rate equals 13.3%
 - $\$8,826 = \$10,000/1.133$
- Thus, higher inflation means lower bond prices

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A.7 Macroeconomics and Finance
Stock Prices and increase in net-earnings

- Suppose that the real value of the firm increases to 35,000 and the nominal value, thus, to \$73,500
- If the real value goes up because the aggregate economy improves then the real discount rate could very well change. Why?
- Suppose that the real discount rate doesn't change

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A.7 Macroeconomics and Finance
Stock Prices and increase in net-earnings

	period 1	period 2
price level	\$2	\$2.1
real value firm	$35,000/1.03$ =33,981	35,000
nominal value firm	$\$73,500/1.0815$ =\$67,961	\$73,500

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A.7 Macroeconomics and Finance
Stock Prices and decrease in net-earnings

- Stock Prices and Microsoft's Monopoly Power?



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A.7 Macroeconomics and Finance Stock Prices and increase in net-earnings

- If the real discount rate doesn't change, then an increase in net-earnings increases stock prices

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A.7 Macroeconomics and Finance Stock Prices and the P/E ratio

- Recall:

$$P = \frac{E}{k - g}$$

- P = price per share
- E = earnings per share
- k = discount rate
- g = growth rate of earnings

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A.7 Macroeconomics and Finance Stock Prices and the P/E ratio

- Qualcomm - August 25 2000
 - Price per share = \$58 9/16
 - Earnings per Share (EPS) = \$0.87
 - P/E ratio = 67
 - If $k = 0.06$ then $g = 0.045$
 - If $k = 0.10$ then $g = 0.085$

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A.7 Macroeconomics and Finance Stock Prices and the P/E ratio

- Siebel - August 25 2000
 - Price per share = \$177.5
 - Earnings per Share (EPS) = \$0.46
 - P/E ratio = 385
 - If $k = 0.06$ then $g = 0.057$
 - If $k = 0.10$ then $g = 0.097$

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A.7 Macroeconomics and Finance Stock Prices and the P/E ratio



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A.7 Macroeconomics and Finance Stock Prices and the P/E ratio

- SP500
 - P/E ratio ≈ 30
 - If $k = 0.07$ then $g = 0.03667$
 - If $k = 0.10$ then $g = 0.06667$

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A.7 Macroeconomics and Finance

Stock Prices and the real discount rate

- Why could the real discount rate change when the aggregate economy improves?
 - If the expectations about the future improve relative to the current situation then consumers and producers would like to borrow more
 - If the Federal Reserve Board worries about inflation then it might reduce liquidity in the banking system which increases discount rates.

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A.7 Macroeconomics and Finance

Asset Prices and Fundamentals: Summary

- Changes in inflation
 - Stock prices are mostly unaffected by inflation
 - Nominal sales, future profits and dividends rise
 - But the nominal discount rate also rises
 - Bond prices fall
 - Nominal interest rates rise
 - Principal and coupon are fixed (unless the bond is indexed)
 - Long term bonds suffer more than short term bonds
 - Short term bonds have only a few payments left

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A.7 Macroeconomics and Finance

Asset Prices and Fundamentals: Summary

- Changes in real discount rates
 - Stock prices fall when discount rates rise
 - Lower present value of future dividends
 - Bond prices fall when discount rates rise
 - Lower present value of future payments of existing bonds
 - If coupon rates rise as well (a few indexed bonds) bond prices may not fall

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A.7 Macroeconomics and Finance

Asset Prices and Fundamentals: Summary

- Indirect effects
 - Federal reserve usually steps in by increasing interest rates and, thus, discount rates, when inflation threatens
 - Thus stocks also fall when inflation is expected
 - Strong business cycle conditions may lead to inflation and an interest rate hike by the Fed
 - Thus bonds fall when business cycle conditions are good (i) because of increase inflation and (ii) because of increase in the real discount rate.

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A.7 Macroeconomics and Finance

Asset Prices and Fundamentals: Summary

Market	Above expectations		Below expectations	
	Business conditions	Inflation	Business conditions	Inflation
Equity	↑	↓	↓	↑
Fixed Income	↓	↓	↑	↑

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