# Chapter 1
# The Science of Macroeconomics

# Learning objectives

This chapter introduces you to

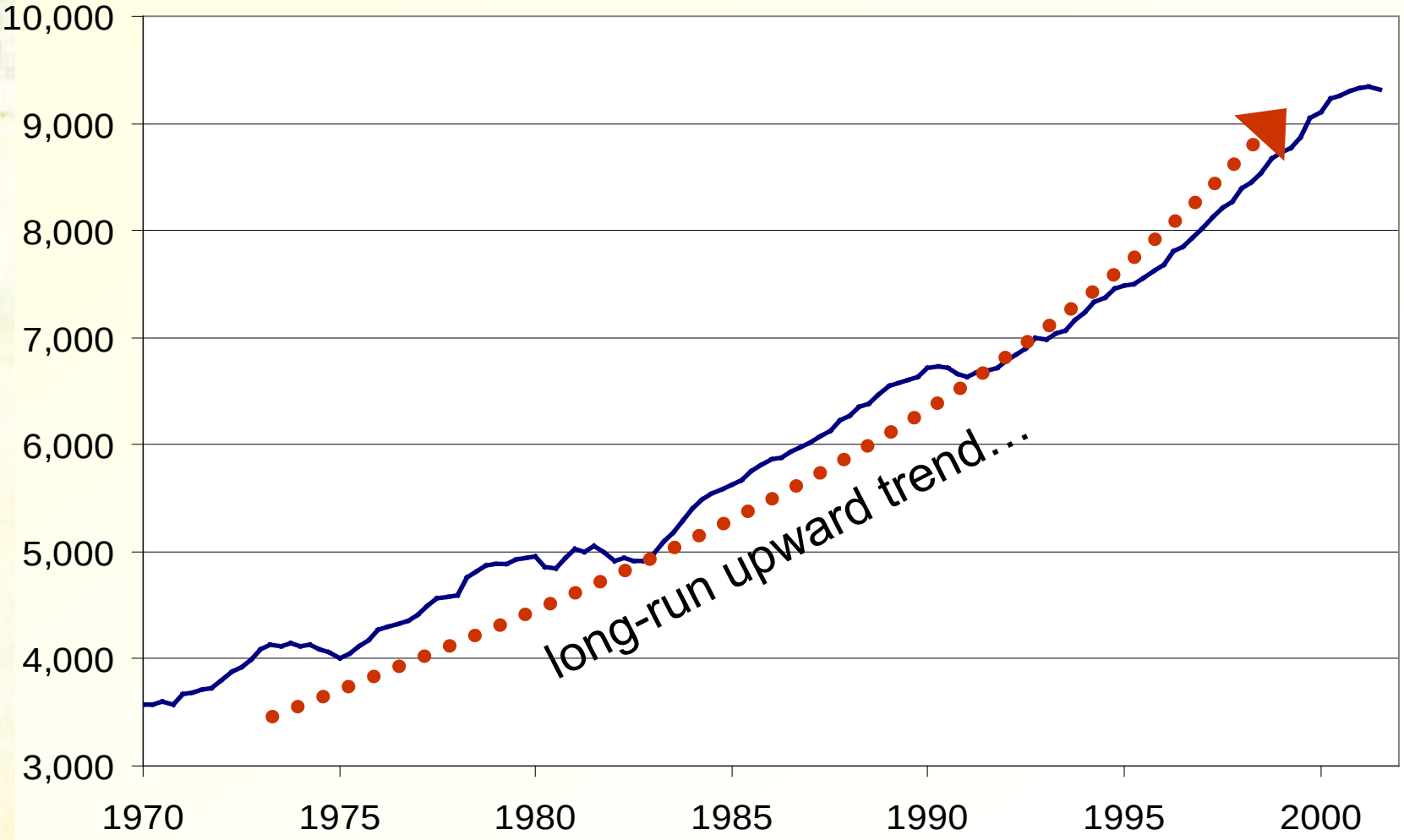
- the issues macroeconomists study
- the tools macroeconomists use
- some important concepts in macroeconomic analysis

# What do we care about?

- Although we study many issues in this macroeconomic course, what we care most are:
  - Economic growth
  - Economic fluctuations

# An example of macroeconomics terms: Gross Domestic Product of the US

in billions of chained 1996 dollars



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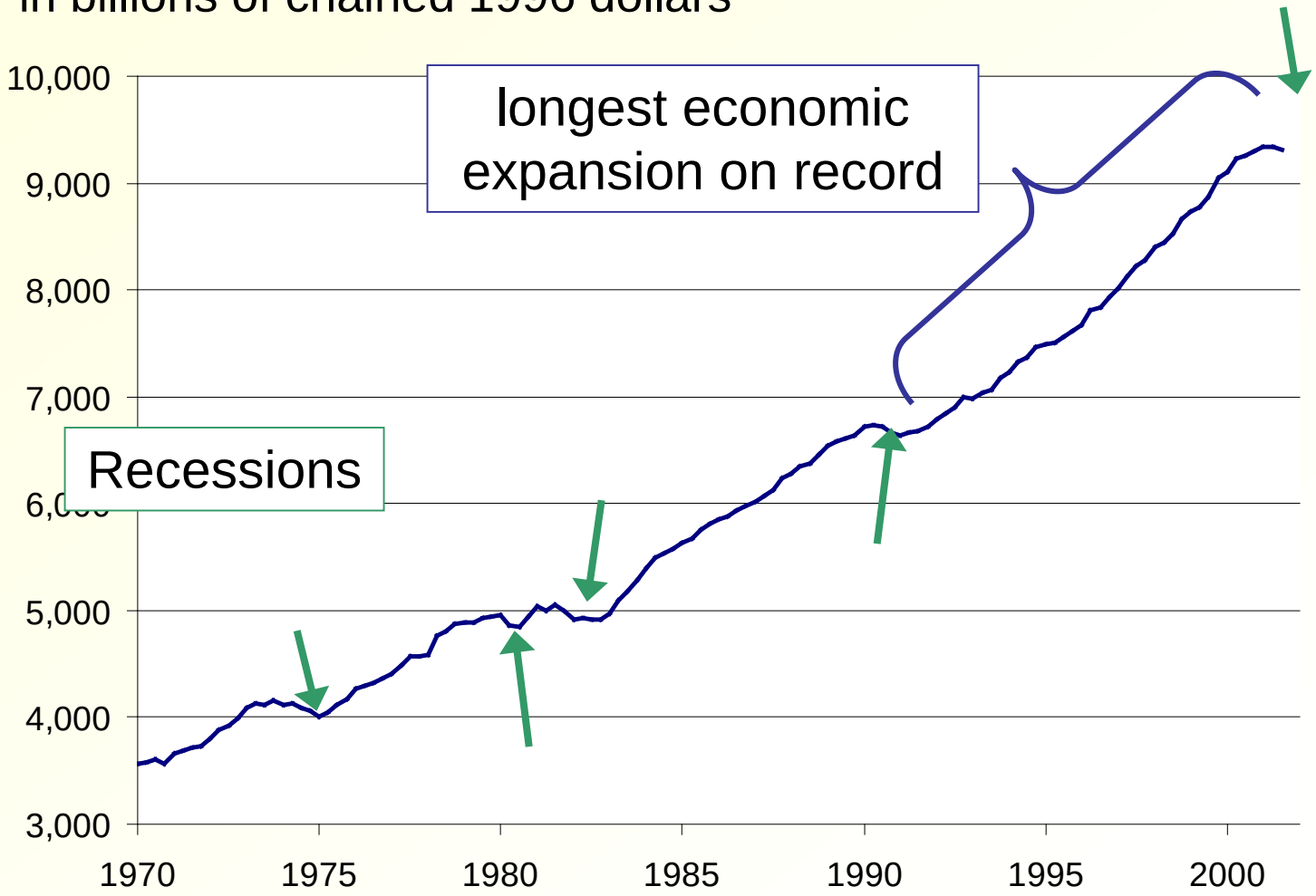


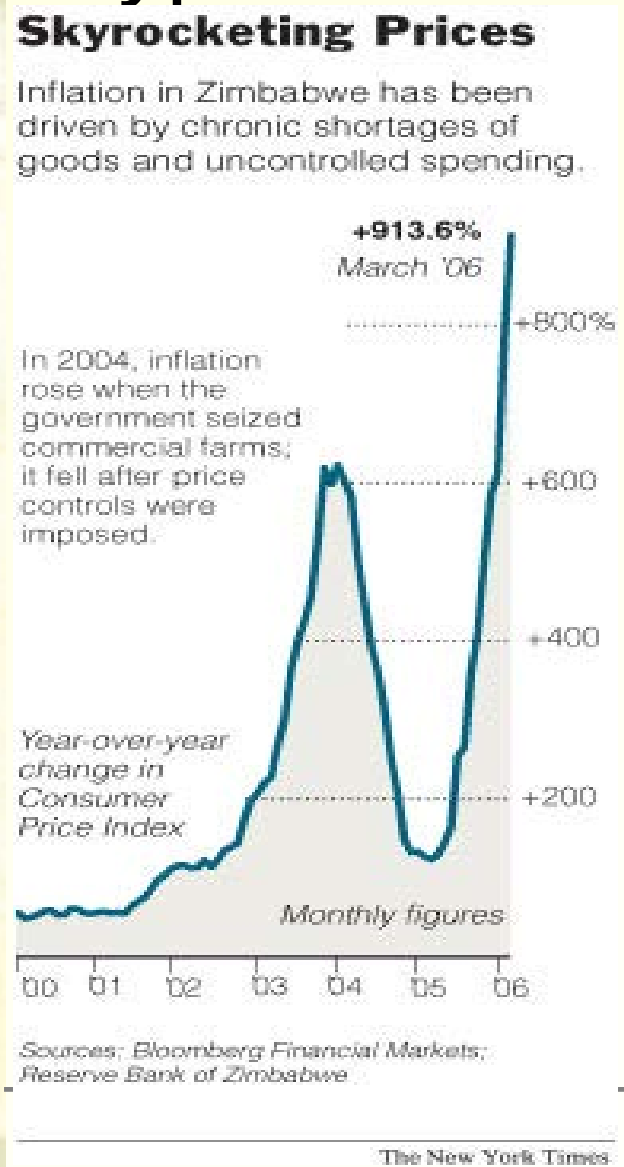
# Important issues in macroeconomics

- Why does the cost of living keep rising?
- Why is the unemployment rate in continental Europe higher than in the U.S. or Japan?
- Why are there recessions?
  Can the government do anything to combat recessions?  Should it??

# Important issues in macroeconomics

- What is the government budget deficit? How does it affect the economy?
- Why does the U.S. have such a huge trade deficit?
- Why are so many countries poor? What policies might help them grow out of poverty?

# Example 1: Hyperinflation in Zimbabwe




# 100 Trillion Banknote

# Example 1:
# How Bad is Hyperinflation in Zimbabwe?

- Zimbabwe has been tormented this entire decade by both deep recession and high inflation.
- Zimbabwe's inflation has surged to 231 million per cent in July 2008.
- In Feb 2009, Zimbabwe central bank decided to remove 12 zeros from currency.

# Example 1: Hyperinflation in Zimbabwe

- Zimbabwe fell into hyperinflation after the government began seizing commercial farms in about 2000.
- Foreign investors fled, manufacturing ground to a halt, goods and foreign currency needed to buy imports fell into short supply and prices shot up.

# Example 1:
# Combat the inflation

- Allow use of foreign currencies, and remove the worthless Zimbabwean dollar from circulation.
- 美元化的利与弊

# Example 2: Why buying US Treasury bonds?

| Major Foreign Holders of US Treasury Securities (in billions of dollars) | Dec-2020 | Dec-2019 |
|---|---|---|
| Japan | 1251.3 | 1155.2 |
| China, Mainland | 1072.3 | 1069.9 |
| United Kingdom | 440.6 | 392.1 |
| Ireland | 318.3 | 281.9 |
| Hong Kong | 227.8 | 249.7 |
| Brazil | 258.3 | 281.8 |
| | | |
| | | |
| Grand Total | 7073.9 | 6844.2 |

# Example 2:
# Why buying US Treasury Bonds?

- China has accumulated large holdings of US assets in recent years. These accumulations are the result of US borrowing to finance its large trade deficit with China.
- To spread risks, our eggs (foreign reserves) need to be invested in the United States, the euro zone and Japan, financial markets, including the purchase of U.S. treasury bonds.

# Example 2:
# Risks of holding US Treasury bonds

- Political risks: China could face U.S. economic sanctions and blockade, freezing of assets.
- Economic risks: depreciation of US dollars

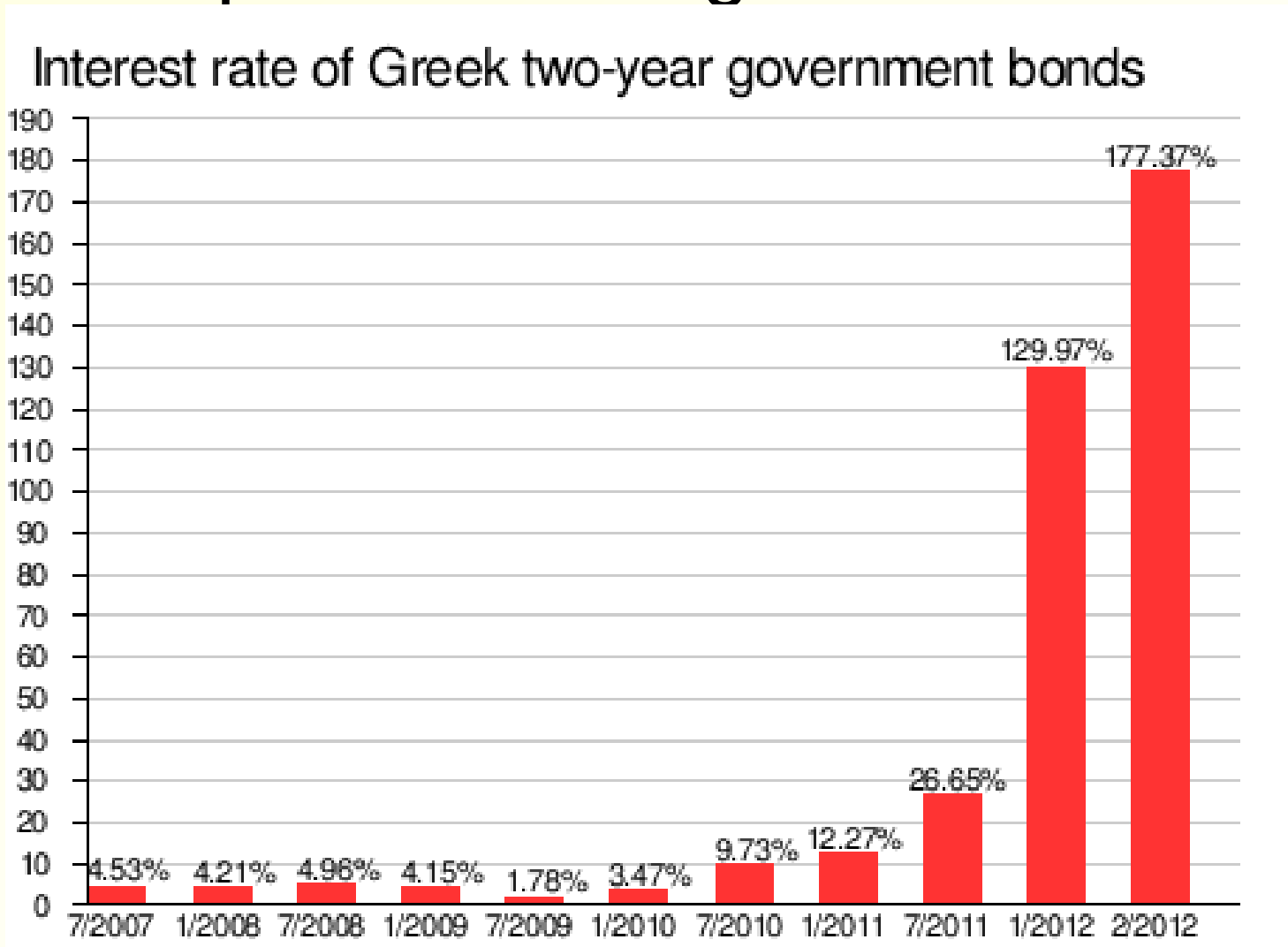
# Example 2:
# Then why do we still hold the bonds

- A large sell-off of China's U.S. holdings could diminish the value of these securities in international markets, and in turn, decrease the value of China's remaining dollar-denominated assets.
- If China reduces its holdings of US debt, others may follow, which will lead to a depreciation of dollars, and thus hurt China's exports to the US.

# Example 2:
# US concerns over China's sudden sales of US bonds

- depreciation of US dollar
- increase in US interest rates, and decline of investment

# Example 3:
# European sovereign debt crisis



# 希腊债务危机大事记

- 2009年10月，刚刚上台的希腊社会党政府宣布，2009年财政赤字占GDP比例将超过12%，远高于欧盟允许的3%上限，希腊债务问题就此浮出水面。
- 2009年12月8日惠誉宣布，将希腊主权信用评级由“A－”降为“BBB+”，前景展望为负面，这是希腊主权信用级别在过去10年中首次跌落到A级以下。
- 2010年2月，希腊债务危机扩散到银行系统，希腊四大银行评级遭到下调。
- 2010年4月，标普下调希腊评级至垃圾级别。
- 2010年4月，希腊正式向欧盟与IMF申请援助
- 2010年5月，希腊宣布大规模财政紧缩计划。
- 2011年5月，希腊推出一系列私有化进程，

# 希腊债务危机大事记

- **First bailout loan and austerity measures (May 2010 - June 2011)**

  2010年5月，欧元区财长召开特别会议，决定启动希腊救助机制，和国际货币基金组织一道在未来3年内为希腊提供总额为1100亿欧元的贷款。希腊同日宣布了大规模财政紧缩计划。

# 希腊债务危机大事记

- **Second bailout loan and austerity measures (July 2011 - 2014)**

  2011年7月，欧元区17国领导人在布鲁塞尔举行特别峰会，最终敲定对希腊实施第二轮紧急救助的方案。

  2012年2月，希腊议会通过了该国与欧盟和国际货币基金组织达成的关于第二轮救援贷款的协议，欧盟和国际货币基金组织将向希腊提供1300亿欧元的新救援贷款。由此，希腊将能够偿还3月份到期的145亿欧元国债，从而避免了无序违约。

# 希腊债务危机大事记（2015-2018）

- 2015年6月25日，“三驾马车”提出一份新的协议草案，同意向希腊提供155亿欧元的第三轮贷款。
- 德国联邦议院8月19日批准了希腊第三轮救助协议，为希腊获得约８６０亿欧元救助贷款铺平道路。与此同时，德国法兰克福机场集团将接管希腊１４个机场，作为希腊获取救助的条件之一。
- 2018年6月，欧元集团债权方认可希腊8年来遵照债权方要求“履行承诺”、落实一系列改革和财政紧缩政策，同意发放最后一笔150亿欧元贷款，同时将希腊还贷期限延长10年。
- 救助计划终止后，希腊可恢复向国际债券市场寻求融资。

# Euro Dollar Exchange Rate

# 希腊债务危机的起因

- 竞争力
- 国际金融危机
- 低廉的举债成本
- 高福利
- 老龄化
- 劳动力市场的刚性
- 欧元：货币联盟而非财政联盟

# 救助？

- 德国之态度
- 流动性支持
- 财政紧缩之悖论
- 新的经济增长点？救急VS救穷

# 如果退出欧元区？

- 本币贬值
- 出口
- 挤兑
- 通胀
- 资本外逃
- 失业与衰退
- 赖账

# Why learn macroeconomics?

The macroeconomy affects society's well-being.

- *example:*
  Unemployment and social problems

# Unemployment and social problems

In the U.S., each one-point increase in the unemployment rate is associated with:

- 920 more suicides
- 650 more murders
- 4,000 more people admitted to state mental institutions
- 3,300 more people sent to state prisons
- 37,000 more deaths
- increases in domestic violence and homelessness

# Why learn macroeconomics?

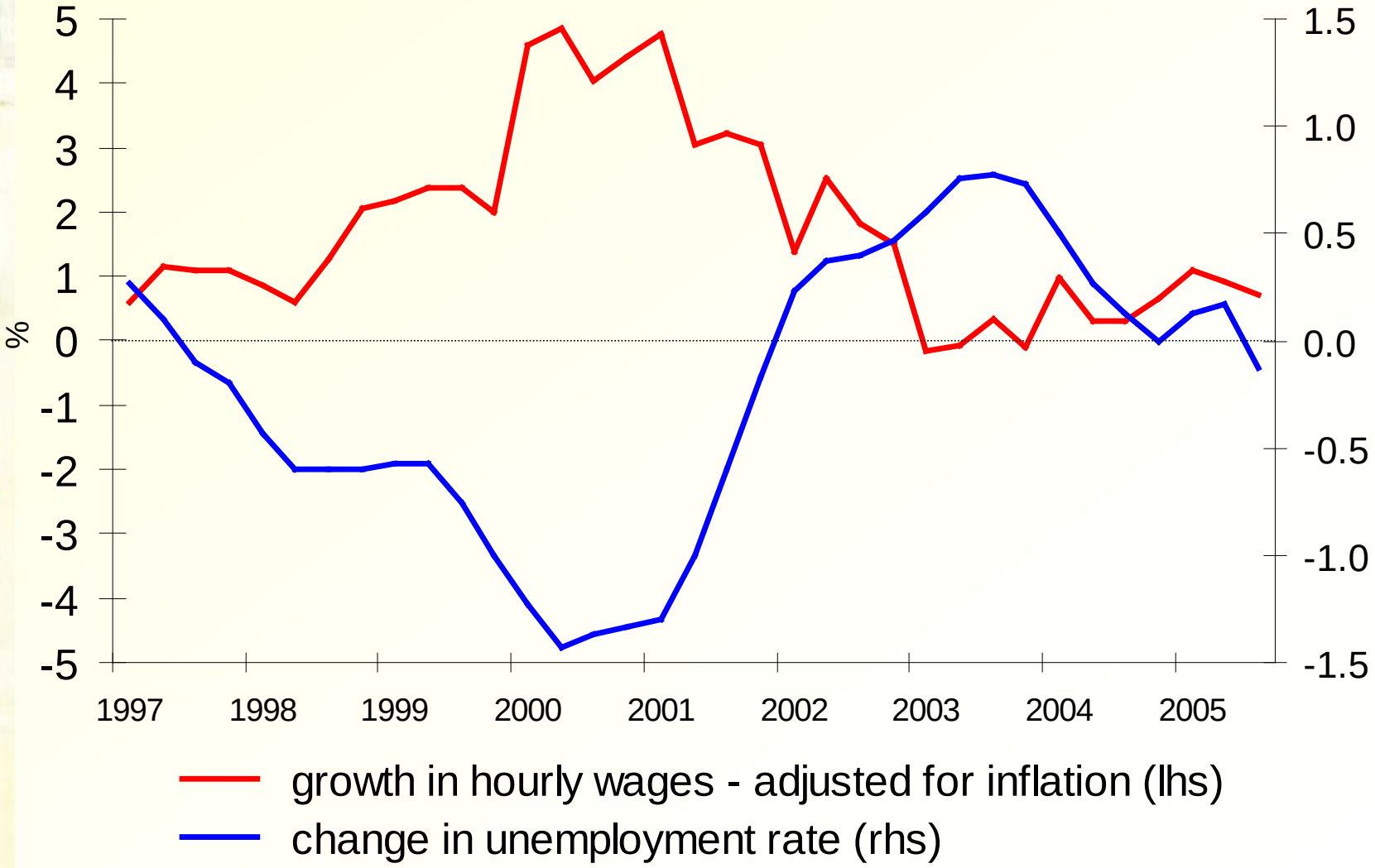
The macroeconomy affects society's well-being.

- *example:*
  Unemployment and social problems

The macroeconomy affects <u>your</u> well-being.

- *example 1:*
  Unemployment and earnings growth
- *example 2:*
  Interest rates and mortgage payments

# French unemployment and earnings growth



# Interest rates and mortgage payments

For a $100,000 30-year mortgage:

| *date* | *actual rate on 30-year mortgage* | *monthly payment* | *annual payment* |
|---|---|---|---|
| Dec 2000 | 7.6% | $713 | $8,550 |
| Dec 2001 | 5.7% | $586 | $7,033 |

# Why learn macroeconomics?

- The macroeconomy affects society's well-being.
  - *example:* Unemployment and social problems
- The macroeconomy affects your well-being.
  - *example 1:* Unemployment and earnings growth
  - *example 2:* Interest rates and mortgage payments
- The macroeconomy affects politics & current events.
  - *example:* Inflation and unemployment in election years

# Inflation and Unemployment in Election Years in the United States

| *year* | *U rate* | *inflation rate* | *elec. outcome* |
|---|---|---|---|
| 1976 | 7.7% | 5.8% | Carter (Dem) |
| 1980 | 7.1% | 13.5% | Reagan (Rep) |
| 1984 | 7.5% | 4.3% | Reagan (Rep) |
| 1988 | 5.5% | 4.1% | Bush I (Rep) |
| 1992 | 7.5% | 3.0% | Clinton (Dem) |
| 1996 | 5.4% | 3.3% | Clinton (Dem) |
| 2000 | 4.0% | 3.4% | Bush II (Rep) |
| 2004 | 5.5% | 2.7% | Bush II (Rep) |

# What’s behind

- We got models!

# Economic models

…are simplified versions of a more complex reality

- irrelevant details are stripped away

Used to

- show the relationships between economic variables
- explain the economy's behavior
- devise policies to improve economic performance

# *Example of a model:* The supply & demand for new cars

- explains the factors that determine the price of cars and the quantity sold.
- assumes the market is **competitive**: each buyer and seller is too small to affect the market price
- Variables:

  $Q^d$ = quantity of cars that buyers demand

  $Q^s$ = quantity that producers supply

  $P$ = price of new cars

  $Y$ = aggregate income

  $P_s$ = price of steel (an input)

# The demand for cars

demand equation: $Q^d = D(P, Y)$

shows that the quantity
of cars consumers demand
is related to the price of cars
and aggregate income.

# Digression: Functional notation

- **General functional notation** shows only that the variables are related:

$$Q^d = D(P, Y)$$

A list of the variables that affect $Q^d$

# Digression: Functional notation

- **General functional notation** shows only that the variables are related:

$$Q^d = D(P, Y)$$

- A **specific functional form** shows the precise quantitative relationship:

Examples:

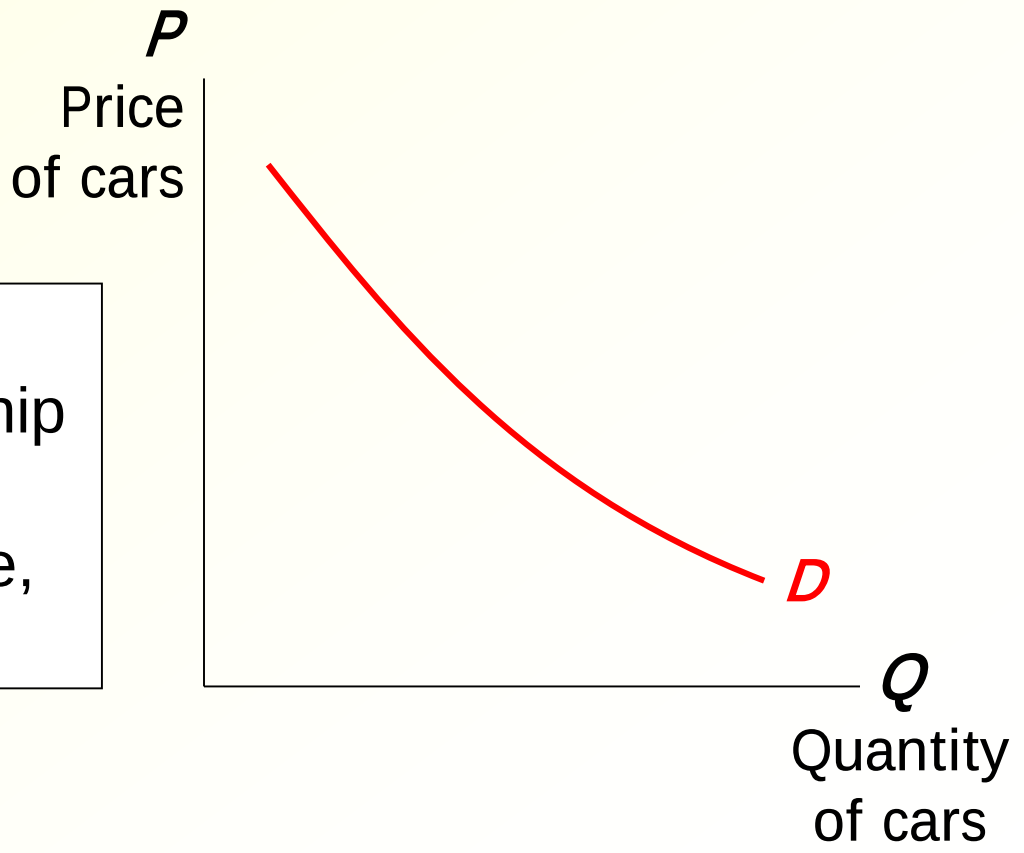
1) $Q^d = D(P, Y) = 60 - 10P + 2Y$

2) $Q^d = D(P, Y) = \dfrac{0.3Y}{P}$

# The market for cars: *demand*

**demand equation:**

$$Q^d = D(P, Y)$$

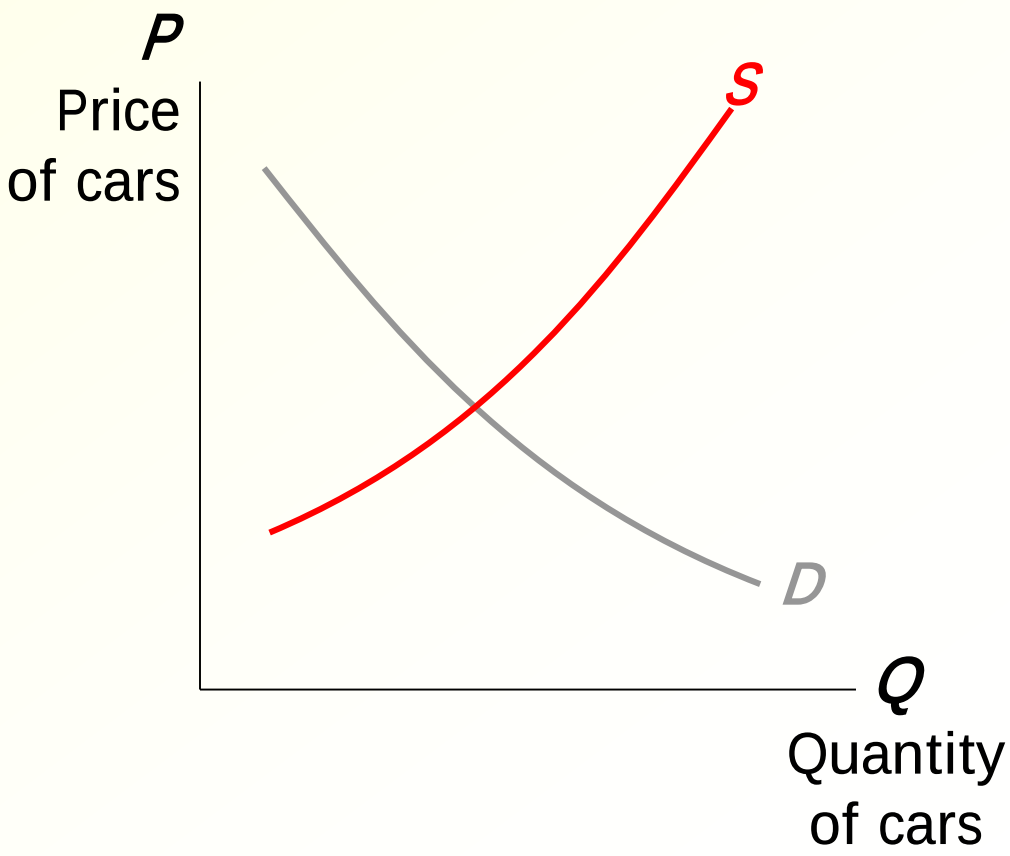



The **demand curve** shows the relationship between quantity demanded and price, other things equal.

# The market for cars: *supply*

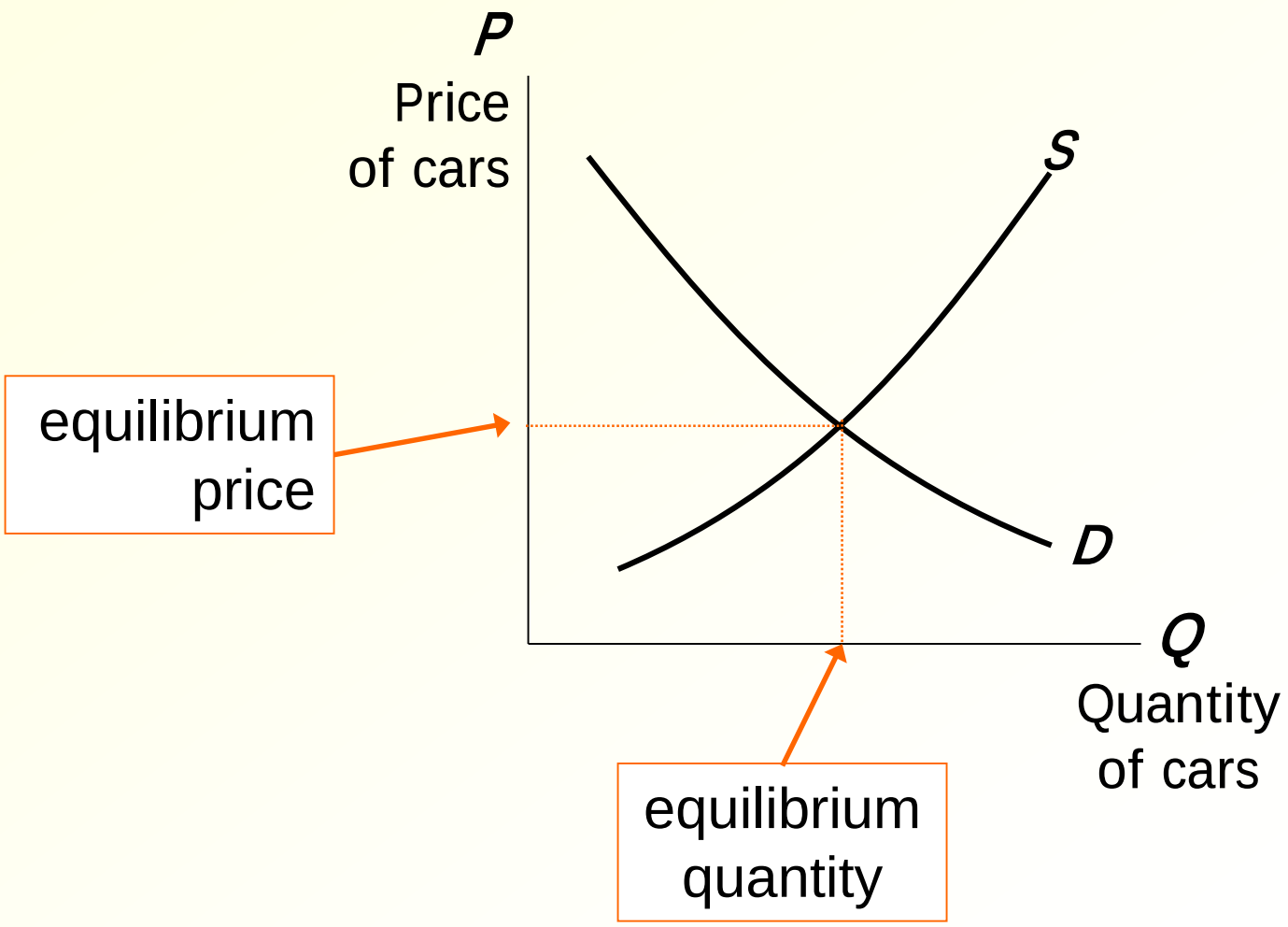
supply equation:

$$Q^s = S(P, P_s)$$




The **supply curve** shows the relationship between quantity supplied and price, other things equal.

# The market for cars: *equilibrium*



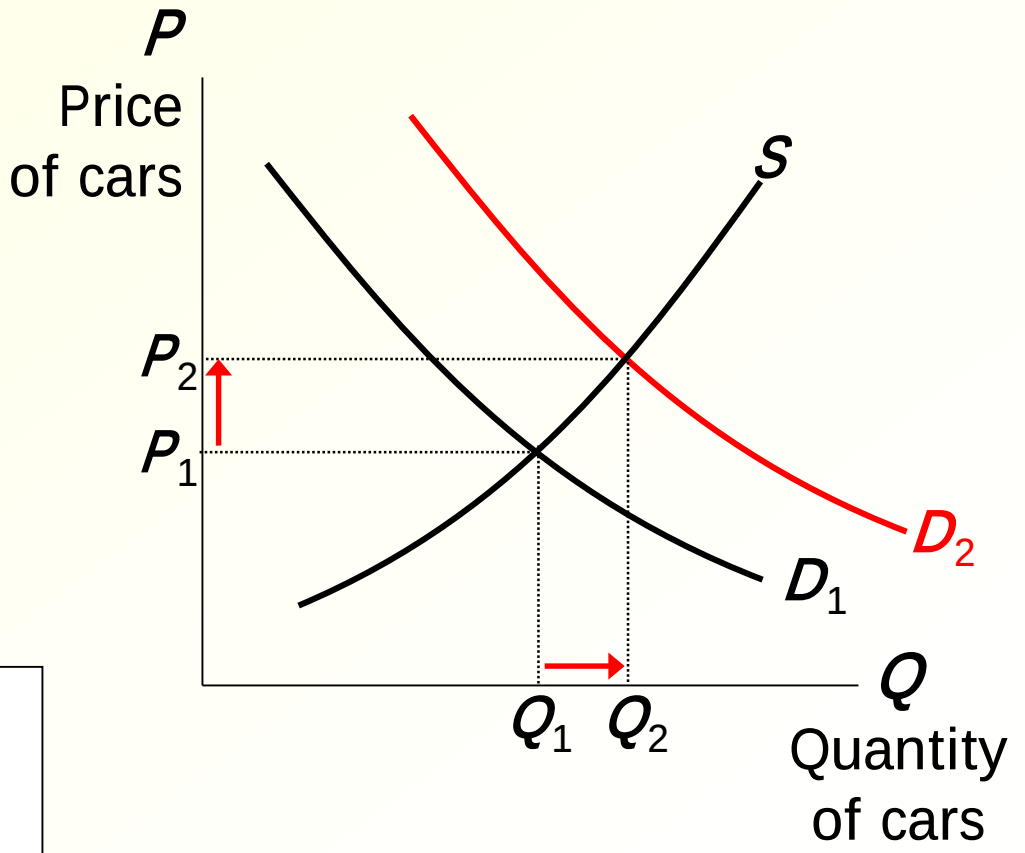
# The effects of an increase in income:

**demand equation:**

$$Q^d = D(P, Y)$$

An increase in income increases the quantity of cars consumers demand at each price…

…which increases the equilibrium price and quantity.



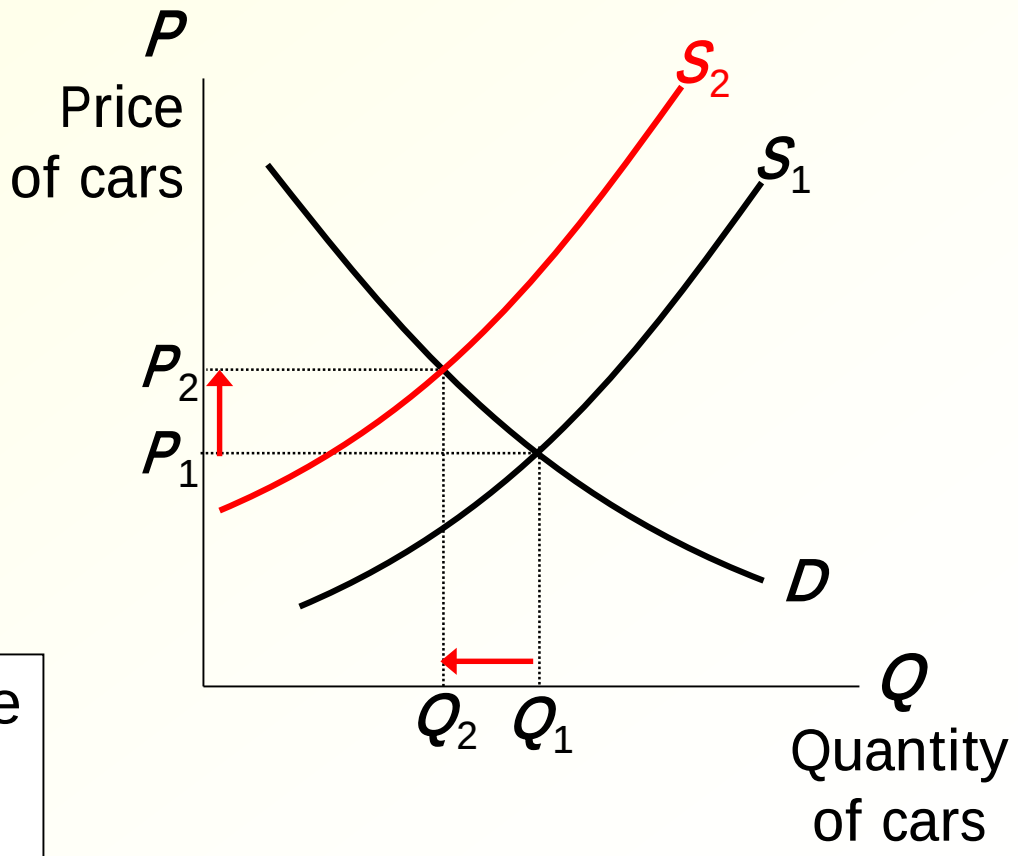
# The effects of a steel price increase:

**demand equation:**

$$Q^d = D(P, Y)$$

An increase in $P_s$ reduces the quantity of cars producers supply at each price…

…which increases the market price and reduces the quantity.



# Endogenous vs. exogenous variables:

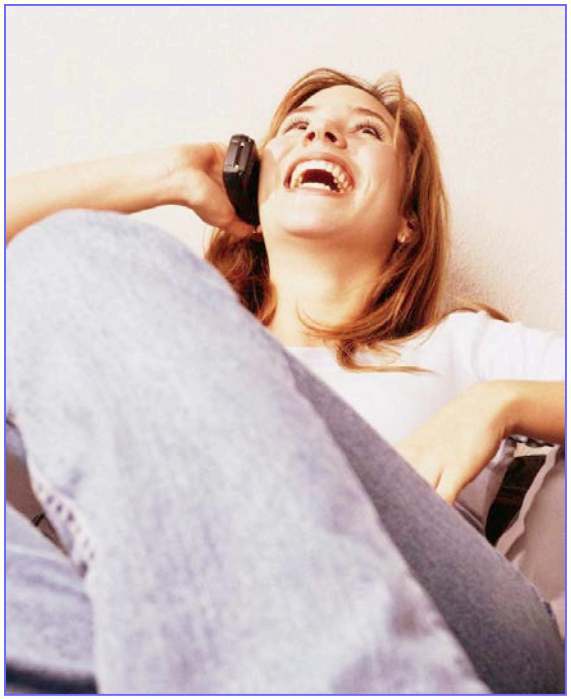
- The values of **endogenous** variables are determined in the model.
- The values of **exogenous** variables are determined outside the model: the model takes their values & behavior as given.
- In the model of supply & demand for cars,

endogenous: $P, Q^d, Q^s$

exogenous: $Y, P_s$

# Now you try:

1. Write down demand and supply equations for mobile phones; include two exogenous variables in each equation.
2. Draw a supply-demand graph for mobile phones.
3. Use your graph to show how a change in one of your exogenous variables affects the model's endogenous variables.



# A Multitude of Models

No one model can address all the issues we care about. For example,

- If we want to know how a fall in aggregate income affects new car prices, we can use the S/D model for new cars.
- But if we want to know why aggregate income falls, we need a different model.

# A Multitude of Models

- So we will learn different models for studying different issues (e.g. unemployment, inflation, long-run growth).
- For each new model, you should keep track of
  - its assumptions,
  - which of its variables are endogenous and which are exogenous,
  - the questions it can help us understand,
  - and those it cannot.

# Prices: Flexible Versus Sticky

- *Market clearing*: an assumption that prices are flexible and adjust to equate supply and demand.
- In the short run, many prices are **sticky**--- they adjust only sluggishly in response to supply/demand imbalances.

For example:

- labor contracts that fix the nominal wage for a year or longer
- magazine prices that publishers change only once every 3-4 years

# Prices: Flexible Versus Sticky

- The economy's behavior depends partly on whether prices are sticky or flexible:
- If prices are sticky, then demand won't always equal supply. This helps explain
  - unemployment (excess supply of labor)
  - the occasional inability of firms to sell what they produce
- Long run: prices flexible, markets clear, economy behaves very differently.

# Outline of this book:

- Introductory material (chaps. 1 & 2)
- ***Classical Theory*** (chaps. 3-7)
  How the economy works in the long run, when prices are flexible
- ***Growth Theory*** (chaps. 8-9)
  The standard of living and its growth rate over the very long run
- ***Business Cycle Theory*** (chaps 10-14)
  How the economy works in the short run, when prices are sticky.

# Outline of this book:

- ***Policy debates*** (Chaps. 16-19)
  Should the government try to smooth business cycle fluctuations? Is the government's debt a problem? How does the financial system work, and how to prevent financial crises?

# Chapter summary

- Macroeconomics is the study of the economy as a whole, including
  - growth in incomes
  - changes in the overall level of prices
  - the unemployment rate
- Macroeconomists attempt to explain the economy and to devise policies to improve its performance.

# Chapter summary

- Economists use different models to examine different issues.
- Models with flexible prices describe the economy in the long run; models with sticky prices describe economy in the short run.
- Macroeconomic events and performance arise from many microeconomic transactions, so macroeconomics uses many of the tools of microeconomics.