Social Implications of a Computerized Society

A Crash Course in Economics

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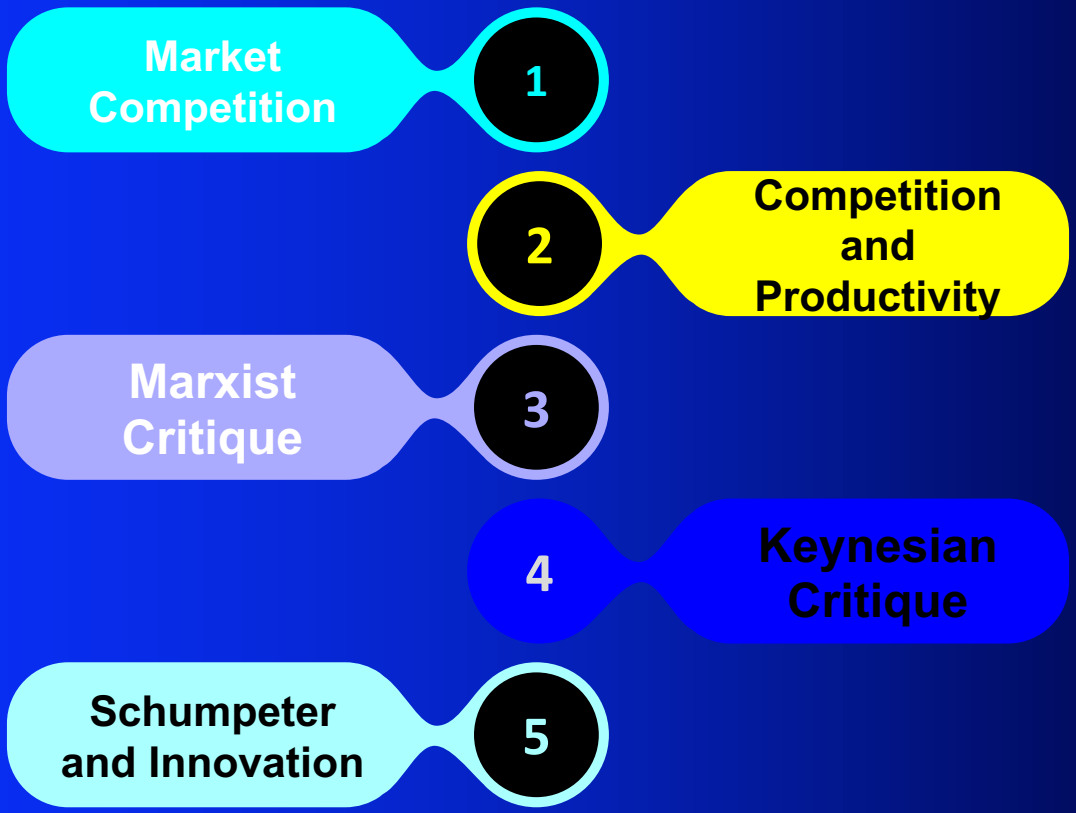
Schools of Economics



Background Question

- See canvas survey **Macro Economics Background**

Internet and Market Competition

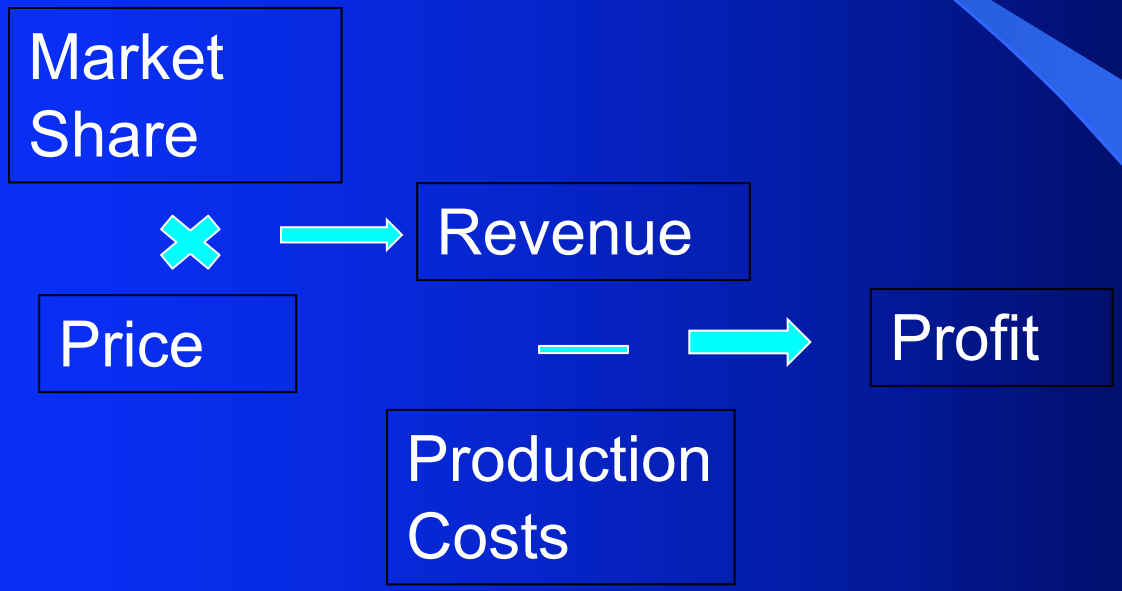
- Some claim (e.g. Bill Gates) that the Internet leads to a “frictionless” market
- Few transaction costs, easy to find customers and vendors

➢ approximates the ideal competitive market of classic economic theory

The Ideal Competitive Market

- perfect information: all agents know all the products and prices.
- no barriers to market entry: anyone can start selling a good.
- no transaction costs: costs of making and executing the deal (e.g., shipping) can be neglected.

The Profit Model



The Bertrand Game (1883)

- Consider a homogenous good where 2 firms compete only on price.
  - e.g., 1 litre of gas.
- Fix total demand *D*.
  - e.g., 1000 people want to buy the gas, so *D* = 1,000.
- Assume same unit cost *c* for each firm (staff, rent, advertising, materials).
  - e.g., each company has costs of $0.50 for 1 litre of gas.
- Options: Each company sets a price for selling the gas.

Bertrand Game Outcomes

- Outcomes: Suppose we have price p1 for firm 1, price p2 for firm 2.
  - If p1 > p2, all customers in an ideal market will buy from the cheaper company.
  - ➢ So the revenue for firm 1 is 0.
    - e.g. if firm 1 charges $2, firm 2 charges $1, firm 1 makes no sales.
- If p1 = p2 = p, the firms split the demand, and the revenue for each is (p – c) x D/2.
  - e.g. if p = $2, the revenue of each company is $(2-0.50) x 1000/2 = $1.5 x 500 = $750.
- What will be the choices of the firms?

Bertrand Game Examples

Small-scale example so we can play this out in class

Demand	Cost
4	$0.50

Firm 1/Firm 2	$6	$7
$7	firm 1: $0.	firm 1: $7 x 2 - $0.5 x 2 = $13
	firm 2: revenue = $6x4 cost = $0.5 x 4 profit = $24-$2 = $22	firm 2: ditto $13

Exercises

Demand D	Cost c
4	$0.50

- Show that in our Bertrand model, it pays to bid 1 cent less than your competitors price *p* if and only if p > c + $0.01.
- Show that this holds for any demand D > 1 and any cost c > 0.

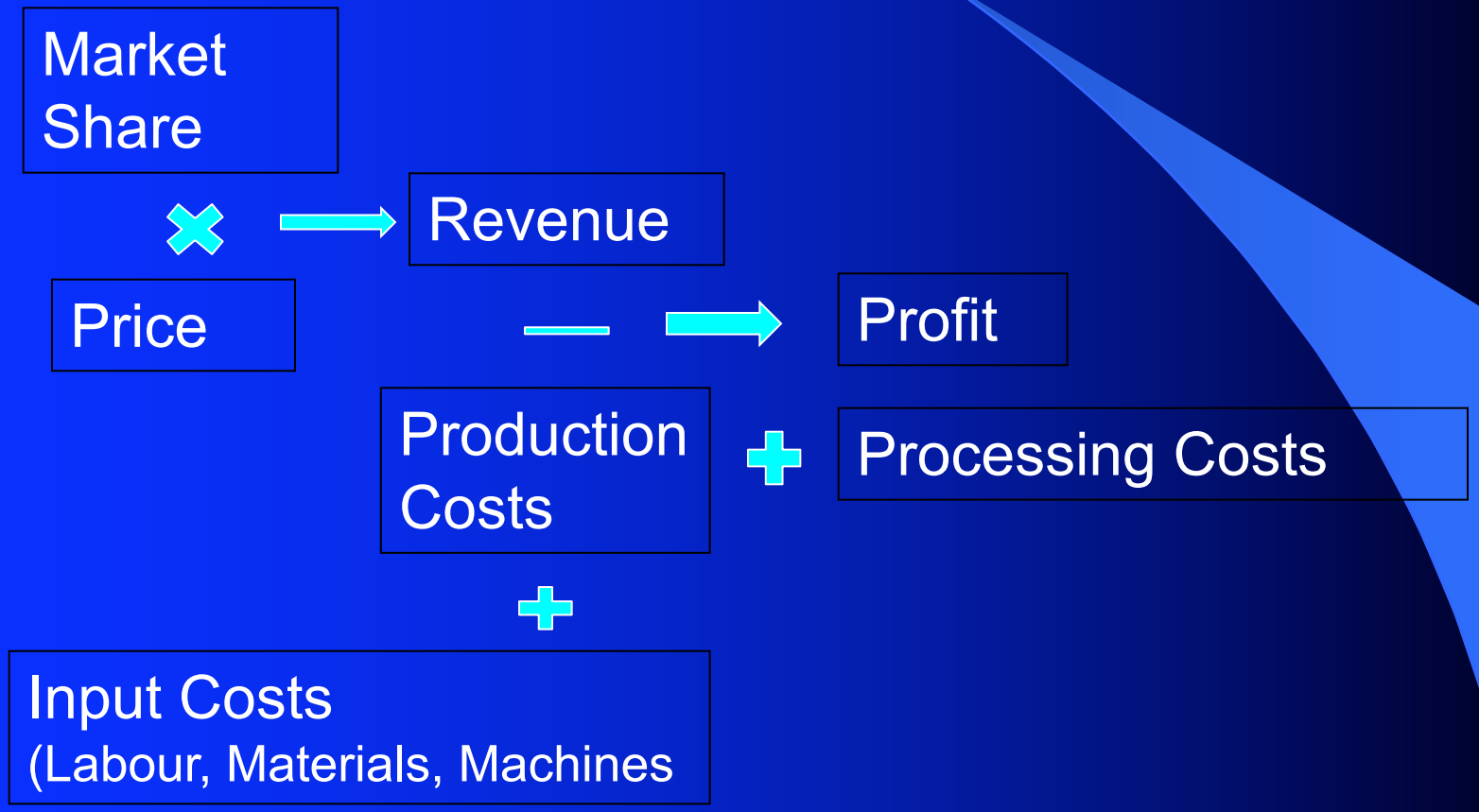
Equilibrium Analysis

- In the stable state of an ideal competitive market, each company charges just enough to recover their costs.*
- In the Bertrand model, price = cost
- In our example, gas price = $0.50
  - Cost could also include wages, taxes etc.

Real-World Examples of Falling Costs

- Memory: Compared to 1970, the cost per memory bit has gone down by a factor of 1Bn
- Prices for Cellphones have dropped substantially over the last 30 years

Profit Model



Discussion Question: how can companies generate profit given the price pressure?

Avoiding Competition in Ways That Benefit Society

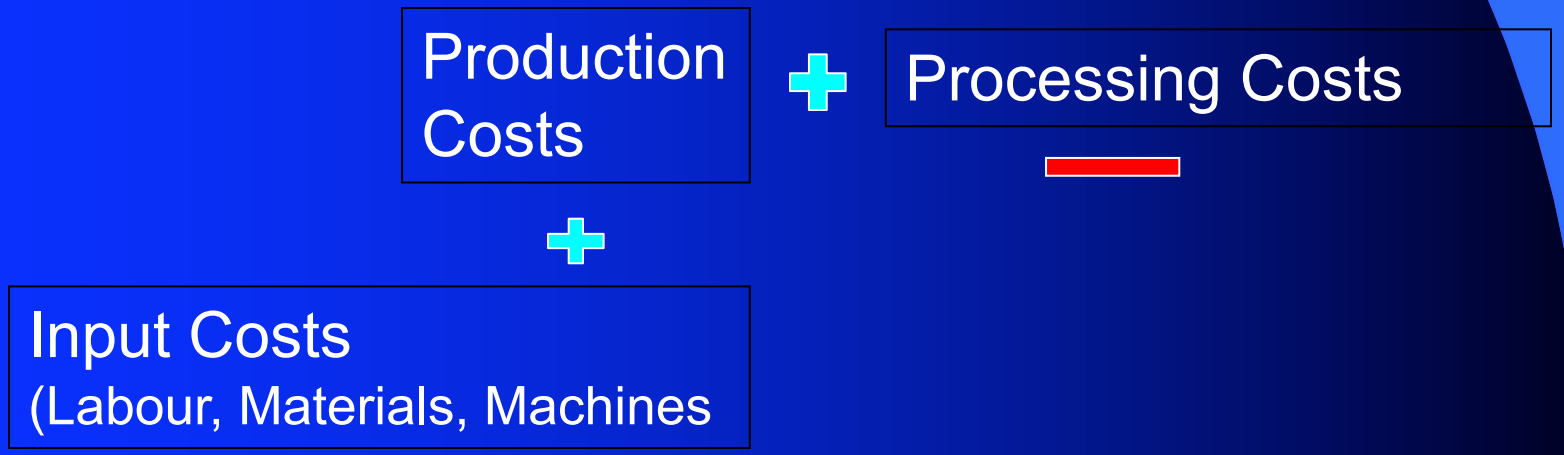
Productivity and Niches

Niches

- *Compete not only on price*, but also on brand, trust, service, etc
  - e.g. Iphone vs. Samsung
  - Mercedes vs. Ford
- Ride-sharing offers transportation in a different way from taxis

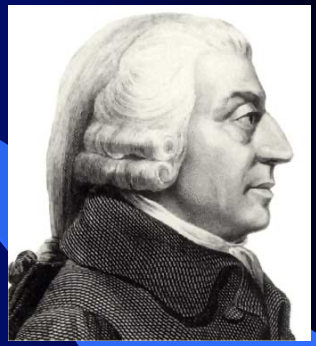
Productivity and Innovation

- Companies can innovate to become more efficient
  - ➢ produce the same good with same price but lower production costs
  - + **Productivity** = output/input (output per hour of work/operation)
- Productive Society = Wealthy Society



The Invisible Hand of the Competitive Market

- "Every individual... neither intends to promote the public interest, nor knows how much he is promoting it... he intends only his own security; and by directing that industry in such a manner as its produce may be of the greatest value, he intends only his own gain, and he is in this, as in many other cases, led by an invisible hand to promote an end which was no part of his intention."
- "It is not from the benevolence of the butcher, the brewer, or the baker, that we expect our dinner, but from their regard to their own interest. We address ourselves, not to their humanity but to their self-love, and never talk to them of our necessities but of their advantages."



Adam Smith
1723-1790

Avoiding Competition

Market Collusion

Market Entry Barriers for Competitors

- Tariffs
- Credentials, Licenses, Legal Compliance
- High Capital Costs, Economies of Scale (refineries, internet platforms)
- People are willing to pay more to buy from the known retailer.
  - For example, it is estimated that Amazon has a 5% margin advantage over unbranded retailers for first-time visitors.

Collusion

- “People of the same trade seldom meet together, even for merriment and diversion, but the conversation ends in a conspiracy against the public, or in some contrivance to raise prices.” Adam Smith
- Real-world example: silicon valley’s anti-poaching agreement

Forces against Collusion

- Law: strong legal penalties for anti-competitive behaviour
- Canada's Competition Bureau
- Difficult to make contracts for illegal collusion – can would-be colluders trust each other?

Trust Among Colluders

- Recall the Bertrand Model example.
- Suppose only two companies sell the gas and they want to fix the price at $2.
- For simplicity, suppose each company has two options
  - keep their word and sell at $2
  - undercut and sell for $1.50

The Prisoner's Dilemma in the Competitive Market

Demand	Cost
4	$0.50

Firm 1/Firm 2	$2	$1.50
$2		
$1.50		

- Fill in the outcomes for each pair of choices
- What is the optimal strategy for each firm?

The Prisoner's Dilemma in the Competitive Market

Demand	Cost
4	$0.50

Firm 1/Firm 2	$2	$1.50
$2	$3,$3	$0, $4
$1.50	$4,$0	$2, $2

- Fill in the outcomes for each pair of choices
- What is the optimal strategy for each firm?

The Story

	Column Player	
Row Player	Not Confess	Confess
Not Confess	5 years each	Row: 9 years Col: 1 year
Confess	Row: 1 year Col: 9 years	7 years for each

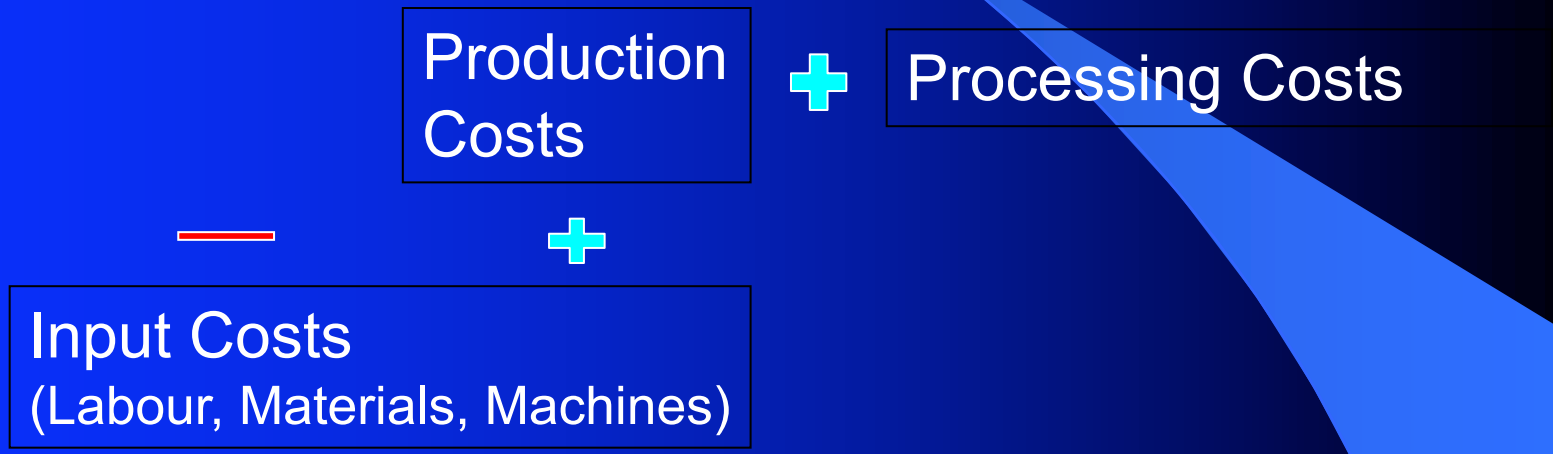
- Two players are interrogated separately and offered a deal to confess to the crime.
- Exercise: Can be linearly transformed to numbers from slide before: what matters is relative payoffs.

Mergers

- A legal way to collude is for competitors to merge
  - monopolies, loss of competition, higher prices, less productivity
- Controlled by government regulations about market concentration

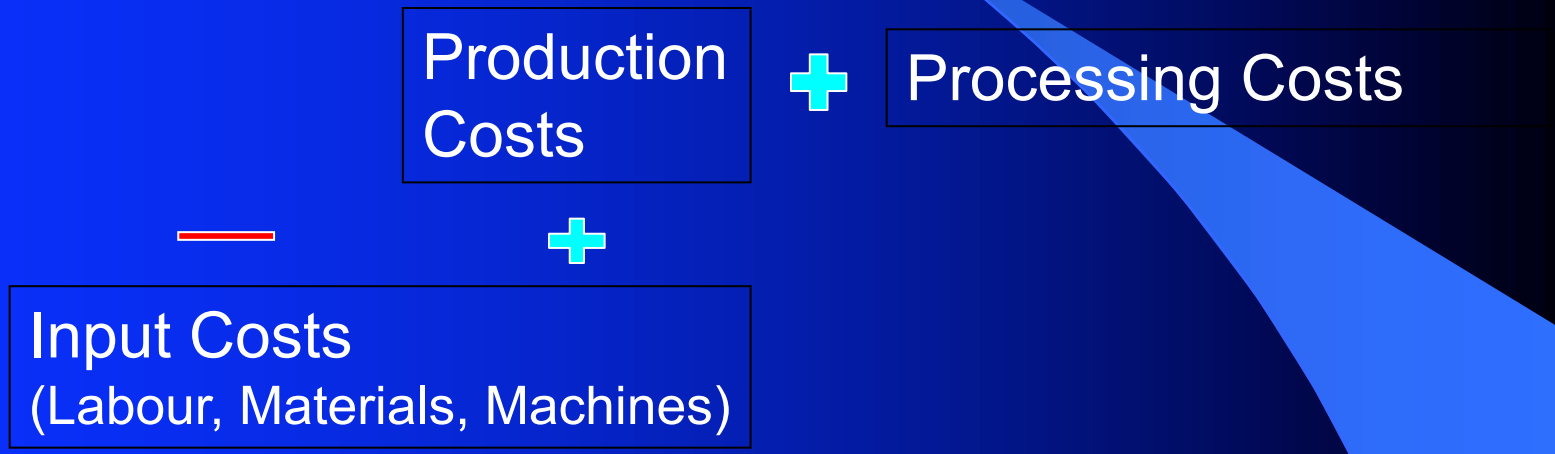
Cost Cutting

Increasing Productivity



- In Adam Smith's ideal world, companies cut **production costs** through raising productivity
- Raising productivity helps society
- "Productivity isn't everything, but in the long run it is almost everything" Paul Krugman Nobel Memorial Prize winner

Cutting Input Costs



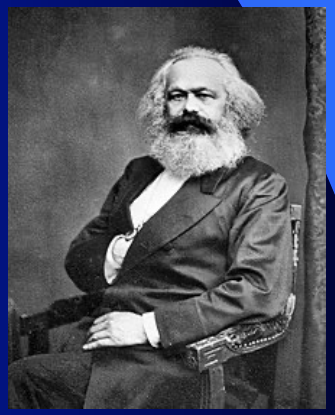
- The company can also increase its profits by cutting **input costs**
- This generally does not help society
  - See Keynesian critique below

Examples

- Walmart uses its bargaining power to bring down prices from suppliers
- Amazon asks governments for taxbreaks and subsidies
- The Canadian lumber industry lobbies the government to charge them lower stumpage fees
- The U.S. says this is an unfair subsidy

“There is a class war, and my class is winning”. Warren Buffet

Marxist critique



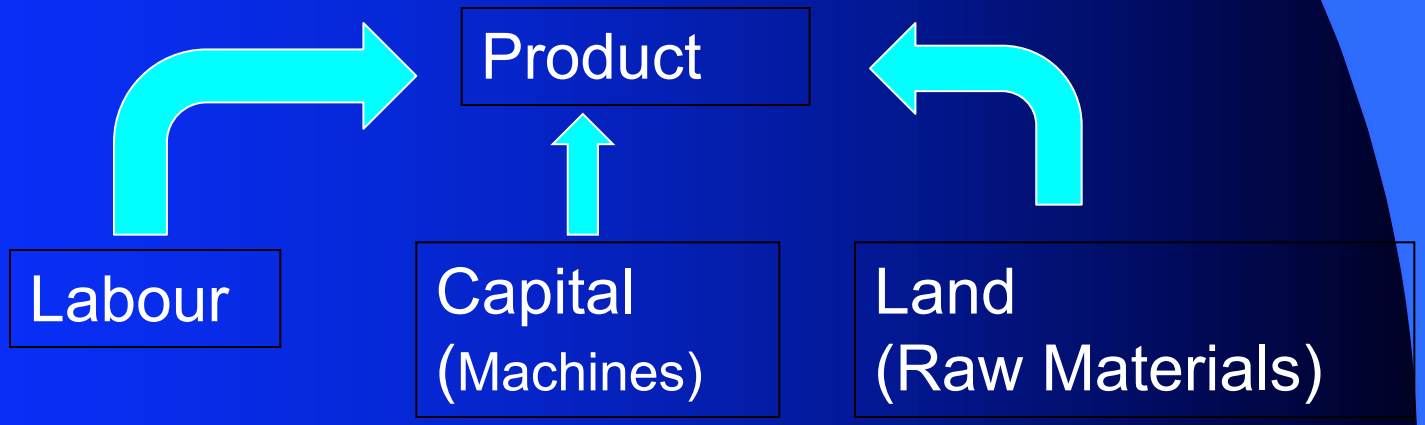
The Structure of Production

- Marx: the classical model is appropriate for shipwreck Robinson Crusoe
  - transforms raw materials from his island into goods of value for himself
- But in modern production, **many people work together** to add value to raw materials.

➢ Conflicts about how gets what share of the added value (profit)

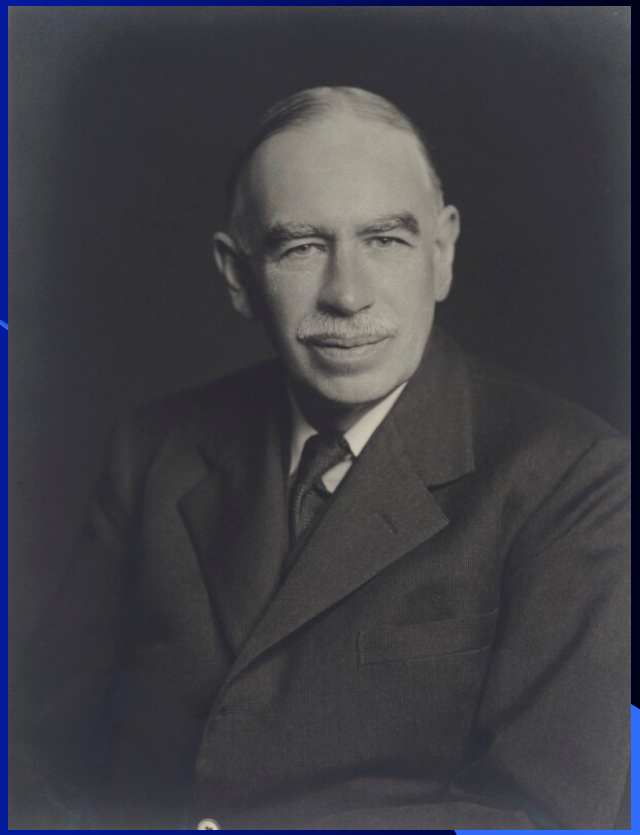
The Means (Factors) of Production

- Land (nature, raw materials)
- Capital (money to buy machines)
- Labour (to work machines)
- Capital + Labour work together to add value to Land



The Class Struggle

- Capital and Labour are in conflict about who gets what share of the added value (profits) ➔ Class Struggle
- Intensified by the pressure on profits from market competition
- Class Struggle is destructive
- According to Marx, owners have the upper hand
- Wage competition by workers drives down wages to subsistence level (the "Iron Law").
  - Think “Hunger Games”



Demand-Side Economics

Keynesian critique

Demand-Side Economics

- Bertrand's Model assumes that the demand is fixed and not influenced by the market players.
- Demand is exogenous.
  - Recall Marx' comparison with Robinson Crusoe
- But in the real economy, people can buy goods in the market because they sell goods (services) in the market.

Competition Game Revisited

- To simplify, suppose we have only 1 gas company (monopoly).
- To earn money, 4 drivers sell groceries to the company.
- They use the money from the grocery sales to buy gas.
- What happens to the profits of the gas company if the drivers lower the price for the groceries?
  - Do profits go up or down?

The Paradox of Thrift

- For the **whole economy**, spending = income.
  - e.g. GDP = sum of goods and services sold
- If everybody saves, we all have less income.
- If everybody spends, we all have more income.

Sector Balance Mechanics

- It is helpful to analyze spending by 4 big sectors in a national economy.
  - government
  - private households
  - private businesses
  - foreigners
- Spending + Income has to balance out across all 4 sectors.
- If all 4 sectors save, all 4 sectors lose income.

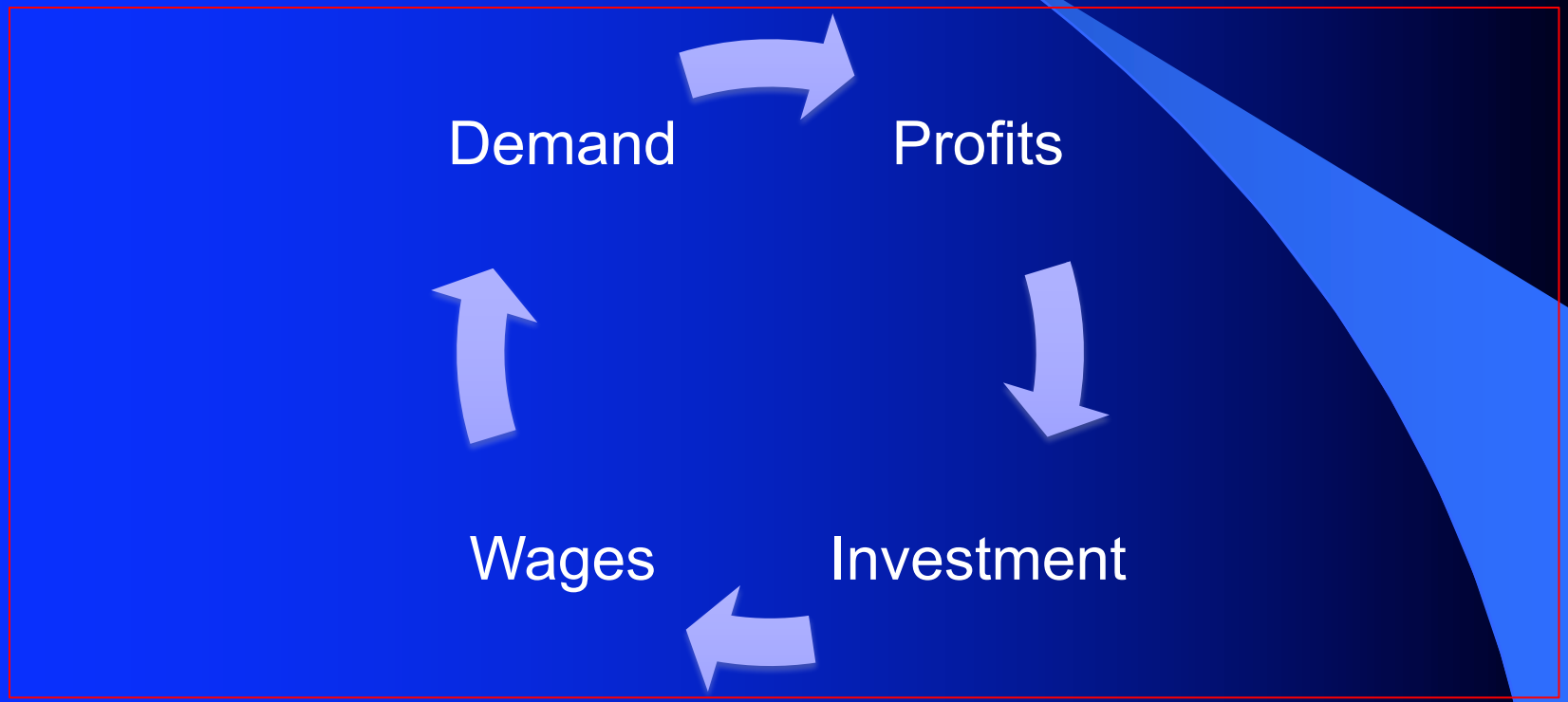
Historical Sector Spending in Canada

- Traditional Pattern for Net Balances:
  - private households save (retirement, down payments)
  - companies spend (go into debt to invest)
  - e.g. Amazon became profitable only in 2003
- In the last 25 years or so, private businesses overall have been net savers – weird! See also here
- Raises concerns about the paradox of thrift

Keynesian Analysis of Recessions

- The big problem in an economy is unemployment
- Unemployment happens in recessions = Economy shrinking
- In Keynesian view, the cause is **demand weakness**: too much net saving in the economy
- Keynes' approach: if the private sector is saving too much, the government must go into debt
- Gvt spending creates demand and grows the economy

The Economy as a Feedback Loop



- In a boom: positive feedback loop
- In a recession: negative feedback loop
- Explains the business cycle (?)

Keynes Quote

- “If the Treasury were to fill old bottles with bank-notes, bury them at suitable depths in disused coal-mines which are then filled up to the surface with town rubbish, and leave it to private enterprise on well-tried principles of laissez-faire to dig the notes up again ... there need be no more unemployment and, with the help of repercussions, the real income of the community, and its capital wealth, would probably become a good deal greater than it actually is."
- “The boom, not the slump, is the time for austerity”

Historical Examples

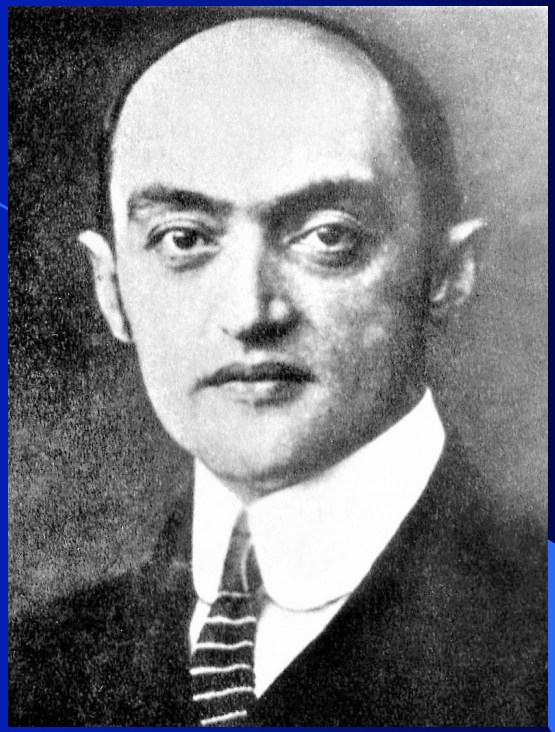
- Henry Ford on raising wages
- Recently Amazon has made a similar move
- Roosevelt's New Deal

Supply Side Economics

- The government can move money into the private sector by spending (Keynes)
- But also by cutting taxes

The Golden Wage Rule

- Most modern governments have an inflation target
- The Golden Rule (simplified): Wages should grow by productivity + inflation target.
- Wages seem to be lagging productivity in the U.S., less so in Canada



Technology and Innovation in the Marketplace

Schumpeter and innovation

The Importance of Innovation

- enterpreneurial innovation → productivity → lasting wealth
- Economic policies should give priority to innovation aka “technology shocks”
- Support “creative destruction” (disruption) against the interests of powerful incumbents
- Allow technology leaders to benefit from “temporary monopolies” (first-mover advantage).
  - Better than patents (?)
- Big companies can innovate because they have enough money to develop ideas

Example: The Iphone

- Iphone disrupted cell phone market
  - creatively destroyed BlackBerry
- temporary monopoly: could charge more in 2007
- competition caught up and brought prices down again

Discussion Question

- How would you look at ride-sharing (Uber) from the four different perspectives? What issues would each framework raise?

1. Classic market competition (Smith)
2. Marxist critique
3. Keynesian demand-side economics
4. Schumpeter innovation and enterprise

Summary I

- Different schools of economics emphasize different aspects and raise different questions
- Classical: emphasizes the benefits of market competition for consumers and productivity
- Marxist: emphasizes conflict between owners (capital) and workers (labour) over share of profits (added value)

Summary II

- Keynesian:
  - holistic view of the economy: total spending = total income
  - feedback system: demand stimulates growth
- Schumpeter: emphasizes the importance of innovation for economic growth
  - entrepreneurs with novel ideas bring “creative destruction” (disruption) and productivity
  - need access to capital
  - temporary monopolies protect first-mover profits from market competition