Microeconomics

**8/24/21**

Human Behavior: homoeconomics

Make choices to maximize utility

Labor -> Income -> Stuff -> Utility

More is better: Utility is increasing

Marginal Utility – Change in utility from change in quantity: Diminishing return

Utility cannot be compared across people

Leisure v. Work

Work -> Less Leisure more income -> more stuff -> More Utility

**8/26/21**

Firms: Production related entities: Objective = Profit Π

Π(Profit) = Total Revenue (TR) – Total Cost (TC)

TR = Price(P) x Quantity(Q)

TC = Wage(W) x Labor(L) + Rental Rate(R) x Capital(K)

Firm View Labor – necessary evil

1. Produce product or service sold -> TR^
2. Must pay -> TC^

Firm View of K

1. See Labor; complements v. substitutes L + K

Modelling choices

1. Utility: Satisfaction more is better
2. Marginal Utility (MU): Change in Utility due to change in quantity diminish

Each persom has own unique utility function

Ordinal not Cardinal

Indifference Curves: Map of combinations of goods that give the same level of utility

Rules

1. Higher U
2. Infinite number of them

**8/31/21**

U = A xAlpha YBeta

Alpha, Beta => Weights on X and Y

Prices Px and Py

MVx = 6 : Px = $2

Mvy = 8 : $4

Mvx/Px = 6/2 = 3

MVy/Py = 8/4 = 2

MVx = 3 : Px = $2

MVy = 8: Py = $4

3/2 = 1.5

8/4 = 2-

**9/9/2021**

Gaining cooperation

1. Finite Repetition

Play 2 times + both agree to cooperate – push, push

Payoffs = 400 + 400 = 800 each

Agree to Push|Push for 2 roundss

IN round 2 what should a self interested player do?

Pull

1. Infinite Repetition: Don’t know when the game to end

Punish noncooperation

1. Tit for Tat: I play cooperatively if you l last played cooperatively. I play noncooperatively if you last played noncooperatively.
2. Grim Trigger: I play cooperatively. If you ever play noncooperatively I will always play noncooperative.

**9/14/2021**

Game Theory

Interactions where outcomes are reliant on recognized mutual interdependence

cooperative v. non-cooperative

Elements:

1. Environment
2. Rules
3. Players
4. Strategies
5. Payoffs
6. Best Response
7. Equilibrium

Prisoner’s dilemma

Env: Cop Shop

Rul;es: No Escape

Bonnie + Clyde – 2 Crimes

Small crime conviction = 3 years each

Large crime conviction = 20 years if only one: 15 years if both; 0 if no evidence

Offer: 2 year reduction for “Rat”

Strategies: Rat, Not Rat

Coop => Strategies: both Don’t Rat

Payoff => 3 years each

Clyde Chooses NR: Bonnies Best Response = Rat: 1 < 3

Bonnie chooses R: Clyde’s Best Response = 16 < 23

Clyde Chooses R; Bonnies Best Response = Rat 16 < 23

Equilibrium: Rat, Rat

Payoffs 16 years each

China: Mack + Meyer

Env. Must pull barge upstream to market

Faster pulling => More revenue, more food + water + strain

Strat: Pull, Shirk

Equilibrium Shirk, Shirk

Payoffs: 8 dollars each

**9/14/2021**

Public Good: Non-Rival and Non-exclusive

4 people with $20 each to start

Each $1 contribution gives $0.4 to each person.

All 4 give $20 => $80 in total

So each person ends up with 80 \* 0.4 = $32

3 people give 20 and 1 gives 0

60 \* 0.4 = 24

Contributors end up with $24

Non contributer ends up with $44

Allow for punishment: Pay $1 to fine someone $3 for insufficient contribution

Opportunity Cost: Value of the next best thing that could be done

Personal choice

Choices: Theatre or Park

Ticket: $25 $0

U $50 $15

**Ecom Cost**: 25 + 15 = 40 from going to Theatre not Park

0 + 50 = 50 from going to park but not theatre

Private Firm

ΠAcct. = Revenue – Explicit Cost

ΠEcom = ΠAcct – Implicit Cost

Example: Plumbing Company, small privately held

Plumbers: National Mean about $60,000

Own Comp: Capital Costs = 25k

Salary = 30k

Revenue = 80k

ΠAcct = 25k

ΠEcom = 25k – (60 – 30) = -5k

Public Comp:

Share and Stock = partial ownership of company

Rights: 1. Vote for board of Diretors which hires CEO 2. Profits -> E = Earnings per Share = ΠAcct/number of shares

People buy Shares for 1. E until they sell 2. P, price per share 3. Control

Amazon PE 60.46

PE = Price per Share / Earnings per Share

$100 deposit in the bank at 2%

End of year 100 \* .02 = 102

Earnings = 2

Price of earnings = 100

PE = 100/2 = 50

E/P = 2/100 = .02 = 2%

E/P = 0.017 = 1.7%

**9/16/2021**

Feasible set on production possibility frontier in production possibility curve: PPF, PPC

Combinations of outputs that may be produced by using all inputs efficiently

Marginal rate of Transformation = Slope

**9/21/2021**

Institutions – Pirates, Communists, others

Poreto Efficiency: A situation in which no one person or more can be made better off without making at least one person worse off.

Institutional change:

1. People choose to maximize own utility

1. Work => food

2. Leisure

2. Each person must have a minimum amount of leisure to survive

3. Each person must have a minimum amount of food to survive

4. Diminishing marginal product of food

Slavery: survival, profit, reallocation

End Slavery: Opportunity

Education + opportunity:

Measuring income distribution

1. Lorenz Curve + Gini Coefficient
2. Quartile + Quantile

Lorenz Curve

Cumulative Share of pop | Share of income

Lowest to highest income

**9/23/2021**

Wage Determination + “Discipline

!. Workers: Maximize own Utility: w/e

1. Effort – e
2. Disutility
3. Opportunity
4. Wages – w

2. Firms w/e ↓

a. π

b. q

c. e

d. w

e: effort 0 – 100%: easy to give 1% moving from 95% to 98% effort is difficult: Higher w 🡺 Higher e

disutility

Reservation Wage

Cost of Living

Amenities – benefits, status, friendships

Opportunity Costs – unemployment

Firms want π(profit) 🡺 need product to sell 🡺 need workers

Derived demand

C ^ 🡺 g ^ 🡺 Total Revenue ^ 🡺 π ^

**9/28/2021**

Income Distribution: fairness, measures, hysterisis demand

Hysterisis: current situation depends on past

1. Education ^ 🡸🡺 income ^
2. Parental Ed. ^ 🡸🡺 child ed ^
3. Parental income ^ 🡸🡺 Child ed ^
4. Assertive mating: Similar people marry each other

“Fair”?

Procedural – Equal Opportunity

Substantive – equal outcome

Income Distribution measures

1. Loren curve + Gine coefficient
2. Mean + median incomes

Lorenz Curve:

1. Order people from lowest to highest income
2. Calculate
3. Each persons share of population
4. Each persons share of income

Gine Coefficient:

0 => perfect equality

1 => perfect inequality

Why it matters to business.

Firms want to maximize profits, π. Π comes from Total Revenues – total cost (TR – TC).

TR = Price \* Quantity

Want high P + high Q => many rich customers

Profit per unit sold = P – Average Total Cost

Driving average Cost V => More K, More Q

K is very expensive

Low Gini => equality of income; many mildy high income customers hard to accumulate K

High Gini => some rich, many poor; few customers easy to accumulate K

Mean: Sum of all observations / number of observations

Median: value of the middle observation

Real (Inflation adjusted) Household Income (Total Income of all residents), annual (in a calendar year)

**9/30/2021**

Firm concern = π = TR – TC

TR = Price \* Quantity = P \* Q

Demand: amount of a good (QD) that people are willing and able to buy at various prices (P) celeris paribus

Downward slopin curve and law of demand

1. Substitution effect
2. Income effect

Observations 🡺 demand 🡺 TR

I = intercept, s = slope

Demand: QD = i + sp s =

Inverse Demand: P = i + sd s =

**10/5/2021**

π = TR – TC

TC = F(Q): TC up with quantity up

Q = f(K, L, w, r)

Short run (SR) vs. Long Run (LR)

Measures + patterns

FC: Fixed Costs

VC: Variable Costs

TC = FC + VC = W\*L + R\*K

AFC: Average Fixed Cost

AVC: Average Variable Cost

ATC: Average Total Cost

MC: Marginal Cost

W = wage rate of L

L = amount of labor

R = rental rate of K

K = amount of capital

TC = W\*L + R\*K

Short Run vs Long Run

Long Run: Time necessary to adjust all inputs

Short Run: Time in which at least one input is fixed

K is fixed, L is not

Q^ 🡺 L^ 🡺 W\*L ^ 🡺 TC^

FC (Fixed Costs) = R\*K Unchanged with Q

VC (Variable Costs) = W\*L change with Q

TC = FC + VC, change with Q

AFC (Average Fixed Costs): decreases as Q ^

AVC (Average Variable Costs): decreases as Q^ then increases as Q^

ATC(Average Total Costs): decreases as Q^ then increases as Q^

MC(Marginal Costs): decreases as Q^ then Increases as Q^

**10/12/2021**

TR = P \* Q

Q = I + s \* P

S =

TR = P(I + sP)

Marginal Renenue, MR =

Elasticity E =

Q = 12 – 2P: S = -2

|  |  |  |  |
| --- | --- | --- | --- |
| P | Q | TR | MR |
| 4 | 4 | 16 |  |
| 3 | 6 | 18 | = 1 |
| 2 | 8 | 18 | = -1 |

Elasticity of Demand: E = = \* =

Q=4 P=4

E = -2 \* 4/4 = -2

Q = 6 P =3

E = -2 \* 3/6 = -1

Q = 8 P = 2

E = -2 \*2/8 = -1/2

Demand is inelastic, E > -1 absE < 1

A Pv = Q^ = TRv, TC^ = Profits V

A P^ = Qv = TR^, TCv = Profits ^

Demand is unitelastic E = -1, absE = 1

Pv = Q^ = TR~, TC^ = Profits v

P^ = Qv = TR~, TCv = Profits ^

Demand is elastic E < -1, absE = 1

Pv = Q^ = TR^, TC^ = Profits = ?

P^ = Qv = TRv, TRv = Profits = ?

Influences of E

1. Number and availability of substitutes

More subs = more elasticity

1. Time to shop

More time = more elasticity

1. Luxury vs. Need

More Luxury = more elasticity

1. Share of income

Larger Share = more elasticity

**10/14/21**

Equlibrium + Welfare

Demand: amount of a good (Q) people are willing and able to buy at various prices (P)

Ceteris paribus

Qd = 16 – 2P P^ 🡺 Qd V

Supply: Amount of a good (Q) people are willing and able to sell at various prices (P)

Ceteris paribus

Qs = -4 + 2P P^ 🡺 Qs^

Equlibrium: Price (P) such that quant

Qd = 16 – 2p

Qs = -4 +2p

P such that Qd = Qs

16-2p = -4 + 2p

-4p = -20

P = 5

-4 + 2(5) = -4 + 10 = 6 = Q ]

Consumer Surplus, CS: Value to consumer above what is paid

Producer Surplus, PS: Price received above lowest acceptable price

Social Surplus or Welfare = CS + PS = 9 + 9 = 18

Taxes

Seller Tax – Producer pays the tax, per unit

Buyer Tax – Buyer pays the tax

Dead Weight Loss – Loss of CS and PS due to a tax

**10/21/2021**

Market Interventions

1. Tax on a market

Legal u. economic incident

1. Price Floors
2. Price Ceilings

Tax on Sellers

Qd = 16 – 2p : Qs = -4 + 2(p – T)

If T = 2: Qs = -4 + 2P – 2\*2 : Qs = -8 + 2p

CS = 1/2 (8-6) \* 4 = 4 < 9: 🡺 -5

PS = 1/2 (4-2)\*4 = 4 < 9 🡺 -5

Tax Revenue TR = Tax Rate \* Quantity sold = 2 \* 4 = 8 > 0

Welfare: Cs + Ps + Tr = 4 + 4 + 8 = 16 < 18 🡺 -2

Tax on buyers

Qd = 16 – 2(P + T): Qs = -4 + 2p

Qd if T = 2: Qd = 16 – 2p -4: Qd = 12 – 2p

CS = 1/2 (8-6)\*4 = 4 < 9 🡺 -5

PS = ½ (4 – 2) \* 4 = 4 < p 🡺 -5

TR = 4 \* 2 = 8

W = 4 + 4 + 8 = 16 < 18 🡺 -2

Elasticity Revenue and products to tax

Inelastic

1. Qv very little
2. Pconsumer ^ a great deal
3. Consumers pay most of the tax
4. TR is large

Elastic

1. Qv very large
2. Pconsumer ^ a little
3. Producers pay most of the tax
4. TR is small

**10/26/2021**

Price Floor

Minimum legal price

1. Only Relevant if it is above equilibrium
2. Enforced (Minimum Wage) or Guarantee (Subsidy)

Price Ceiling

Maximum legal price

1. Must be below equilibrium to be relevant
2. Enforced only

Rent Control over time

1. Rent Control over time = 0
2. Population: Rich, Old, Homeless

**10/28/21**

Market Power: ability to influence market prices

With market Power: Increase in Quantity reduces Price

Marginal Revenue, MR =

Π = TR – TC

Marginal π = MR – MC

Q is worth doing if MR – MC >= 0

E = = (Slope of demand) = current Quantality.

Qd = 12 – 2p

Q=2 🡺 p=5

TR = 5\*2 = 10

E = -2 \* 5/2 = -5 Elastic

Q=3 🡺 p = 4.5

TR = 4.5 \* 3 = 13.5

E = -2 \* 4.5/3 = -9/3 = -3

MR of Q = = = 3.5

**11/2/2021**

Monopoly: Single Seller, blocked entry

Industry demand = Firm Demand

Q = qi

Perfectly Competitive market operations

1. Assumptions
2. Many consumers
3. Many producers of homogenous good
4. Price taker
5. Increasing MC
6. No Increasing returns to Scale
7. Profit Maximizing 🡺 MR = MC
8. No barriers to entry/exit
9. Short Run
10. Long Run

Firm Behavior

P\* = 5

|  |  |  |
| --- | --- | --- |
| Q | TR | MR |
| 0 | 0 | ------ |
| 1 | 5 | 5 |
| 2 | 10 | 5 |
| 3 | 15 | 5 |

Shut down?

If qi = 0

Then p \* q – FC – AVC \* qi

Π = -FC

Qi > 0

Π = p \* q – FC – Avc \*qi >= -FC

P \* qi – AVC \*q >= 0

P > AVC

**11/9/2021**

Silk Route 130BC – 1455 AD

Exports 🡺 goods + services produced domestically, sold Foreign

Imports 🡺 good + services produced Foreign, sold domestically

ME: H20 + Barley

A: H2O + Hops

B: H2O + Yeast

C: H2O + Hops

D: H2O + Bottles

E: H2O + Bottles

F: H2O + Yeast

Product: Barley Pop 🡺 H2O + Barley + Hops + Yeast + Bottle

Cost Hops: A 🡺 1 Barley : 1Hops, C 🡺 2 Barley : 1 Hops

Cost Yeast: B 🡺 2 Barley: 1 Yeast, F 🡺 1 Barley : 1 Yeast

Cost Bottles: D 🡺 3 Barley: 1 bottle, E 🡺 2 Barley : 1 Bottle

Total Cost: 4 Barley (A F E)

IF E is in Mexico and we go with D: We now need 5 Barley

Cost of reducing solar panel imports with tariffs

Tariffs raise domestic price of solar panels 🡺 Qd V

Causes less installation and fewer jobs

**11/11/21**

Basic Trade

Who exports what + how much + term of Trade

Absolute Advantage v. Comparative Advantage

Simple (?!) Method

2 countries: Domestic + Foreign

2 goods: Food (F) + Clothing (C)

1 input : Labor (L)

|  |  |
| --- | --- |
| Domestic | Foreign |
| L = 20 | L = 20 |
| 1L = 6F | 1L = 1F |
| 1L = 2C | 1L = 1C |

Autarky: No Trade Across Countries

Absolute Advantage: Ability to produce a product with fewer inputs

Domestic: 1L = 6F: 1/6L = 1F 1L = 2C: 1/2L = 1C

Foreign: 1L = 1F 1L = 1C

Absolute Advantage F: Domestic 1/6 < 1

Absolute Advantage C: Domestic ½ < 1

US Exports: Crops, Heavy equ ipment, Entertainment, military hardware, Civilian Aircraft, Technology

Comparative Advantage: Ability to produce at lower opportunity cost

Domestic: 1L = 6F or 1L = 2C

1F = 2/6C = 1/3C cost of food

1C = 3F cost of cloth

Foreign: 1L = 1F or 1L = 1C

1F = 1C cost of food

1C =1F cost of cloth

Where is food Cheaper?

Domestic: 1/3 < 1

Where is cloth Cheaper?

Foreign: 1 < 3

Specialize in production of a good, export it, import another good, have a higher standard of living

Specialize in producing good texporting good that you have comparative advantage in

Suppose we start in Autarky

Domestic allocates L: 12 in Food, 8 in cloth

1L = 6F: 12 \* 6 = 72F

1L = 2C: 8 \* 2 = 16C

Foreign allocates L: 4 in Food, 6 in Cloth

1L = 1F: 1 \* 4 = 4F

1L = 1C: 1 \* 6 = 6C

Domestic should Increase food, export some food import cloth

Terms of Trade

Domestic 1F = 1/3C Foreign 1F = 1C

1F = 2/3C

3/2F > 1C

Trade volume 3F for 2C

Domestic increases F by 3 + export 3

Foreign increases C by 2 + export 2

Domestic 3F 🡺 72 + 3 = 75

1L – 75/6 = 12.5L in F

1. – 12.5 = 7.5L in C

1L = 2C: 7.5 \* 2 = 15C

Foreign: 2C 🡺 6+2 = 8C

1L = 1C = 8L in C

10 – 8 = 2L in F

1L = 1F: 2 \* 1 = 2F

Domestic

Autarky Consumption

72F 16C

Trade

Produce: 75F 15C

Trade: -3F +2C

Cons: 72F 17C

Foreign

Autarky Consumption

4F 6C

Trade

Produce: 2F 8C

Trade: +3F -2C

Consume: 5F 6C

Moving L between industries

From import competing to exporting industries

Trade Adjustment Assistance: T.A.A

**11/23/2021**

Negative Externalities

Point Source

Permits will decline annually at known pace

Must reduce SO2 production

1. P^ = Qf 🡺 SO2
2. Switch to “cleaner coal”
3. Invest in new; clean power plants
4. Research and Develop cleaner methods

If we clean up fast we can sell permits to those that don’t

Positive Externalities

Benefit received by someone not involved In a transaction

1944 India Independence, Singapore still British Colony

India per capita GDP > Singapore

1963 Singapore Independence

India per capita GDP > Singapore

Singapore PM = Lee Kwan Yu

Education is mandatory + publicly funded: Top quality

India – great PHD; poor elementary

Singapore – Great elementary; import PHD

**11/30/2021**

Inefficient use of Resources + externalities

Rivalry

Exclusion

|  |  |  |  |
| --- | --- | --- | --- |
|  |  | Rival |  |
|  |  | yes | no |
| Exclusion | yes | Pure Private | Semi-Property |
|  | no | Common Property | Pure Public |

Tragedy of the commons: Related with Common Property

Pure Public Goods: Parks, GPS

ELK Pop in 1995 = 17000; 2015 = 4500

Roads can be Common Property or a Pure public

Electronic Road Pricing, ERP

**12/7/21**

Public Goods

Non-Rival

Non-Exclusive 🡺 π <= 0

Street Lights 🡺 Crime Reduction

Common Property

Rival

Non-Exclusive 🡺 Inefficient; Excessive use of resources

Lack of property Rights

Coase Theorem: If transactions costs are small and property rights are given bargaining will result in efficient use of resources

2 Types of firms

1. Hunting and Fishing HF
2. Mining M
3. Clean
4. Dirty

ΠHF = 8 with dirty mining; 14 with clean mining

ΠM = 16 with dirty mining; 12 with clean mining

ΠClean = 14 + 12 = 26

ΠDirty = 8 + 16 = 24

1. H+F Owns 🡺 requires Clean

ΠHF = 14; ΠM = 12

1. M owns 🡺 dirty

ΠM = 16, ΠM = 8

HF offer M $4 to be clean 🡺

ΠM = 12 + 4 = 16; ΠHF = 14 – 4 = 10

Low Transaction costs are required for Coase’s Theorem to work

Asymmetric Information: One party to a transaction has valuable information about the transaction and the other party(ies) does not

1. Moral Hazard: Behavior changes as a result of and after a transaction

Insurance, Seatbelts

1. Adverse Selection: the least desirable party to a transaction is the most likely to be the part of a transaction

Health Insurance

Expected Value – Pi = Probablity of event i

Sum of all Pi = 1

3 people: Income = 20000 each

Cost of Hospitalization = 80000

Pr(Hosp) = 0.1 for each

Every person same chance to go to hospital: (1 - .1) \* 20,000 + (0.1)(20000 - 80000) = 12000

Suppose Insurance becomes available: “Fair” premium – total collected =

Expected costs Pr(Hosp) = .3

EC = .3 \* 80000 = 24000

Premium = 24000/3 = 8000

Insured

20000 – 8000 = 12000 w/ certainty

Risk Adverse 🡺 Buy insurance

Suppose A: PR(Hosp) = 0.05

B: PR(Hosp) = .1

C: PR(Hosp) = .15

EVA = (1 - .05) \* 20000 + (0.5)(-60000) = 16000

EVB: Same as above

EVC: (1 - .15) \* 20000 + (.15)(-60000) = 8000

PR(Hosp) = .3; Expected Cost = 24000; Premium = 8000

A: Insured = 12000: Uninsured = 16000; Wont Buy Insurance

B: Insured = 12000: Uninsured = 12000; Buy

C: Insured = 12000: Uninsured = 8000; buy

**12/9/2021**

Buyer

Akerlof on car safety

Adverse selection – why are used car lemons?

Who knows? Seller or Buyer?

VGood = $20000; VLemon = $5000

Pr(good) = 0.3

Ev = 0.3 \* 20000 + 0.7 \* 5000 = 9500

Seller

Cost good 13000

Cost Lemon = 2000

πGood = 20000 – 13000 = 7000

πGood = 5000 – 2000 = 3000

Customers pay 95000 max < cost of good car

No π on good cares 🡺 Sell only lemons

9500 – 2000 = 7500

Fixing Problen: Car dealers give guarantee