Lecture 1 - Introduction

Fundamentals of Microeconomics Prof. Prakarsh Singh (1215) prakarsh.singh@plaksha.edu.in Prof. Kriti Khanna (1203) kriti.khanna@plaksha.edu.in © Prakarsh Singh Personal Background • Chandigarh -> London -> Massachusetts -> Seattle -> Chandigarh • Chess, Table Tennis • Father of a curious 7.5 years old • Just returned from a trip to Kerala's Periyar Wildlife Reserve © Prakarsh Singh © Prakarsh Singh Learning Outcomes • Models – Graphs, Math – sharp predictions – tested in Problem Sets • Theory and definitions – tested in MCQ Quizzes • Real World Applications – tested in Team assignments • Lectures will discuss examples of when models are good approximations of reality, and when critical assumptions of a model fail. • We will also learn about economists who came up with the models in microeconomics. Encourage you to read widely apart from the core textbook. © Prakarsh Singh • Organization: 2 x lectures / week; tutorial sessions with Teaching Fellows - Problem Sets discussion every week starting in week 3. • Submission of assignments / Participation / Mid-term end of week 8 • Team Project check in during week 9 • Policy on Plagiarism. Problem set gets marked 0 if copied blindly from a classmate. You may be asked to explain your answer to the TA. • Policy on Questions during lectures / during the week. Ask questions. © Prakarsh Singh Tutorials • We will divide ~150 students into groups of 50 for each Teaching Assistant (TA). • Further organize each TA group into subsections of 25 students each. • The initial portion of the tutorial will focus on practicing applicationtype questions. • The latter half will involve discussions on concepts, exploration of case studies, and addressing any doubts you may have. © Prakarsh Singh Outline for first half of the course (also available on LMS) © Prakarsh Singh © Prakarsh Singh Evaluation • Problem sets • In-class quizzes (with a longer in-class quiz after 3 weeks of classes) • Mid-semester test • Final semester exam • Team presentations © Prakarsh Singh Class Etiquette • Arrive punctually for class and participate in the in-class quiz at the start of every class. • If you wish to add to the discussion or ask questions, raise your hand. • You may also keep note of your questions, and then later fill out an online form with your questions. This form will be shared with you after class by the Teaching Fellows. • I will try to respond to all your questions in the online form in the next 2 working days. © Prakarsh Singh • Policy on Attendance and Laptops/Mobiles. You are all adults • No laptops and mobiles allowed during lectures. • You will be escorted out of the classroom if caught using your phone (other than taking in class quizzes) or laptops. • You will take an MCQ quiz on your phone in the first 5 minutes of the class. If you're late for the quiz, you will automatically get a 0. • MCQ quiz will cover topics that have been covered but those that are about to be covered in that week's lectures. MCQs start next week on Tue. © Prakarsh Singh © Prakarsh Singh Economics… • …is the study of how people make choices under conditions of scarcity • Scarcity $\equiv$ wants > what can be produced with available resources • Scarcity $\Rightarrow$ people face tradeoffs when they make choices (Principle #1). To get something, we usually have to give up something else. • Clean environment vs Development? © Prakarsh Singh © Prakarsh Singh • Guns v. butter, more production geared towards military use and less consumption goods • "The efforts of men are utilized in two different ways: They are directed to the production or transformation of economic goods, or else to the appropriation of goods produced by others." – Vilfredo Pareto © Prakarsh Singh Principle #2: Cost of Something Is What You Give Up to Get It. • Opportunity Cost next best alternative • Explicit cost + Implicit cost • Ex –go to movies or work • Movie costs $10 and wages = $8. • OC of movie = explicit cost (10) + implicit cost (8) = 18 • Ex. OC of coming to class – implicit cost is having fun. Is there an explicit cost? What about the cost of tuition? No! you can't come to class without paying tuition, but it's still not an opportunity cost. • explicit costs need not be OC's. © Prakarsh Singh • Opportunity Cost of Free Pizza? • Opportunity Cost of Teaching at a University (for a Professor)? • Opportunity Cost of Studying for an undergraduate degree? • Opportunity Cost of going to work in the office? © Prakarsh Singh © Prakarsh Singh • When you make a choice, you compare the benefits with the OC. • Example. Law school decision: • Why is it hard to get into law school during recessions? • OC of law school = tuition + wall street salary • Now, there is no wall street salary so OC of law school small during recessions so everyone wants to go (benefit exceeds cost). © Prakarsh Singh • Example - You won a free ticket to an AR Rahman concert (which has no resale value). • Arijit Singh is performing on the same night and is your next best alternative. • Arijit's Ticket cost $40. • willing to pay up to $50 to see Arijit. • What is the OC of seeing AR Rahman? • = (0 explicit cost) + (implicit cost = 50-40) =10. • Even though you value the Arijit's ticket at 50, you're not getting it for free so the $40 for Arijit reduces the appeal of Rahman concert. • Suppose we go to Rahman concert. • How much do we value it? > 10 © Prakarsh Singh Sunk cost fallacy • Imagine that you bought a concert ticket a few weeks ago for $50. On the day of the concert, you feel sick, and it's raining outside. You know that traffic will be worse because of the rain and that you risk getting sicker by going to the concert. • Although it seems that the current drawbacks outweigh the

benefits, why are you still likely to choose to go to the concert? • Concorde effect, Boring movies Source: The Decision Lab. © Prakarsh Singh

Lecture 2 - Efficiency and PPF

© Prakarsh Singh A Second Key Concept: Efficiency • Easier to define in terms of its absence: • If it's possible to do things differently and get more, then the situation is inefficient. • Inefficiencies are rare, but if you can find it, it's great because eliminating it means you can get something without having to give up something else (don't face tradeoff) • We will see some examples in a bit © Prakarsh Singh Scarcity and Efficiency ♣ How should we make choices in a world of scarcity to arrive at an efficient outcome? ♣ First look at individuals ♣ Mankiw's Principle # 3 – Rational People think at the margin because it produces an efficient outcome • Keep repeating the question: if I do things a little differently, can I arrive at a better outcome? • We'll be talking about marginal thinking throughout the course. "Marginal" most common word in econ. • Consumers – utility maximizing decision • Firms – profit maximizing decision © Prakarsh Singh The Production Possibilities Frontier (PPF) • Let's look at a model that illustrates these issues: OC, scarcity, inefficiency, and also economic growth. • The first question we should ask is what is feasible/ how much can be produced? • Suppose a society has 1000 identical workers each of whom could make either 1 car or 3 computers. • Society can produce either 3000 computers with 0 cars, 1000 cars with 0 computers, or something in between. • Production Possibilities Frontier (PPF) shows the combinations of output that the economy can possibly produce given the available factors of production and the available production technology. © Prakarsh Singh Figure 2 The PPF Copyright©2003 Southwestern/Thomson Learning 0 QCars 3,000 1,000 QComputers 1) Why is slope negative? To get more CARS (X) you must switch resources away from producing COMPUTERS (Y)? To produce 1 more car X, you must produce 3 less computers Y. What concept does this illustrate? OC of 1 more X=|slope|=3 computers 2) Scarcity – points outside the curve not feasible. A 3) Point A inefficient. How could we end up at point A? Not using all of our resources (unemployment, no property rights) B 4) Point B Efficient - impossible to produce more of one good without producing less of another. 1 3 © Prakarsh Singh A More Realistic PPF • Resources are Heterogeneous • Some workers are (relatively) good at making computers. • Some workers are (relatively) good at making cars. • Assume endpoints are the same - maximum is still 3000 computers or 1000 cars. • Would the rest of the PPF look the same? • At 0 cars which worker do you shift to make more cars? • Car worker • Is OC of extra car big or small? Small • At 950 cars which workers do you HAVE TO USE to make more cars? • Computer workers • is OC of extra car big or small? Big. © Prakarsh Singh Figure 2 The PPF Copyright©2003 Southwestern/Thomson Learning QCars 0 3,000 1,000 QComputers So why is OC (slope) changing? Because of heterogeneous resources 1 car 1 car "best" means relatively best. Worker A can make 4 computers, 2 cars Worker B can make 1 computer, 1 car Who should make the first car? B – lose 1 computer as opposed to 2 computers B is worse at making cars but relatively better. © Prakarsh Singh Copyright©2003 Southwestern/Thomson Learning PPF 0 3,000 1,000 Stupid's PPF A QCars QComputers Inefficiency can also occur because of misallocation of workers. You can get a PPF that is bowed in because the first people who produce cars are the ones who are relatively better at making computers. © Prakarsh Singh What can shift the PPF? Copyright © 2004 South-Western 0 4,000 3,000 1,000 What caused this shift? improved technology in the computer industry. We know it's not more workers because then you could produce more cars you can produce more computers and cars since you don't have to devote as many resources to computers. Illustrates economic growth QComputers QCars © Prakarsh Singh • Principle #4: People respond to incentives! Congestion charge; Bonuses to Child care workers; Compensation • The Most Important Lesson of Ec11! • Principle #6: Markets Are Usually a Good Way to Organize Economic Activity. • Usually deliver an efficient outcome © Prakarsh Singh BUT: Sometimes Markets Fail! - Fail to deliver efficiency • Causes of Market Failure: • externality: the impact of one person's actions on the wellbeing of a bystander. Market overproduces pollution, but underproduces education. • market doesn't provide public goods (non-rival and nonexcludable). • Example - National defense, public radio, basic research. • market power: the ability of a single economic actor (or small group) to influence prices (monopoly). • Principle #7: Governments Can Sometimes Improve Market Outcomes. • In terms of efficiency - when market outcome not efficient © Prakarsh Singh Excludable Non-excludable Rivalrous Private goods food, clothing, cars, personal electronics Common goods fish stocks, timber, coal Non-rivalrous Club goods cinemas, private parks, satellite television Public goods free-to-air television, air, national defence © Prakarsh Singh

Lecture 3 - Market Demand

© Prakarsh Singh Group Assignments • Each team of 5 members will give a 4 min presentation. • The focus of these presentations will be on real-world applications that illustrate the concepts learned in class. • The 5 criteria (each out of 10) that you will be graded on are: Originality – e.g. not a link already shared with class. Relevance to lectures – e.g. is the application relevant to concepts covered in class. Clarity of presentation – e.g. definition of concept, example. Responses to Q&A – e.g. testing the team over email on how deeply they thought about the application. Time Constraint – not exceeding 4 min. Market Supply and Demand Figure 8 The Equilibrium of Supply and Demand Copyright©2003 Southwestern/Thomson Learning P 0 1 2 3 4 5 6 7 8 9 10 11 12 Q 13 Equilibrium quantity Equilibrium price Equilibrium S D $2.00 © Prakarsh Singh • Start the model of D & S which is the foundation for much of what we'll do in the course. • They determine the price and quantity sold of each good. • Start with D & S for goods, but later loanable funds (price is the interest rate). Since there are so many applications, this model is one of the most powerful tools you can learn to understand how the world works. • The terms D & S refer to the behavior of people as they interact with one another in markets. • A market is a group of buyers and sellers of a particular good or service. • Buyers determine demand. • Sellers determine supply THE MARKET FORCES OF SUPPLY AND DEMAND © Prakarsh Singh What does "price taking" mean? • Consumers are price takers: • If you buy 1 Whopper at Burger King the price is $1.99. What would the price be if you decide to buy 3 Whoppers? • Sellers are price takers: • A farmer is deciding whether to plant 20 or 25 acres in corn. How will her decision affect the price of corn? It won't. • Make sure when you use the model of D&S that you do not violate price taking. Don't ever worry about how an individual buyer or sellers will affect the price. • Paradox: What is true for one is not true for all? Consumers combined (demand) do influence price. © Prakarsh Singh Perfectly Competitive Markets - Assumptions 1. Can represent market for a good or a service that has a large number of sellers and buyers 2. Buyers and sellers are well informed about Price (Perfect Information) 3. Quality of the product remains the same regardless of the price. 4. Buyers and sellers are price takers. 5. Free entry and exit of sellers. © Prakarsh Singh Results 1. Price reflects the value at which the good or service is traded. 2. If a price is kept higher than equilibrium, the market forces make it move towards equilibrium. 3. If a price is kept lower than equilibrium, the market forces make it move towards equilibrium. 4. This price maximizes utilitarian efficiency for consumers and producers. This means there is no other price at which benefit for (Consumers + Producers) together is highest. 5. This price can create winners and losers for both consumers and producers. 6. High cost producers (e.g. inefficient) are left out of the market. 7. Those consumers unwilling to pay the price (e.g. poorer) are left out of the market. © Prakarsh Singh Figure 9 Markets Not in Equilibrium Copyright©2003 Southwestern/Thomson Learning P 0 S D (a) Excess Supply QD QS Surplus 4 Q $2.50 10 2.00 7 © Prakarsh Singh Dis-Equilibrium • Temporary surplus/excess supply • if for some reason P>P*, QS>QD • While the surplus exists, Q is given by QD . Can't force people to buy. • P↓ to eliminate the excess supply. • Firms see that they have goods that they can't sell so they lower price. In the experiment, if you charged a high price, you might not have been able to sell so you lowered the price. • As P↓, QD↑, QS↓. © Prakarsh Singh Figure 9 Markets Not in Equilibrium Copyright©2003 Southwestern/Thomson Learning P 0 Q S D (b) Excess Demand QS QD 1.50 10 $2.00 4 7 Shortage © Prakarsh Singh Dis-Equilibrium • Temporary Shortage/excess demand • When P QS . • While the shortage exists, Q given by QS . Can't force firms to sell. • P↑ to eliminate the shortage. • Sellers see they can raise their prices without losing sales. • As P↑, QD↓, QS↑. • Dis-equilibrium is temporary, unless I tell you that P can't adjust (next week, price floors and price ceilings) • Focus our attention on P* and Q*. © Prakarsh Singh Market for PC's in the 1980's Copyright©2003 Southwestern/Thomson Learning P 0 Q 82 84 86 88 © Prakarsh Singh • Between 1982 and 1988 the Q of PCs produced annually nearly tripled; the P nearly doubled. • The price and quantity did not increase in a steady manner, however. • How can we explain the erratic behavior of P and Q? • The model of D & S will help us explain what happened. This is an economist's most valuable tool for understanding how markets work. • Other examples – if you don't care about the price of computers in the 1980's, how about the price of home heating oil in the winter for poor families AND what can be done about it (reduce demand for foreign oil), wage after graduation… © Prakarsh Singh Examples of Perfect Competition • Agricultural Markets • How many prices of corn are there? • Can a farmer or consumer affect the price of corn? • Financial Markets • How many prices are there for a share of Google stock at a moment in time? • Can a buyer or seller affect the price of Google? © Prakarsh Singh • Monopoly • One seller (e.g., Debeers Diamonds) • price "maker" not a price taker. • Oligopoly • Few sellers (e.g., Steel Companies) • We begin by studying perfectly competitive markets since they're the easiest to analyze and there is some degree of competition in most markets, so that the model of D&S still makes useful predictions, even

though most markets don't satisfy the assumption. • Much of what we learn will apply to other types of markets. Competition: Other Than Perfect © Prakarsh Singh DEMAND • Let's being our study of markets by looking at the behavior of buyers. • Quantity demanded (QD) is amount of a good that buyers are willing and able to purchase at a given price. Remember auction P QD $0 12 $0.50 10 $1 8 $1.50 6 … • Hypothetical: "What would QD be at a given price?" • An individual's demand curve plots the relationship between P and individual QD . DRAW. • * Price on vertical axis even though it's the independent variable. Alfred Marshall got it wrong a long time ago but it has stuck. © Prakarsh Singh Market Demand versus Individual Demand • to analyze how markets work, we need to look at market demand, which is the sum of all the individual demands for a particular good or service. • Graphically, individual demand curves are summed horizontally to obtain the market demand curve: • What is the total QD at a given P? © Prakarsh Singh Jim's + Mary's =? P $6 $4 10 20 Q + P $6 $4 5 10 Q P $6 $4 15 30 Q = Market Demand D © Prakarsh Singh The (Market) Demand Curve • Market Demand curve - Relationship between P and Market QD - plots the behavior of buyers and how much they wish to purchase at different prices. • Slope: (-) – as P↑, QD↓ (i) you substitute towards other goods (ii) can't afford to buy as much of that good so QD↓ What does an increase in the price of a good have to do with OC? OC of that good has risen since you could buy more other goods with the money it now costs to buy this good. That's the implicit part. 2nd, the explicit cost has increased as well so OC goes up for that reason. • "Other Things" affect Demand: income, prices of other goods, tastes, number of buyers (affects the sum), (expectations? NO) © Prakarsh Singh Important to distinguish between: Shifts in the Demand Curve vs. Movements along a stationary curve: •If QD changes because of a change in P, this is a movement along a demand curve. •If QD changes for a given price (due to a change in one of the "Other Things"), this is a shift in the demand curve • "demand has changed" © Prakarsh Singh Shifts: • Consumer Income • as income↑, demand for a normal good ↑ • Curve shifts right. DRAW. • as income↑, demand for an inferior good ↓ • Inferior goods? Bus rides, potatoes. Most goods are normal goods, although on an exam you will have to say you're assuming the good is normal when you shift the curve the way you do. © Prakarsh Singh • Prices of Related Goods • PA↓, Demand for B↑ the two goods are complements • (e.g., bread and jam) • PA↓, Demand for B↓ the two goods are substitutes • (e.g., butter and ghee) • Most goods are substitutes, but again, state your assumption. © Prakarsh Singh Supply • Quantity supplied (QS) is the amount of a good that sellers are willing to sell at a given price (hypothetical). P QS $0 0 $0.50 0 $1 1 $1.50 2 • DRAW Supply Curve: The Relationship between P and QS • As P↑, it becomes more profitable to produce more units so QS↑ • What can we say about the cost of producing the first ice cream cone? > $.50 since he doesn't supply any at P=$.50 and < $1 (since he's willing to produce at P=$1. If cost>1, he wouldn't sell at P=$1) [cost of producing the second cone in between 1 and 1.50] © Prakarsh Singh Market Supply versus Individual Supply • Market supply refers to the sum of all individual supplies for all sellers of a particular good or service. • Graphically, individual supply curves are summed horizontally to obtain the market supply curve. • At a given P, what will be the total QS ? © Prakarsh Singh

Lecture 4 - Market Supply and Elasticity

© Prakarsh Singh (Market) Supply Curve • Market supply curve - Relationship between P and Market QS - plots the behavior of sellers and how much they wish to sell at different prices. • Slope: (+) – as P↑, QS↑ because as P rises because sellers increase, and sellers can increase profits by selling more. • Other Things: Input prices, technology, weather, number of sellers (expectations? NO) © Prakarsh Singh Shifts in the Supply Curve vs. Movements along a stationary curve: •If QS changes because of a change in P, this is a movement along the supply curve •If QS changes for a given P (due to a change in one of the "Other Things"), this is a shift in the supply curve • "Supply has changed" © Prakarsh Singh Examples • Merrill Streep says pesticides in apples © Prakarsh Singh • demand shifts left due to change in tastes © Prakarsh Singh • When a war breaks out in middle east, Poil↑ • what happens to price of gasoline? © Prakarsh Singh • supply shifts ← so price rises (cost of input ↑) • What happens to the demand for petrol-based cars? © Prakarsh Singh • Price of complement (gas) ↑ so demand shifts ← • What happens to market for EV vehicles? © Prakarsh Singh • demand shifts → price of substitute ↑ © Prakarsh Singh Example rves • Consider the ice cream market. A spell of hot weather hits but Psugar↑. What happens to P*, Q*? © Prakarsh Singh • Demand shifts right but supply shifts left so P↑ but Q ambiguous. © Prakarsh Singh Example: • Old cars pollute more than new cars. • New law requires that expensive emissions control devices be placed on new cars. • Why might this law actually lower air quality in the short run? • Supply of new cars shifts left because cost of making them has increased

so price of new cars increases • Old cars and news cars are substitutes so demand for old cars shifts right so Q of old cars increases. • Law of Unintended Consequences – also seatbelt example. © Prakarsh Singh Example • Pbutter↑ Qbutter↑ Qbread↑ • Cause? Pflour↓ or Pmilk↓ ? © Prakarsh Singh • Pflour↓, since flour is an ingredient in bread, the supply curve for bread would shift to the right. The result would be a fall in the price of bread and a rise in the quantity of bread. • Since butter is a complement to bread, the fall in the price of bread increases the demand for butter. The result is a rise in both the equilibrium price and quantity of butter. WORKS • Pmilk↓ Since milk is an ingredient in butter, the fall in the price of milk leads to an increase in the supply of butter. This leads to a decrease in the price of butter, rather than a rise in the price of butter. DOESN'T WORK. © Prakarsh Singh • Demand: Income, prices of other goods, tastes, number of buyers • Supply: Input prices, technology, weather, number of sellers Reminder – Office hours are from Wednesday from 1 pm to 2 pm for any questions. © Prakarsh Singh Example • Prior to Iraq's invasion of Kuwait on August 2, 1990, approximately 60 million barrels of crude oil were produced in the world per day. The price of crude oil was $15 per barrel. Kuwait and Iraq produced 4 of the 60 million barrels. The Security Council of the United Nations responded to the invasion by passing a resolution requiring nations to boycott Iraqi oil. The Security Council's action succeeded: no Iraqi or Kuwaiti oil reached world markets. • Can we be even more specific about the price and quantity? Does the price of oil rise by a lot or a little? Does Q fall by a lot or a little? © Prakarsh Singh Diagram © Prakarsh Singh Elasticity • Add precision to the model of D & S. • Introduce the concept of elasticity, which is a measure of responsive buyers and sellers are to changes in prices. • Elasticity is related to slope, but is not quite the same as slope. • As opposed to slope, changes are measured as percentage changes © Prakarsh Singh Elasticity of DEMAND • Price elasticity of demand is a measure of how much QD responds to a change in the price of that good. • E_D refers to a movement along a demand curve!! So far, this only occurs when supply changes. • always < 0 so need absolute value % % D D Q E P $\Delta \equiv \Delta$ The Variety of Demand • Inelastic Demand • QD does not respond strongly to price changes. • Elastic Demand • QD responds strongly to changes in price. % % implies 1 D D $\Delta < \Delta < Q P E$ % % implies 1 D D $\Delta > \Delta > Q P E$ © Prakarsh Singh There is a relationship which you can sometimes use to infer elasticity from slope 0 D P D' Q $E_D = |(\Delta Q/Q) / (\Delta P/P)| = | (P/Q) / (\Delta P / \Delta Q) | = | (P/Q) / slope |$ At a common point, the demand curve with the flatter slope is the more elastic Interesting Cases of ED • Perfectly Inelastic • QD does not respond to price changes. • Perfectly Elastic • QD changes infinitely with any change in price. • Unit Elastic • QD changes by the same percentage as the price. $0 D E = D E \rightarrow \infty 1 D E =$ © Prakarsh Singh Determinants of ED • Availability of Close Substitutes • Necessities versus Luxuries • Narrowness of the market • If market is defined to be broader, there are more substitutes available. • Time Horizon – how does it affect ED? • E_D increases over time because there's more time to find substitutes. © Prakarsh Singh © Prakarsh Singh © Prakarsh Singh The investigation raised fears that Amazon would have been able to "delist or not list rival robot vacuum cleaners," reduce their visibility on its marketplace, limit access to "commercially attractive product labels" like Amazon's Choice, or make it costlier for iRobot's rivals to advertise and sell their products, she said in a statement. It would have been "economically profitable" for Amazon to shut out rivals, limiting competition and leading to higher prices, lower quality and less innovation, she said. I understand slope; why do we need elasticities? – look at demand for milk D P $6 $4 1 2 Gallons slope = +2/-1= -2 4 8 Qts No, it's not +2/-4 = -.5 D © Prakarsh Singh Elasticities are Unit Free! • At $4 per gallon, a 50% increase in P (from 4 to 6) will reduce QD by 50% • At $4 a quart, a 50% increase in P will decrease QD by 50% • Whether we measure milk in gallons or quarts, we can agree that demand is unitary elastic (ED=1) in this range of the demand curve • Slope changes when you use different units of measurement but % changes don't. • Elasticity is units free which is the primary reason we use it. © Prakarsh Singh Total Revenue and ED • Elasticity is also important because it tells us what happens to TR as we move along a demand curve • Total revenue is the amount paid by buyers and received by sellers of a good. • TR = P • Q Area (draw) • What happens to TR as we move along a demand curve? • Percentage change rule: The percentage change of a product of two numbers is approximately equal to the percentage change in each factor. • %ΔTR = %Δ(P • Q) $\approx$ %ΔP + %ΔQ • As you move up along a demand curve, %ΔP > 0 and %ΔQ < 0 so %ΔTR ??? • EXAMPLE - As P goes from $4 to $5, Q goes from 100 to 90, TR increases from $400 to $450, %$\Delta$TR > 0. Figure 2 Total Revenue Copyright©2003 Southwestern/Thomson Learning D Q Q P 0 P P × Q = $400 (revenue) $4 100 $5 90 TR=450 TR=400 %$\Delta$TR > 0 © Prakarsh Singh %ΔTR = %ΔP + %ΔQ > 0 (>>0) (percentage decrease in Q: $\Rightarrow$ Demand is inelastic E_D = |%ΔQD / %ΔP| < 1 P↑: demand inelastic $\leftrightarrow$ TR↑. © Prakarsh Singh Copyright©2003 Southwestern/Thomson Learning 2. . . . leads to no change in TR Q 4 0 100 P $5 80 1. An increase in price . . . D P↑: E_D = 1 $\Leftrightarrow$ TR unchanged. QD*P = constant. Same TR everywhere. %ΔTR = %ΔP + %ΔQ = 0 (>0) (< $400). %$\Delta$TR = %$\Delta$P + %$\Delta$Q < 0 (>0) (< $250). %$\Delta$TR = %$\Delta$P + %$\Delta$Q > 0 (>0) The fall in P is a smaller percent than the rise in Q P↓: demand elastic $\Leftrightarrow$ TR© Prakarsh

Singh ↑ We want you to be able to: 1. Identify whether a change in P and Q results from a movement along a stationary demand curve. 2. If yes: a) Be able to infer from the change in TR, whether demand is elastic, unit elastic or inelastic. OR b) Be able infer the change in TR if we tell you whether demand is elastic, unit elastic or inelastic. © Prakarsh Singh 0 D P Q $3.5 7 Elastic Region: P↓, TR↑ Inelastic Region: P↑, TR↑ E D=1. TR maximized 14 Constant Slope BUT elasticity ranges from elastic (infinity) to inelastic (0) © Prakarsh Singh

Lecture 5 - Elasticity and Price Controls

0 D P Q $3.5 7 Elastic Region: P↓, TR↑ Inelastic Region: P↑, TR↑ E D=1. TR maximized 14 Constant Slope BUT elasticity ranges from elastic (infinity) to inelastic (0) © Prakarsh Singh • Why is the upper region elastic? What's going on? • E D = |%ΔQ / %ΔP|: to the left, %ΔQ BIG and %ΔP SMALL, elastic • But there's no real intuition for this. It's an artifact of using linear demand curves. • So when we use linear demand curves and claim that it is inelastic because the slope is steep, we can only say that if we're to the right of the midpoint. • When is elasticity constant along a linear demand curve? • Horizontal demand - Slope and elasticity are constant throughout (but slope=0 while E D=∞) • Vertical demand - Slope and elasticity are constant throughout (but slope =∞ while ED=0) © Prakarsh Singh 2. The point that is unit elastic maximizes TR. Why? • AND Ed = |%ΔQd/ %ΔP| • If Ed > 1 (to the left of the midpoint since the slope is the same but P/Q is bigger), lowering price increase TR since %ΔQ > |%ΔP| so TR goes up in net. • If Ed < 1 (to the right of the midpoint since the slope is the same but P/Q is smaller), raising price increases TR since |%ΔQ| < %ΔP % % % Δ = Δ + Δ TR P Q© Prakarsh Singh Ex. 2 0 D P D' Q Is D more elastic than D'? **parts of purple line more elastic than parts of blue line even though purple line is steeper. elastic point inelastic point © Prakarsh Singh Ex. 3 - constant elasticity and slope ranges from -∞ to 0 D Q 0 P Economists prefer constant elasticity demand curves. © Prakarsh Singh There is a relationship which you can sometimes use to infer elasticity from slope 0 D P D' Q E D = |(ΔQ/Q) / (ΔP/P) | = | (P/Q) / (ΔP / ΔQ) | = | (P/Q) / slope | At a common point, the demand curve with the flatter slope is the more elastic © Prakarsh Singh Income Elasticity of Demand • IED = %ΔD / %ΔI • measures how much demand (horizontal shift) responds to a change in consumers' income. • But it's for a given price so we're still looking at a shift in the demand curve. Same with CPE. • IED > 0 (normal good), 0). What determines if IED big or small? • Necessities - income inelastic: IED small. • Fall in income doesn't lead to much change in D. • food, fuel, clothing, utilities, and medical services. • Luxuries - income elastic. IED big • sports cars, furs, and expensive foods. © Prakarsh Singh Cross price elasticity of demand • CPED = %ΔDA / %ΔPB • measures the responsiveness of the demand (shift) for one good to a change in price of another. • What is the sign? • Substitutes: CPED > 0 • Complements: CPED < 0 © Prakarsh Singh Price Elasticity of Supply • E S = %ΔQS / %ΔP • measure of how much QS responds to a change in P (so it's the responsiveness of QS along a stationary supply curve). • When do we move along a supply curve? So far, this only occurs when demand changes. • Ex. demand shifts right. • Why no absolute value? Supply upward sloping anyway so ES > 0. • What happens to TR? • Don't need to know Es to infer the change in TR as we move along supply curve © Prakarsh Singh Determinants of ES • Ability of sellers to change the amount of good they produce. • Beach-front land is inelastic, but not perfectly. • Books, cars, or manufactured goods are elastic. • Time period. • Supply is more elastic in LR. One reason is entry and exit. © Prakarsh Singh Price ceilings and Price floors • Examples of Price ceilings • Examples of Price floors Price ceilings and Price floors • Examples of Price ceilings – tickets at Cricket matches (e.g. if the max retail selling price of tickets is Rs. 10,000); vaccination price (e.g. if the max selling price of Covishield is Rs. 250); maximum rental that a landlord can charge • Examples of Price floors – minimum wages in India (Rs. 178/day), US ($7.25/hour), minimum support price for wheat in India (Rs. 2275 per Quintal), rice (Rs. 2183 per Quintal), cotton (Rs. 6620 per Quintal). © Prakarsh Singh Interfering with Market Outcomes • Principle 6 – Market outcomes are efficient if the market is perfectly competitive and no externalities. 1. people who value the good the most buy it 2. firms who can supply at lowest OC supply it 3. At Q*, MV=MC so CS+PS maximized. • As we'll see, Price controls: 1. does not hold for price ceilings (non-price rationing among consumers) 2. does not hold for price floors (non-price rationing among suppliers) 3. does not hold for both price ceilings and floors • 1 and 2 still hold with taxes and subsidies. • Price controls - legal max or min on price - usually enacted when policymakers believe the market price is unfair to buyers or sellers. Price Ceiling affects Welfare – NOT IN MANKIW but should be (Mankiw does price controls before efficiency, 6 before 7) Copyright © 2004 South-Western A F B D C E 0 Q P D S QCeiling PCeiling P * Q* Draw shortage first – determined by both ES and ED Q=Qceiling not an equilibrium: QD≠QS Shortage QD PS0 = CS0 = PS1 = CS1 = Price Ceiling affects Welfare – NOT IN MANKIW but should

be (Mankiw does price controls before efficiency, 6 before 7) Copyright © 2004 South-Western A F B D C E 0 Q P D S QCeiling PCeiling P * Q* Draw shortage first – determined by both ES and ED Q=Qceiling not an equilibrium: QD≠QS Fall in Q determined by ES -New way to get movement along supply curve Shortage QD PS0 = F+D+E CS0 = A+B+C PS1 = F CS1 = A+B+D (best case scenario) Welfare Analysis of Price Ceiling (Best Case Scenario) • Producers – worse off • lose E (reduction in Q), lose D (transfer to consumers) • Do producers with least cost sell the good? YES • Consumers: are they better off? ambiguous • Lose C (reduction in Q), gain D (transfer from producers) • net effect depends on ED vs. ES . • If demand elastic (those out of market didn't value it that much anyway), loss C small and gain D not affected. • If supply elastic, loss to consumers C big (since QS goes down a lot so lots of consumers out of the market) and gain D small. • If supply perfectly inelastic, loss to consumers C=0 • So the more elastic demand vs. supply, the better off are consumers. • Do consumers who value the good the most get it? NO. • Without rationing by price (in which those who value the good the most get it), there could be rationing by other means such as discrimination. • Therefore CS=A+B+D only in best case scenario. That's why Mankiw doesn't do this.

Lecture 6 - Price Controls and Efficiency

Welfare Economics • Welfare economics addresses half of the question: what makes a good society? It focuses on efficiency. • efficiency – is the happiness of society maximized? • Or is it possible to rearrange to increase happiness. • equity – is happiness fairly distributed? more based on value judgments. © Prakarsh Singh How P↓ affects CS Copyright©2003 Southwestern/Thomson Learning Initial CS Q P 0 D P1 Q1 P2 Q2 CS to new consumers Additional CS to initial consumers Notice: change in P does not affect MV of each unit consumed. © Prakarsh Singh How P↑ affects PS Copyright©2003 Southwestern/Thomson Learning Q Notice: P does not affect O.C. of producing good P 0 P1 S A Initial PS Q1 P2 Q2 PS to new producers Additional PS to initial producers © Prakarsh Singh Principle #6-Markets are usually a good way to organize economic activity • We've seen what CS and PS are in the market outcome. But is CS+PS as large as possible? • We'll show that……. 1. In free markets, goods are allocated to buyers who value them most highly, as measured by their willingness to pay. • They get most CS for a given price. 2. In free markets, goods are produced by firms who can produce them at lowest cost. • They get the most PS for a given price. 3. (In addition) we can show that Free markets produce the quantity of goods that maximizes CS+PS • This is an amazing result that without intervention, markets work themselves out in places like the U.S., western Europe, Japan. © Prakarsh Singh More detail on why CS+PS maximized Copyright©2003 Southwestern/Thomson Learning P 0 Q S=MC D=MV CS Q*=100 PS $1.50 At Q*-2=98 MV>MC – potential gain to trade. CS, PS > 0 at Q*-2 ⇒ Increase CS+PS if Q↑. At Q*+2 MC>MV. CS, PS < 0. ⇒ Increase CS+PS if Q↓. Example of marginal thinking Free market takes us to Q*. 1) only high MV consumers and low MC sellers trade. 2) Suppose we're not at Q*, can we do better? © Prakarsh Singh Interfering with Market Outcomes • Principle 6 – Market outcomes are efficient if the market is perfectly competitive and no externalities. 1. people who value the good the most buy it 2. firms who can supply at lowest OC supply it 3. At Q*, MV=MC so CS+PS maximized. • As we'll see, Price controls: 1. does not hold for price ceilings (non-price rationing among consumers) 2. does not hold for price floors (non-price rationing among suppliers) 3. does not hold for both price ceilings and floors • 1 and 2 still hold with taxes and subsidies. • Price controls - legal max or min on price - usually enacted when policymakers believe the market price is unfair to buyers or sellers. © Prakarsh Singh Price Ceiling affects Welfare – NOT IN MANKIW but should be (Mankiw does price controls before efficiency, 6 before 7) Copyright © 2004 South-Western A F B D C E 0 Q P D S QCeiling PCeiling P * Q* Draw shortage first – determined by both ES and ED Q=Qceiling not an equilibrium: QD≠QS Shortage QD PS0 = CS0 = PS1 = CS1 = © Prakarsh Singh Price Ceiling affects Welfare – NOT IN MANKIW but should be (Mankiw does price controls before efficiency, 6 before 7) Copyright © 2004 South-Western A F B D C E 0 Q P D S QCeiling PCeiling P * Q* Draw shortage first – determined by both ES and ED Q=Qceiling not an equilibrium: QD≠QS Fall in Q determined by ES -New way to get movement along supply curve Shortage QD PS0 = F+D+E CS0 = A+B+C PS1 = F CS1 = A+B+D (best case scenario) © Prakarsh Singh Welfare Analysis of Price Ceiling (Best Case Scenario) • Producers – worse off • lose E (reduction in Q), lose D (transfer to consumers) • Do producers with least cost sell the good? YES • Consumers: are they better off? ambiguous • Lose C (reduction in Q), gain D (transfer from producers) • net effect depends on ED vs. ES . • If demand elastic (those out of market didn't value it that much anyway), loss C small and gain D not affected. • If supply elastic, loss to consumers C big (since QS goes down a lot so lots of consumers out of the market) and gain D small. • If supply perfectly inelastic, loss to consumers C=0 • So the more elastic demand vs. supply, the better off

are consumers. • Do consumers who value the good the most get it? NO. • Without rationing by price (in which those who value the good the most get it), there could be rationing by other means such as discrimination. • Therefore CS=A+B+D only in best case scenario. That's why Mankiw doesn't do this. © Prakarsh Singh • DWL = C+E = lost surplus from not being at efficient Q (Minimum DWL) • Inefficiency: at QPC-1, MV>MC but this unit isn't produced because of the price ceiling. • DWL always depends on fall in Q (which depends on price ceiling. But for a given price ceiling, fall in Q depends on E_S. • with price ceiling, this depends on what? E_S • If supply perfectly inelastic. DRAW © Prakarsh Singh Price Floor Affects Welfare Copyright © 2004 South-Western A F B D C E 0 Q P D S QFloor PFloor P * Q* Draw surplus first – determined by both ES and ED Q=Qfloor not an equilibrium: QD≠QS Fall in Q determined by ED - New way to get movement along demand curve Surplus QS CS0 = PS0 = CS1 = PS1 = © Prakarsh Singh Price Floor Affects Welfare Copyright © 2004 South-Western A F B D C E 0 Q P D S QFloor PFloor P * Q* Draw surplus first – determined by both ES and ED Q=Qfloor not an equilibrium: QD≠QS Fall in Q determined by ED - New way to get movement along demand curve Surplus QS CS0 = A+B+C PS0 = F+D+E CS1 = A PS1 = F+D+B (best case scenario) © Prakarsh Singh Welfare Analysis of Price Floor (Best Case Scenario) • Consumers – worse off • lose C (reduction in Q), lose B (transfer to producers) • Do the consumers who value the good the most get it? YES • Producers: are they better off? Ambiguous • Lose E (reduction in Q), gain B (transfer from consumers) • net effect depends on ES vs. ED. • If demand elastic, gain to producers B small and loss to producers E big (Q falls a lot). • If supply elastic, loss to producers E small (those out of market had high costs) and gain B not affected. • So the more elastic supply vs. demand, the better off are firms. • Do firms who can produce at least cost sell good? NO. • Therefore PS=F+D+B only in best case scenario. • DWL = C+E (minimum DWL) • Depends on fall in Q: with a price floor, this depends on what? E_D © Prakarsh Singh Rent Control and MW • Use welfare analysis to examine two important policies for poverty reduction: Rent Control and MW. • Rental housing market • Concern that the poor can't afford decent housing • Labor market • Concern that low wage earners cannot live at an adequate standard of living ("living wage") © Prakarsh Singh Effects of Minimum Wage • W↑ Increase in wage that benefits workers previously earning below minimum wage • Desired outcome • Transfer from employers to employees • Labor surplus (unemployment) because QS > QD • Job losers disproportionately less educated and teenagers • Bad for employers and workers who lose jobs • Are poor people better off? labor income W•QL • W ↑, QL ↓ - W•QL like TR, depends on the ED for low skilled labor. • Magnitude of employment decline determined by E_D – big argument among economists. • Minimum wage is bad if demand elastic and many people lose their job. Higher elasticity of demand leads to larger employment decline and higher unemployment © Prakarsh Singh Labor market with a binding Minimum Wage (price floor) Copyright©2003 Southwestern/Thomson Learning QL Wage 0 SL Labor surplus (unemployment) DL WMW QD= QMIN QS W* Q* Hypothetically unemployed © Prakarsh Singh LR Effects: Copyright©2003 Southwestern/Thomson Learning QL Wage 0 SL DL -SR WMW QSR W* Q* DL -LR QLR unemployment↑, labor income↓, DWL↑ Why? E_D increases over time: DRAW -firms substitute away from low wage workers © Prakarsh Singh Rental housing market with rent control (price ceiling) in the SR (D and S inelastic) Copyright©2003 Southwestern/Thomson Learning P↓ - benefits renters- Desired outcome Q↓ Why might Q↓ be small? Inelastic ES Quantity of Apartments 0 S Non price rationing – don't know apartment is going to those who value it the most. Although that's okay if we're talking about ability to pay. Want poor people who can't pay to get apartment. However, what will rich people do? bribes –reduces DWL but not good for helping the poor D Shortage Rental Price P* Qs QRC QD PRC © Prakarsh Singh LR effects: Copyright©2003 Southwestern/Thomson Learning 0 Rental Price of Apartment Quantity of Apartments D S Shortage P* Q* PRC Qs = QRC QD bigger shortage, Q↓ more, DWL↑. Why? E_s increases over time:– DRAW Rental apartments switched to condominiums; co-ops; commercial uses © Prakarsh Singh • Decline in apartment quality Why? • No incentive to invest in rental housing stock because you can always rent the apartment • Discrimination - Proportion of renters who are not poor and white appears to increase over time. Why? • With a larger shortage, it's easier to fill up apartments with whites. • Most benefits go to tenants in lower and mid-Manhattan where the residents are relatively wealthy. © Prakarsh Singh Empirical Evidence • "Once a tenant has secured a rent-controlled apartment, he may not choose to move in the future and give up his rent control, even if his housing needs change (Suen 1980, Glaeser and Luttmer 2003, Sims 2011, Bulow and Klemperer 2012). • This mis-allocation can lead to empty-nest households living in family-sized apartments and young families crammed into small studios, clearly an inefficient allocation. • Similarly, if rental rates are below market rates, renters may choose to consume excessive quantities of housing (Olsen 1972, Gyourko and Linneman 1989). • Rent control can also lead to decay of the rental housing stock; landlords do not invest in maintenance because they can't recoup these investment by raising rents. (Downs 1988, Sims 2007)." • Source:

Is Efficiency always desirable? Ex. should there be a market for Kidneys? Copyright©2003 Southwestern/Thomson Learning P 0 Q S D A Q0 B C D P1 Q1 Supply: if P=0, generosity. As P↑ more willing to supply. (waiting list, illegal to sell) Demand: Why isn't demand vertical? because if P too high, can't pay or you don't want to bankrupt your family (even if you can pay). If P=0 (illegal to sell), Shortage (people who want kidneys don't get them) What's the initial consumer surplus? Initial producer surplus? Now allow markets for kidneys to operate. What's the final consumer surplus? Final producer surplus? © Prakarsh Singh Is Efficiency always desirable? Ex. should there be a market for Kidneys? Copyright©2003 Southwestern/Thomson Learning P 0 Q S D A Q0 B C D P1 Q1 Supply: if P=0, generosity. As P↑ more willing to supply. (waiting list, illegal to sell) Demand: Why isn't demand vertical? because if P too high, can't pay or you don't want to bankrupt your family (even if you can pay). If P=0 (illegal to sell), Shortage (people who want kidneys don't get them) PS0=0 because P=0. Producers are people with kidneys CS0=A+C (best case scenario) Now let's open the market. P=P1 CS1=A+B (lose C, gain B) (net effect depends on elasticities) PS1=C+D (gain C and D) CS+PS↑ by B+D (efficiency) generosity Shortage© Prakarsh Singh Should we have kidney market? • Yes: • more people will get kidneys (area B). • What about who is receiving the kidneys? some elderly who didn't value them as much as the young won't get them • What about a black market for kidneys? • No: • Only the rich will get kidneys. (equity argument) • Who are most likely to supply more kidneys? Poor people – but who are we to judge? • Crowding out of altruism and of good kidneys? • Tradeoff between equity and efficiency © Prakarsh Singh Should we have kidney market? • What would help us make this decision? • What about slope of supply curve? If supply inelastic, we're not losing much surplus/Q by closing the market, and P↑↑ • What about size of shortage? (doesn't depend on slopes, just x intercepts of S and D) If the initial shortage is small, then maybe market not good. © Prakarsh Singh

Lecture 7 - Taxes

© Prakarsh Singh © Prakarsh Singh © Prakarsh Singh "The Only Two Certainties In Life Are Death And Taxes" Benjamin Franklin to Jean-Baptiste Leroy, a prominent French scientist in a 1789 letter. © Prakarsh Singh History of Taxes 1 • There is no art which one government sooner learns of another than that of draining money from the pocket of people – Adam Smith (Wealth of Nations (1776) bk. 5, ch. 2) • The exact point in time when a tax was first instituted is unknown • poor historical records • Empires such as the Egyptian, Mesopotamian, Chinese, and Inca were theocratic: • the religion and the government were mixed • Paying tribute to the leader was both a religious contribution and a governmental extraction History of Taxes 2 • Inheritance and Gift Tax • Egypt, around 700 BC, is believed to have originated the first gift and inheritance tax • a tax of 10% of the value was imposed on transfers of land • Tax evasion was achieved via phony sales of property to children • Consumption-Based Taxes • Ancient Egypt and Rome had this tax • In Rome, the tax on the sale of slaves at auction was imposed for a time • Customs and duties – on the values of goods exported or imported – paid by ancient traders History of Taxes 3 • Income Taxation • Various societies in the past tried to use progressive tax systems. • Direct taxes in India were introduced when tax advisers, drawing on Manu Smriti and Arthasastra, guided kings and rulers on how best to shape and formulate policy • Most influential in recent times: In the 1790s, the British were faced with paying for its continuous warfare with the French • This led to taxation innovation in both countries • Britain adopted a tax on the rental value of houses, a forerunner of a more comprehensive income tax. • In 1799, general income tax was implemented in Great Britain History of Taxes in India • Taxes were considered a sacred duty in Vedic times • Medieval Era: • Emperor Krishnadevraya of Vijaynagar introduced a tax system • The tax was dependent on the income of the farmer • Mughals had a comprehensive tax system depending on land size and fertility • Modern Era: • Income tax in India was introduced by Sir James Wilson on 24th July 1860 • After Independence: • The most comprehensive Income Tax was brought about through the Income Tax Act of 1922. • The tax system evolved over time. Tax Revenue in India Tax Revenue in India Optimal Tax Rates and Laffer Curve Analysis for India Snigdha Kalra, Sargam Gupta Presented at: 18th Annual Conference on Economic Growth and Development Indian Statistical Institute, Delhi Distribution of Taxes in India Interfering with Market Outcomes • Principle 6 – Market outcomes are efficient if the market is perfectly competitive (and no externalities). 1. people who value the good the most buy it 2. firms who can supply at lowest OC supply it 3. At Q*, MV=MC so CS+PS maximized. • Price controls: 1. does not hold for price ceilings (non-price rationing among consumers) 2. does not hold for price floors (non-price rationing among suppliers) 3. does not hold for both price ceilings and floors • Taxes • 1. and 2. still hold but 3. does not hold. Why have them if inefficient?

• Government uses taxes to fund government spending on the poor, roads, health care, military, airports, research, stimulus will eventually require higher taxes • but we have to understand that the imposition of taxes also affects economic activity in a number of markets © Prakarsh Singh How Taxes on Buyers (and Sellers) Affect Market Outcomes • A tax drives a wedge between the price consumers pay and the price sellers receive • sales tax: PC=PS + tax • holds regardless of statutory incidence (who tax is placed on) • payroll tax: WF/C=WW/S + tax • When a good is taxed, Q↓ ⇒DWL • Buyers and sellers share the tax burden and loss of surplus (economic incidence vs. statutory incidence). © Prakarsh Singh EXs: Economic vs. Statutory Incidence • Ex - Tax on cigarettes of 10 cents per pack is imposed on cigarette sellers. So every time a pack is sold, seller has to give 10 cents to the government so they raise the price. • Payroll tax 14% on workers and firms equally (7% and 7%) but economic incidence not equally shared. • Law saying employers had to pay all 14% wouldn't matter • Law requiring firms to provide health insurance. • What will firms do? You end up paying for some of your own health benefits because your employer lowers wage. • Employees pay for 80% of health benefits through lost wages. So if insurance premium (on firm) is $5,000, lost wages = $4,000. © Prakarsh Singh The Effects of a Tax Copyright©2003 Southwestern/Thomson Learning Q 0 P D Tax=2 4=PC1 3=P*=PS0=PC0 Q Q* TAX 2=PS1 S 5 Suppose $2 tax placed on consumers. 1 QTAX is an Equilibrium? - YES QD = QS (no rationing) (given PC-PS = tax) 2 prices, PC1 , PS1 Incidence: Consumers: PC1-P* = 4-3 = 1 Sellers: P*-PS1 = 3-2 = 1 © Prakarsh Singh $2 tax evenly divided Economic Incidence • As we saw the statutory incidence doesn't matter • What determines economic incidence? • Economic (tax) incidence depends on slopes, not exactly elasticities, but we'll say elasticities. • incidence is higher for more inelastic side of market. © Prakarsh Singh Economic Incidence (independent of statutory incidence) Copyright©2003 Southwestern/Thomson Learning 0 Quantity Price D S Tax PS PC (a) Elastic Supply, Inelastic Demand (EXS: FOOD, GASOLINE, HEALTH CARE) P* © Prakarsh Singh Economic Tax Incidence (independent of statutory incidence) Copyright©2003 Southwestern/Thomson Learning 0 Quantity Price D S Tax (b) Inelastic Supply, Elastic Demand (EXS: LUXURY GOODS – YACHTS) PC P* PS © Prakarsh Singh inelastic demand, no DWL Copyright©2003 Southwestern/Thomson Learning 0 Q P S D Tax PC P P* S Q* © Prakarsh Singh inelastic supply, no DWL Copyright©2003 Southwestern/Thomson Learning 0 Q P D S Tax PC P* PS Q* © Prakarsh Singh How a Tax Affects Welfare Copyright © 2004 South-Western A F B D C E 0 Q P D S PC QTAX PS P* Q* CS0=A+B+C PS0=D+E+F CS1=A PS1=F Govt. Revenue B+D (transfer to those not in market) DWL: C+E (govt. doesn't get it because it's not traded) © Prakarsh Singh Elasticity and Tax Incidence (now look at change in CS, PS also) (basically a re-statement of before) * Tax incidence is higher for the more inelastic side of the market. • As the elasticity of demand rises relative to the elasticity of supply, producers bear a greater share of the tax burden • Relatively larger decrease in PS • Decline in PS is a higher proportion of the decline in TS • As the elasticity of demand falls relative to the elasticity of supply, consumers bear a greater share of the tax burden • Relatively larger increase in Pc • Decline in CS is a higher proportion of the decline in TS © Prakarsh Singh Example • Luxury tax on yachts in Canada on Jan 1, 2022 • 20% between $250K-$500K, 10% on the entire price of the yacht if it's over $500K. • How would this tax impact the yacht industry in Canada? © Prakarsh Singh Example © Prakarsh Singh Example © Prakarsh Singh Size of DWL What determines the size of the DWL of a tax? a) Size of Tax –as tax↑, Q↓ more, DWL↑ (for given slopes) (go to next slide) $700B will mean a large tax increase at some point– Big DWL b) for given tax, as E D and E S ↑, Q↓ more, DWL↑ © Prakarsh Singh a) Effect of Size of Tax on DWL Copyright © 2004 South-Western P 0 Q D S © Prakarsh Singh b) Effect of Elasticity on DWL Copyright © 2004 South-Western Demand – elastic vs. inelastic P 0 Q Size of tax D (elastic) S D (inelastic) DWL = ½ *B*H Base the same, but height changes © Prakarsh Singh Copyright © 2004 South-Western Supply – elastic vs. inelastic P 0 Q Size of tax D S (elastic) S (inelastic) © Prakarsh Singh Determinants of TAX REVENUE What determines tax revenue? = tax*Q a) E D and ES : for a given tax, as ED and ES ↑, Q↓ by more, less is taxed, tax revenue↓ (go to next slide) also, the less likely it is that an increase in the tax will increase tax revenue (not showing) b) Size of Tax – as tax↑, what happens to tax revenue↑? tax↑*Q↓ - (hold elasticity constant and vary the tax) © Prakarsh Singh a) Effect of Elasticity on Tax Revenue Copyright © 2004 South-Western Demand – elastic vs. inelastic P 0 Q D (elastic) S D (inelastic) Tax revenue = B*H Height(tax) is the same, but the base changes © Prakarsh Singh

Lecture 8 - Welfare Analysis of Taxes and Subsidies

Elasticity and Tax Incidence * Tax incidence is higher for the more inelastic side of the market. • As the elasticity of demand rises relative to the elasticity of supply, producers bear a greater share of the tax burden • As the elasticity of demand falls relative to the elasticity of supply, consumers bear a greater share of the tax burden © Prakarsh Singh How a Tax Affects Welfare Copyright © 2004 South-Western A F B D C E 0 Q P D S PC QTAX PS P* Q* CS0=A+B+C PS0=D+E+F CS1=A PS1=F Govt. Revenue B+D (transfer to those not in market) DWL: C+E (govt. doesn't get it because it's not traded) © Prakarsh Singh Example • Luxury tax on yachts in Canada on Jan 1, 2022 • 20% between \$250K-\$500K, 10% on the entire price of the yacht if it's over \$500K. • How would this tax impact the yacht industry in Canada? © Prakarsh Singh Example © Prakarsh Singh Example © Prakarsh Singh Size of DWL What determines the size of the DWL of a tax? a) Size of Tax –as tax↑, Q↓ more, DWL↑ (for given slopes) (go to next slide) \$700B will mean a large tax increase at some point– Big DWL b) for given tax, as E D and E S ↑, Q↓ more, DWL↑ © Prakarsh Singh a) Effect of Size of Tax on DWL Copyright © 2004 South-Western P 0 Q D S © Prakarsh Singh b) Effect of Elasticity on DWL Copyright © 2004 South-Western Demand – elastic vs. inelastic P 0 Q Size of tax D (elastic) S D (inelastic) DWL = ½ *B*H Base the same, but height changes © Prakarsh Singh Copyright © 2004 South-Western Supply – elastic vs. inelastic P 0 Q Size of tax D S (elastic) S (inelastic) © Prakarsh Singh Determinants of TAX REVENUE What determines tax revenue? = tax*Q a) E D and ES : for a given tax, as ED and ES ↑, Q↓ by more, less is taxed, tax revenue↓ b) Size of Tax – as tax↑, what happens to tax revenue↑? tax↑*Q↓ - (hold elasticity constant and vary the tax) © Prakarsh Singh a) Effect of Elasticity on Tax Revenue Copyright © 2004 South-Western Demand – elastic vs. inelastic P 0 Q D (elastic) S D (inelastic) Tax revenue = B*H Height(tax) is the same, but the base changes © Prakarsh Singh b) Effect of Size of Tax on Tax Revenue Copyright © 2004 South-Western D S 0 Q P Q0 (a) Small Tax, small tax revenue (b) Medium tax, large tax revenue (c) Large tax, small tax revenue PC Q1 PS © Prakarsh Singh Copyright © 2004 South-Western The Laffer curve Tax Revenue 0 Tax Size B to C - tax revenue↑ and DWL↓ (Q↑) (no tradeoff between revenue and DWL) C to A – tax revenue↓ and DWL↓ (Q↑) tradeoff between revenue and DWL. tax revenue same at A and B. Which point is better, A or B? DWL bigger at B (inefficient) Must hold but what does it look like? (where is the peak) – Democrats vs. Republicans. A B C © Prakarsh Singh © Prakarsh Singh Subsidies • Subsidies are negative taxes – get money if you buy or sell. • PS = PC + subsidy • 5 = 3 + 2 • Encourage economic activity beyond competitive market equilibrium: QSUB > Q* • Administrative incidence is irrelevant • Avoids main problems with price controls © Prakarsh Singh Effects of a Subsidy Copyright©2003 Southwestern/Thomson Learning 0 Q S D P Q* PS1=4 QSUB PC1=2 subsidy wedge 5 3=P*=PS0=PC0 © Prakarsh Singh Copyright©2003 Southwestern/Thomson Learning 0 Q S D P P* Q* PS QSUB PC subsidy wedge C D E B A G F H Find the change in CS, PS, Subsidy cost and DWL © Prakarsh Singh Copyright©2003 Southwestern/Thomson Learning 0 Q S D P P* Q* PS QSUB PC subsidy wedge C D E B A CS ↑ by C+D+E PS ↑ by B+G Subsidy cost = B+C+D+E+G+H DWL=H (increase in CS+PS is smaller than cost). G F H © Prakarsh Singh Find the change in CS, PS, Subsidy cost and DWL

Lecture 9- Costs and Perfect Competition

How do firms maximize Π? Need 3 Important Definitions: true for all firms, regardless of market structure (PC, monopoly) 1. Π =TR-TC 2. MR=ΔTR when Δq=1: the additional revenue the firm accrues from producing and selling 1 more unit of output 3. MC=ΔTC when Δq=1: the additional costs incurred from producing and selling one more unit of output Profit maximizing rule for all firms: • Ex. Suppose, at current level of production q_0 , MR=\$4 and MC=\$3. • Is firm maximizing profit? No, produce extra unit. • Suppose MR=4 and MC=6. Is firm maximizing profit? Tricky because MR and MC refer to producing one more unit. However, it is likely that MC > MR for the previous unit. If this is true, produce 1 less: Costs go down by something close to \$6 and revenue falls by something close to \$4, so that profits rise. • Profit maximizing rule: • If MR > MC produce more • If MR < MC see if profits will go up by producing one less. • With continuous units, produce q s.t. MR=MC • ALL Profit Maximizing Firms follow this rule, regardless of market structure. Graphs vs. Numerical Examples • When we use a numerical example, we work with distinct units, should the firm produce: e.g. 7 or 8? • With graphs we assume that the firm can choose to make 7.675234 units. • The graphical analysis may sound strange, but it has the virtue of simplifying the profit maximizing rule: • To maximize profit produce where MR = MC! Start with MR (in perfect competition) • MR depends on market structure • Perfect Competition 1. Homogeneous product 2. Lots of buyers and sellers 3. Perfect information – people know prices 4. (free entry and exit) - talk about later when we discuss LR • (1-3) $\Rightarrow$ price taking (as well as the law of one price) • the market price won't change based on my decisions. • Suppose the market price is \$2 and I decide to sell

one more unit. Since the market price is unchanged, my revenues will rise by $2 so MR=2. • More generally, price taking $\Rightarrow$ MR = P. • Only true for PC. Different market structures have different MR. • Internet has brought us closer to assumptions of perfect competition in many markets • Closer to perfect information • even if you hold the number of total sellers constant, the number of sellers available to any one person has increased. Before, you were confined more to local sellers. • Distance no longer differentiates many goods, meaning that they're more identical. A Perfectly Competitive Firm's MR Curve: Suppose P=2 Copyright © 2004 South-Western $/unit 2.00 0 q MR=$2.00 First draw upward sloping linear TR line with points (1,2) (2,4) and $ on the Y axis. Determining MC: The Production Function • We are half way there! We first determined MR. Now we need to know the determinants of MC! • MC does NOT depend on market structure. To know about costs, we need to know about production since costs are incurred when goods are produced (hire workers) • The production function shows the relationship between quantity of inputs used to make a good and the quantity of output of that good. • Inputs/factors of production 1) labor – variable factor 2) capital – fixed factor (cost can't be avoided) in SR. • Of course some types of capital are variable as well. We're ignoring cookie dough as a variable factor. • The marginal product of an input is the increase in output that arises from an additional unit of that input. • MPL=Δq when ΔL=1, holding K fixed Table 1: A Production Function and Total Cost: Caroline's Cookie Factory Copyright©2004 South-Western wage=$10 Look at first 2 columns first, graph Output on Yaxis and Number of Workers on X-axis. Figure 2 Caroline's Production Function Copyright © 2004 South-Western 120 90 50 0 1 2 3 Production function With K fixed, q only changes when L changes Upward sloping Law of Diminishing MP - MP of an input declines as the quantity of the input increases. Can't be downward sloping because you would never hire someone who reduced output. "Take a coffee break, permanently" L= Workers q Table 1: A Production Function and Total Cost: Caroline's Cookie Factory Copyright©2004 South-Western wage=$10 graph MPL on Y-axis and Number of Workers on X-axis MPL at Caroline's Copyright © 2004 South-Western MPL 50 40 30 L = Workers 0 1 2 3 MPL (can't be negative) From Production Function to TC Curve (go back to Table 1) • TC curve – relates TC to q • TC = VC + FC • VC – costs that vary with q. As we hire more labor to produce more output, TC$\uparrow$. • FC - you incur them regardless of how much is produced. • Monthly rent on factory, or you buy factory but takes time to sell. • Short run - time frame when some costs are fixed. In long run, all costs are variable. Table 1: A Production Function and Total Cost: Caroline's Cookie Factory Copyright©2004 South-Western wage=$10 Plot Output on X-axis against Total Cost on Y-axis Figure 3 Caroline's TC Curve (let's graph Table1) Copyright © 2004 South-Western $ $80 70 60 50 40 30 20 10 q 0 150 5 workers 90 2 workers 50 1worker 120 140 TC Fixed Costs VC (q=150) = $50 =W($10) *5 workers Sum of MC of hiring each worker = (10+10+10+10+10) Notice that TC curve is getting steeper • For the same rise, the run is getting smaller. • When you go from Q=0 to Q=50, TC goes up by 10. • When you go from Q=50 to Q=90, TC also goes up by 10 (but there was less additional output). • Or, for the same run, the rise is getting bigger • if you go from Q=0 to Q=50, TC goes up from 30 to 40 • If you go from Q=50 to Q=100, TC goes up from 40 to 52. You need more than one extra worker to increase Q by 50 when you start at Q=50 as opposed to starting at Q=0. • What's happening to MC as q$\uparrow$? • MC = ΔTC when Δq=1 (=ΔVC) • For the same change in q (run), ΔTC$\uparrow$ $\Rightarrow$MC$\uparrow$ as q$\uparrow$ MC = W / MPL • MC depends on W and Production Function • As q$\uparrow$, need more L $\Rightarrow$ MPL$\downarrow$, $\Rightarrow$ MC$\uparrow$ • Diminishing MPL $\Rightarrow$ Increasing MC Now that we know MR and MC, we can derive the firm's supply curve using profit maximization condition (MR=MC) • Mankiw uses the Conrad's Coffee Shop example to derive supply curve since the table uses increments of output, q, not workers, L. . • For the supply curve, we don't need these other costs. Table 2 The Various Measures of Cost: Conrad's Coffee Shop q FC VC TC MC 0 $3.00 $0.00 $3.00 $0.30 1 3.00 0.30 3.30 0.50 2 3.00 0.80 3.80 0.70 3 3.00 1.50 4.50 0.90 4 3.00 2.40 5.40 1.10 5 3.00 3.50 6.50 1.30 6 3.00 4.80 7.80 1.50 7 3.00 6.30 9.30 1.70 8 3.00 8.00 11.00 1.90 9 3.00 9.90 12.90 2.10 10 3.00 12.00 15.00 Conrad's TC curve – also becoming steeper Copyright © 2004 South-Western 3.80 3.30 $3 0 1 2 3 Fixed Costs 4.50 TC Increasing MC For the same run, the rise is getting bigger. Same idea as figure 3 (Caroline) that showed diminishing MPL/increasing MC. MC of first unit = $.30 (not $3 since FC are fixed, MC=ΔTC) MC of 2nd unit = $.50 q $ Conrad's MC Curve Copyright © 2004 South-Western $3.50 3.25 3.00 2.75 2.50 2.25 2.00 1.75 1.50 1.25 1.00 0.75 0.50 0.25 0 1 2 3 4 5 6 7 8 9 10 MC Rising MC mirror image of Diminishing MPL. $ q Show MC curve= supply curve (for given P, what is qs) using MR=MC Copyright © 2004 South-Western 0 4 8 MC $1 q S$1.00 $1.75 q S$1.75 If P=1, MR=1 $\Rightarrow$ qs = 4 (from table) If P=1.75, MR=1.75 $\Rightarrow$ qs = 8 $ q Supply curve = MC Curve • Shows the firm's cost of producing each additional unit. • MC = W / MPL • Slope: (+) as q$\uparrow$, need more L $\Rightarrow$ MPL$\downarrow$ $\Rightarrow$ MC$\uparrow$ • Shifts: • W (more generally the prices of variable inputs). • Technology (change in MPL not due to q) Recap of Lecture on Costs • Firms maximize profits = TR-TC • This leads them to equate MR and MC…if MR>MC, produce

more…if MC>MR, produce less… • Generally, TC gets steeper in q… • MC is positively sloping in q • MB is flat for a perfectly competitive firm and is equal to the price • MC = w/MPL

Lecture 10 - Perfect Competition

Recap of Lecture on Costs • Firms maximize profits = TR-TC • This leads them to equate MR and MC…if MR>MC, produce more…if MC>MR, produce less… • Generally, TC gets steeper in q… • MC is positively sloping in q • MR is flat for a perfectly competitive firm and is equal to the price • MC = w/MPL • Malawi – AIDS and coffin makers • Thai Massage Parlors – limited opening times • GM-crops lower costs for US farmers © Prakarsh Singh Zoolander • https://www.youtube.com/watch?v=E_ PnuXelvWA © Prakarsh Singh Analyze Changes in SR equilibrium Changes in SR equilibrium: (i) Demand: start in the market diagram and show the new equilibrium price and the effects of the new equilibrium price on quantity supplied (ii) Supply: What can shift the supply curve? - Change in "n" – start in market picture (need for LR) - Shift in MC (W, MPL) – start in firm picture start with the typical firm, show the effect of the change on the MC curve and therefore the supply curve, then find the new P from the market and illustrate the effects of the new P on the typical firm. - Shift in FC (e.g. rent or K)– start in firm picture n⁻ (decrease in number of firms) Firm 0 q P Market Q P 0 D S P0 Q0 A MC q0 MR B Q1 P1 MR' q1 S' After P, should an individual firm continue to produce q0? Increase in Demand Firm 0 q P Market Q P 0 D S P0 Q0 A MC q0 MR D' B Q1 P1 MR' q1 These graphs are simpler than Mankiw • To determine SR equilibrium, just need MR, MC, D, S. • AFC not interesting • AVC used to analyze the shutdown decision – ignore • ATC - helps us to figure out P, but only need that for LR LR in Perfect Competition (need ATC curve) 1. No FC • In LR, you can sell your factory and exit this market. 2. Free entry and exit (4th assumption of PC) • Won't be the case with monopoly. Firm's LR Decision to Exit/Enter P = TR – TC = pq – TC = pq – (TC/q)*q = pq – ATC*q = (p-ATC)q • If P < ATC, TR < TC, PATC - Enter a competitive market if you can earn positive profits Def. of LR Equilibrium 1. Must be a SR equilibrium: • Given P, QS =QD . • Firms Maximizing P 2. Õ=0 (P=ATC) only difference with SR eq. SR P>0 Þ entry Þ P⁻ SR PA, A is increasing. • Example • Exam 1 = 50 A = 50 • Exam 2 = 30 A = 40 Average went down because MA • If MC < ATC, ATC⁻ • If MC > ATC, ATC. • Where MC=ATC, ATC stops falling and starts rising, i.e., ATC at a minimum The Various Measures of Cost: Conrad's Lemonade Shop Copyright©2004 South-Western The Various Measures of Cost: Conrad's Lemonade Shop Copyright©2004 South-Western Between q = 3 and 4, why does ATC fall? MC(.90)< ATC(1.50) Between q = 5 and 6, why is ATC constant? MC(1.30) =ATC(1.30) The Various Measures of Cost: Conrad's Lemonade Shop Copyright©2004 South-Western Between q = 3 and 4, why does ATC fall? MC(.90)< ATC(1.50) Between q = 5 and 6, why is ATC constant? MC(1.30) =ATC(1.30) Conrad's ATC and MC Curves Copyright © 2004 South-Western Costs $3.50 3.25 3.00 2.75 2.50 2.25 2.00 1.75 1.50 1.25 1.00 0.75 0.50 0.25 Quantity of Output (glasses of lemonade per hour) 0 1 2 3 4 5 6 7 8 9 10 MC ATC SR [1] LR Þ Adjustment to the LR Equilibrium Copyright © 2004 South-Western Firm Market 0 q P Profit MC ATC Q ENTRY P 0 D PF S P0 QF F Q0 P0 A SF PF qF q0 SR equilibrium? YES LR? NO. So what will happen? Do firms in perfect competition try to minimize ATC in LR? Each firm producing at q that minimizes ATC NO! Firms max P and enter profitable markets! So why do we get this outcome? MR = P (price-taking) || || MC = ATC by profit max (MC=MR) and LR eq. (zero profits means P=ATC) MC = ATC implies producing at min(ATC) But this is a result, which is no firm's intention!! So it's not like firms produce there to minimize ATC since if the price were greater, they would not produce to minimize ATC, they would produce more. Increase in Demand in SR and LR Copyright © 2004 South-Western Firm Market Getting to the LR 0 q Price Profit MC ATC Q ENTRY Price 0 D' PF S P1 QF F Q1 P1 B SF PF q0= qF q1 D Q0 A P in SR (can always stay at q0 but you can do better at q1) but back down to 0 in LR Increase in Q in LR only coming from entry. Each firm producing the same.

Lecture 11 - Profit and Loss under various scenarios in Perfect Competition

Do firms in perfect competition try to minimize ATC in LR? Each firm producing at q that minimizes ATC NO! Firms max Π and enter profitable markets! So why do we get this outcome? MR = P (price-taking) || || || MC = ATC by profit max (MC=MR) and LR eq. (zero profits means P=ATC) MC = ATC implies producing at min(ATC) But this is a result, which is no firm's intention!! So it's not like firms produce there to minimize ATC since if the price were greater, they

would not produce to minimize ATC, they would produce more. Increase in Demand in SR and LR Copyright © 2004 South-Western Firm Market Getting to the LR 0 q Price Profit MC ATC Q ENTRY Price 0 D' PF S P1 QF F Q1 P1 B SF PF q0= qF q1 D Q0 A $\Pi\uparrow$ in SR (can always stay at q0 but you can do better at q1) but back down to 0 in LR Increase in Q in LR only coming from entry. Each firm producing the same. Case Study: The Effect of Clinton's Health Proposal on Firms On April 7, 1994, President Clinton held a town meeting at the KCTV television studios in Kansas City, Missouri. He fielded a variety of questions concerning his health care proposal. One question was posed by the chief executive officer of Godfather Pizza, Inc. The CEO feared that Clinton's proposal would raise his costs, hurt his business, and force him to lay off workers. President Clinton agreed that costs would rise, but argued that since the costs of all pizza firms would increase, Godfather would not suffer: "..., so [for] you [the health proposal] would add about one and one-half percent to the total cost of doing business. Would that really cause you to lay a lot of people off if all your competitors had to do it too? Only if people stop eating out. If all your competitors had to do it, and your cost of doing business went up one and one-half percent, wouldn't that leave you in the same position you are in now? Why wouldn't they all be in the same position, and why wouldn't you all be able to raise the price of pizza two percent? I'm a satisfied customer. I'd keep buying from you." President Clinton emphasizes that the costs of all pizza firms will be increased by his health proposal. He contends that since his proposal would increase the costs of all pizza firms, all firms would raise their price to cover the costs, so that an individual firm would not be hurt. Do you agree or disagree with the President's analysis? How does the health-care proposal affect individual firm behavior, firm profits, and market supply? What effect does it have on the price and quantity in the market for pizza? Draw if Clinton is right in proposing that healthcare insurance costs of pizza workers would be borne by customers... Decrease in Supply in LR (Wages) Firm 0 q P Market Q P 0 Demand, D1 S0 P01 Q01 A MC q0 MC' S1 q1 Q1 P1 B MR MR' ATC ATC' Loss SF QF PF F =qF Exit Assume shift in MC // so ATC shift up by the same amount (if cost of each unit goes up by one, average goes up by one) ***Tricky - don't exit the firm you're looking at. Clinton Proposal • SR: P increases by less than $.10. Clinton was wrong about this: the price does not rise to offset the increase in costs. • The firm's profit maximizing quantity decreases from q0 to q1 . Since the typical firm would be producing fewer pizzas, less labor would be hired by the typical firm. We see that Clinton was wrong: pizza firms would layoff workers. • LR: Clinton is right that P has risen by the full amount, but some pizza joints were forced to exit the market. © Prakarsh Singh

IMPORTANT TOPICS COVERED IN LECTURE ON 22-02-2024
RESOUCRES
1) Perfect competition market in different scenarios
a) When market demand increases –
Short Run Adjustments:
Increase in Price and Quantity: With an increase in market demand, the equilibrium price and quantity in the market both rise. This leads to upward shift in MR on firm's side.
No Change in Cost Structure: In the short run, the cost structure of firms remains unchanged. The MC intersects MR at a higher quantity in firm side.
Profitability Impact: With cost remaining same, firms experience higher profits in the short run.
Long Run Adjustments:
Entry of New Firms: In the long run, the higher profits attract new firms to enter the market. These new entrants increase the overall supply of the product in the market.
Increase in Market Supply: With the entry of new firms, the market supply curve shifts to the right, leading to a decrease in market price.
Zero Economic Profit Equilibrium: As more firms enter the market, competition intensifies, and market prices decrease. Eventually, firms in the market earn

zero economic profits, where the price equals the average total cost of production.

Adjustment in Output Levels: Firms adjust their levels of output in response to changes in market conditions. They may increase or decrease production levels based on market demand and cost considerations.

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b) When market supply decreases – In short run, when market supply of a good decreases, prices of a good increases. This shifts the MR curve of a representative firm upwards. MC curve intersects the new MR at a higher quantity produced by the representative firm and with ATC remaining same, profits in short run rises.

In the long run, new firms enter the market attracted by the profits causing a rightward shift in market supply curve. This leads to an increase in the market supply of goods and price of goods reduce. The profits are given by (P-ATC(q))*q. Profits leads to Refer to Lecture Slides

more firms in the LR, so that in the LR, there are no excess profits for the firms. The profits earned by the representative firm are back to zero in long run.

c) When marginal cost of a firm increases-

Short Run Adjustments:

Shift in MC and ATC Curves: An increase in MC shifts the marginal cost and average total cost (ATC) curves upwards. This indicates that the cost of producing each additional unit of output has risen.

Shift in Market supply: An increase in marginal cost leads to a leftward shift in the market supply curve by an equivalent amount.

Price Increase: With a decrease in supply, the market price of the goods increases.

Effect on Marginal Revenue (MR): The increase in market price leads to an upward shift in the marginal revenue (MR) curve. The firms produce a lower quantity at the point where MR cuts MC. The price of good is lower than ATC.

Short-Run Losses: The gap between ATC and the price at which the goods are produced leads to losses in the short run.

Long Run Adjustments:

Exit of Firms: Firms experiencing losses in the short run may decide to exit the market, especially if they are unable to cover their costs. This reduces the number of firms in the market and shifts the supply curve further leftwards.

Market Price Adjustment: With fewer firms in the market and reduced supply, the market price of the goods increases even more.

Effect on MR: The higher market price causes the MR curve to shift up. The MR cuts the MC at the minimum of ATC.

Zero Profit Equilibrium: Eventually, in the long run, firms in the market adjust to the new conditions till the firms earn zero economic profits. This implies that they cover all their costs and do not earn any additional profits.

Market Supply and Price: Firms in the long run produce the same quantity as before, but at a higher price due to the increased market price of goods. The overall market supply also decreases due to the exit of firms.

d) When fixed cost of a firm increases –

Short Run Adjustments:

Refer to Lecture slides

Perfect competition

Effect on Cost Curves: An increase in AFC shifts the average total cost (ATC) curve upwards but does not affect the marginal cost (MC) curve. This is because AFC is a fixed cost and does not change with the level of output.

No Immediate Output Changes: Since AFC does not directly affect the firm's decision-making in the short run, there is no change in the level of output produced by the firm.

Price: The price remains unchanged in the short run, and firms continue to produce and sell at the prevailing market price.

Profitability Impact: If the market price is less than ATC at this quantity then the firms start to incur losses.

Long Run Adjustments:

Exit of Firms: In the long run, few firms exit the market.

Effect on Market Supply: This decreases the market supply and may eventually lead to an increase in market prices.

Market Price Adjustment: With reduced market supply, market prices may increase to a level where remaining firms can cover both variable and fixed costs.

Zero Economic Profit Equilibrium: In the long run, firms adjust to the new market conditions. At the intersection of the marginal cost (MC) and marginal revenue (MR) curves, firms earn zero economic profit..

Coming up in the Next Class

1) Monopoly

2) Monopoly vs Perfect Competition

3) Profit maximization in

Monopoly
4) Price Discrimination in
Monopoly
Monopolies: Three Things Economists
Want You to Know (profspeak.com)
Why monopolies don't always harm the economies