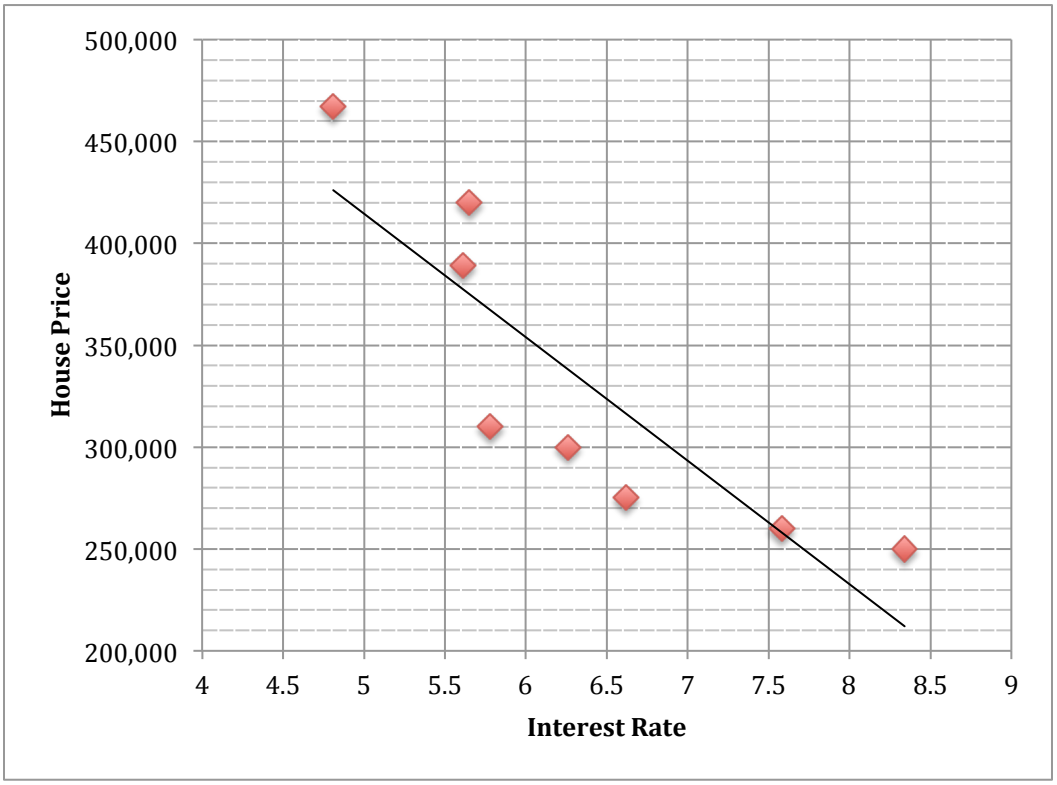
Chapter 2

- What do economists do?
  - Economic theories, hypotheses and models
  - Ceteris paribus
- Forms of data
  - Cross sectional
  - Time series
  - Longitudinal
- Positive and Normative Economic statements
- Price Indexes
  - Single Price Index
  - Composite Index
    - Consumer Price Index (CPI)
- Brief math review

What do economists do?

- Observe and study economic behaviour, experience and events
  - Example: what is the effect of interest rates on house prices
- Use economic *theories* that can explain economic behaviour
  - The theory says: Interest rates determine the cost of buying a house
  - Make a hypothesis: changes in interest rates cause changes in house prices
- Use economic *models* to test hypotheses, explain economic behaviour and predict policy outcomes. To do this, some tools and techniques are needed, such as
  - Data: Actual recorded values of variables
    - Variables take on different values. Variables here are house prices and interest rates
    - Collect house price and interest rate data
  - Algebra
    - Construct a model in a mathematical form
  - Diagrams: Observe the data. Present the model in graphical form

- Increasing house prices and falling interest rates at the same time



- Statistical techniques
  - Using the model, data and statistical techniques, estimate a regression line and test whether the hypothesis is correct

- Verbal explanation: Explain your work and your result
  - House prices are inversely related to interest rates

- **Ceteris paribus**

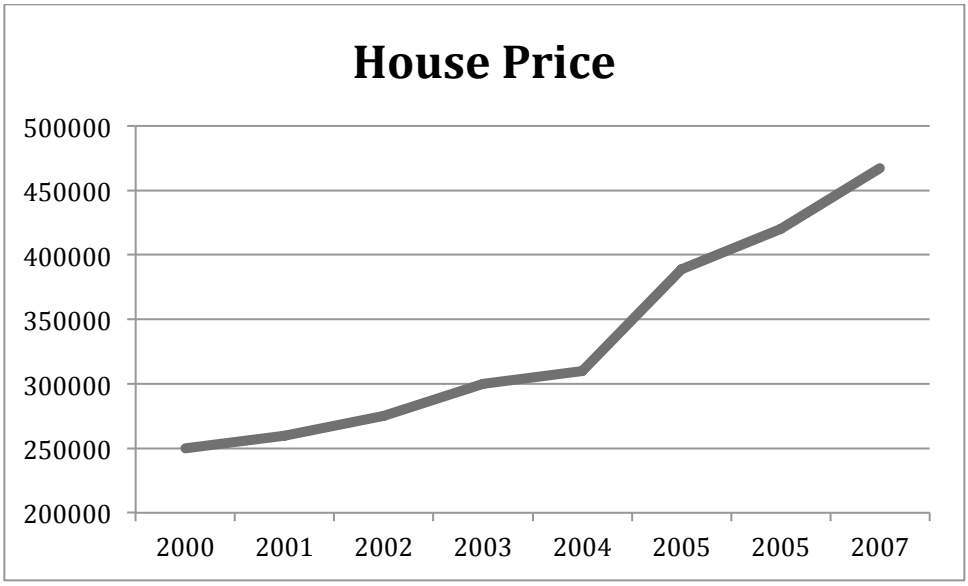
- It is a Latin phrase meaning "other things being equal".
- There are many factors in how you make a decision. Ceteris paribus says that we should change only one factor at a time to isolate how that one factor affects our behaviour.

❖ **Forms of Data**

- ***Time series data***: Different values of a variable over time

  - Average house prices in Canada from 2000 to 2007
  - Interest rates in Canada from 2000 to 2007

Year	Interest rate	**House price**
2000	8.34	250,000
2001	7.58	260,000
2002	6.62	275,000
2003	6.26	300,000
2004	5.78	310,000
2005	5.61	389,000
2005	5.65	420,000
2007	4.81	467,000



- ***Cross-sectional data***: Sample of observations of subjects (individuals, firms, countries) at a specific point of time

    - eg, Individual house prices in Montreal in June 2000
    - Eg, GPA of students in ECON201/C in 2015
    - eg, Individual companies' income in 2000 in Canada

Income in June 2005	
Company	**Income ($)**
A	368000
B	594000
C	950000
D	734000
E	180,000
F	1000000

- ***Longitudinal data***: Track the same sample at different points in time.

    - Health Survey Data: Track the health condition of a specific sample of patients over time
    - In education data: Track a specific sample of students' life condition over a long period of time

GPA	**1995**	**1996**	**1997**	**1998**	**1999**	**2000**
Jeff	A	A+	A-	B	B+	A
Rebecca	A+	A+	A-	B+	B+	A-
Marc	B-	B+	C+	C	B-	B
Zoë	C+	D	C-	B-	B+	A

❖ **Positive and Normative Economists**

Positive statement (Objective statements)

- Is a branch of economics that tries to explain and describe economic phenomenon. It usually focuses on studying the cause-and-effect relationship behavior between different economic factors. In other words, it studies *what* the condition of the economy *actually is.*

  - It is 21 degree today.
  - Higher interest rates will reduce house price.
  - The inflation rate is three percent.
  - As prices increase, demand for goods decreases.
  - There is a negative relationship between inflation rates and unemployment.
  - High tax rates slow down the economy.
  - A fall in income would lead to an increase in demand for potatoes.
  - If the government increases the tax on alcohol, this will lead to a fall in wine consumption.

Normative Statement (Subjective statements)

- Is a branch of economics that incorporates value judgments and makes recommendations on what the outcome of the economy should be. In other words, this branch studies what *ought to be* rather than what actually is.

  - You should get minimum B- to be qualified for ABC program.
  - To come out of recession, the central bank should decrease the interest rate by 0.5 percent.
  - The government should double the tax rate to achieve equity.
  - Health issues are more important than literacy in economic growth.
  - The government should increase the minimum wage to decrease poverty.

❖ Price Indexes

- *Single Price Index*

- *Value of* $Price\ Index_t = \frac{Absolute\ value\ in\ year\ t}{Absolute\ value\ in\ base\ year} * 100$
- Representing data in a simpler way
- Interpretation of the data is easier with reference to base year

Example:

Year (Base year 2001)	House Price$	House Price Index (HPI)	HPI
2000	250,000	(250,000/260,000)*100	96.2
2001	**260,000**	**(260,000/260,000)*100**	**100.0**
2002	275,000	(275,000/260,000)*100	105.8
2003	300,000	(300,000/260,000)*100	115.4
2004	310,000	(310,000/260,000)*100	119.2
2005	389,000	(389,000/260,000)*100	149.6
2005	420,000	(420,000/260,000)*100	161.5
2007	467,000	(467,000/260,000)*100	179.6

- Base year index is always 100

- *Composite Price Index*

- Weighted average of different components in the basket
- Weights are based on relative importance of each component in the basket
- $Price\ Index_t = w_1 * PI_1 + w_2 * PI_2 + w_3 * PI_3 + \cdots + w_n * PI_n$ (1,2,…, n each component in the basket)

Example:
Let's assume that a fuel basket contains oil, natural gas and coal, such that:

Basket	Weight	Price Index for each component
Oil	0.5	120
Natural Gas	0.25	98
Coal	0.25	115
Fuel Price Index	**(0.5*120)+(0.25*98)+(0.25*115)=113.25**	

Consumer Price Index (CPI)

- One of the most common examples of the price index
- Weighted average of all goods and services that a typical Canadian uses (This basket includes food, housing, education, health care, travel expenses, transportation, etc)
- $CPI_t = \frac{Cost\ of\ basket\ in\ year\ t\ in\ dollars}{Cost\ of\ basket\ in\ base\ year} * 100$

Example:
Cost of basket of goods in 2002: *$6500*
Cost of the same basket in base year (in 2001): *$6200*
Calculate CPI in 2001 and 2002:

$$CPI_{2001} = \frac{6200}{6200} * 100 = 100$$

* CPI in base year is 100

$$CPI_{2002} = \frac{6500}{6200} * 100 = 104.8$$

- CPI is used:
  - As a measure for cost of living
  - To calculate inflation/deflation (price growth)
    - $Price\ Growth\ = \frac{CPI_2 - CPI_1}{CPI_1} * 100$
    - If price growth > 0 → Inflation
      If price growth < 0 → Deflation

Example:
Calculate inflation rate in 2002 (between 2002 and 2001)

$$Price\ Growth = \frac{104.8 - 100}{100} * 100 = 4.8\% > 0 \rightarrow Inflation$$

  - Real values versus nominal values
    - Use the CPI to find real values:
    - Real values take into account the effect of inflation; nominal values do not.
    - $real\ value = \frac{Nominal\ Value_t}{CPI_t} * 100$

Example #1:

Calculate the real house price in 2001 and 2002:

Nominal house price in 2001: 260,000
Nominal house price in 2002: *275,000*
CPI in 2001: 100
CPI in 2002: *104.8*

$$Real\ House\ price_{2001} = \frac{260{,}000}{100} * 100 = 260{,}000$$

$$Real\ House\ price_{2002} = \frac{275{,}000}{104.8} * 100 = 262{,}404.6$$

Interpretation: Nominal house prices increased from 260,000 to 275,000 from 2001 to 2002. However, by taking into account the effect of inflation, we see that the real house value grew from 260,000 in 2001 to only 262,405 in 2002.

* You can calculate the real index similarly by dividing the nominal index by the CPI

Example #2:

Real wages versus nominal wages

$$Real\ Wage_t = \frac{Nominal\ Wage_t}{CPI_t} * 100$$

Year	Nominal Wage	CPI	Real Wage
2001	20	98	?
2002	??	102	20.41
2003	30	???	28.57

- ?

$$Real\ Wage_t = \frac{20}{98} * 100 = 20.41$$

- ??

$$20.41 = \frac{Nominal\ Wage_{2002}}{102} * 100$$

Nominal wage in 2002 = 20.82

- ???

$$28.57 = \frac{30}{CPI_{2003}} * 100$$

CPI in 2003 = 105

❖ **Brief math review**

Suppose we have the following linear equation:

$$Y = a + bX$$

Y and *X* are variables.
a and *b* are parameters.

Y: dependent variable
X: independent or explanatory variable

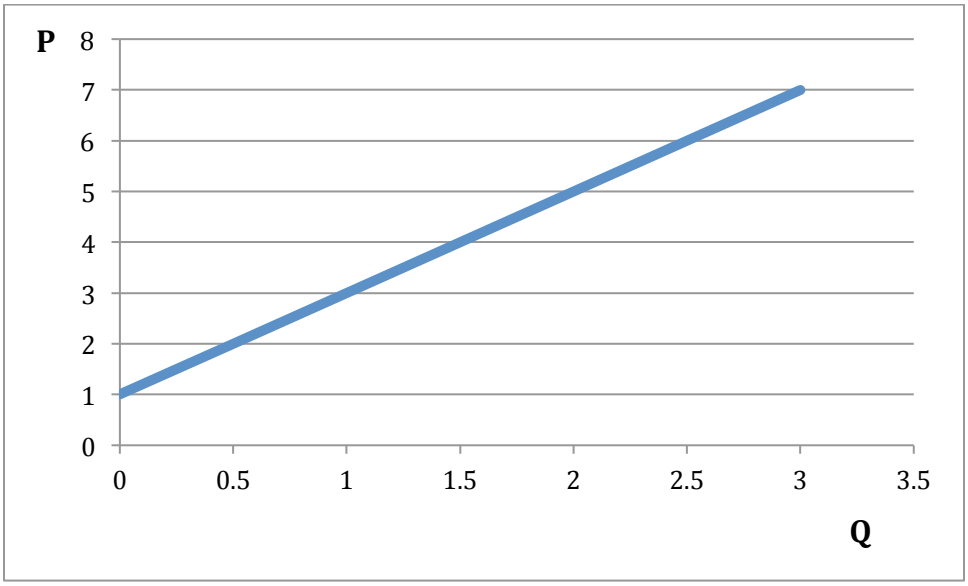
a: intercept (*X = 0* ➔ *Y = a*)
b: slope ($\frac{\Delta Y}{\Delta X} = \frac{Y_2 - Y_1}{X_2 - X_1} = b$)

Suppose *a>0*, *b>0*:

Suppose *a>0*, *b<0*

Numerical examples:

$$P = 1 + 2Q$$



$$P = 5 - Q$$