I. Introduction: A Recap and Overview

Recap

The previous chapter provides the basic logical foundations of microeconomics. It showed how **rational decision makers**—in the sense of being net benefit maximizers—would behave in their roles as consumers and producers. That behavior, in turn, implied that when consumers and producers are price takers, equilibrium price emerge that are equal to the marginal benefits of consumers and the marginal costs of firms.

Consumers and firms tend to be price takers when there are many consumers and firms in the market of interest. In such cases, no single individual or economic organization has significant control over the average price at which goods and services are sold in the market of interest. It was "**price taking**" behavior that allowed us to derive both individual demand and supply curves and demand and supply curves for local, regional, or international markets for particular products.

Prices in such settings tend to move toward the levels that "clear the market" of interest. Such price set market demand at that price (P*) equal to market supply at that price (P*). If prices are below P*, too little is provided to satisfy demand and consumers compete with each other for the product on sale and, in effect, bid the price up until supply equals demand. If prices are above that level, then supply exceeds demand and firms, in effect, compete with each other for consumers by lowering the price of the goods on offer until supply equals demand. Because such activities are undertaken by many consumers or firms at the same time, they jointly induce prices to adjust to equilibrium levels—the price characterized by the intersection of the demand and supply curves.

Chapter 2 also showed why trade takes place. **Both firms and consumers benefit each time a trade is transacted**. Consumers realize consumer surplus because their total benefits from purchasing the good of interest exceed their total costs. Otherwise, they would not purchase any of the good. (Keep in mind, that **individuals buy none of most goods** on offer exactly because their expected benefits from many purchases are less than the expected cost of most goods.)

On the other side of the market, **firms produce and sell goods and services because they can profit** from doing so—which is to say, because the revenues realized by selling the good or service of interest is higher than the cost of producing it. Firm owners seek profits, because that is one of the sources of income that allows them to purchase goods in their roles as consumers, to generate funds for "a rainy day," and to make other investments to improve prospects for future consumption.

Trade is always voluntary, and unless one or the other side is fooled into making a mistake either when purchasing or when

selling a good, both parties have to benefit—otherwise the exchange would not take place.

Specialization occurs because some entrepreneurs (firm owners or firm organizers) are better at some forms of production or at some forms of organization than they are at others. This allows them to profitably sell their products or services at a lower price than other less able producers. (Input sellers also tend to specialize in providing the services, equipment, or intermediate goods that maximize their income. However, analysis of input markets is taken up in the next chapter and so are neglected in this one.)

Most producers, thus, sort themselves out (in the pursuit of profits) into markets where their skills produce the most efficient (least cost) means of bring products to market. This process enhances the gains from trade realized by consumers by reducing production costs, which tends to reduce prevailing market prices at the same time that they generate profits for entrepreneurs and firm owners.

All this is not to say that no one ever makes mistakes, but rather it is to say that, on average, prices gravitate to levels that set demand equal to supply in every market. As a consequence, surpluses (excess supplies) and shortages (excess demand) tend to be small and on average are approximately zero for all goods in well-functioning markets. The last graph in chapter 2 showed how the gains from trade are divided up in a market where both sides are price takers rather than price makers. That division was approximately equal, which is not the only possibility but varies with the slopes of the demand and supply curves in the market of interest. Figure 3.1 show how the division of gains to trade between sellers (firms) and purchasers (consumers) varies with the slope of the supply and demand curves.

In general, the flatter (more price sensitive) the demand or supply curve is, the smaller the fraction of the net benefits of exchange are realized by consumers. In the first diagram, the demand curve is steeper (less price sensitive), and consumers realize most of the net benefits of exchange. In the second diagram, the supply curve is steeper and more of the net benefits are realized by suppliers.





It is not that firms are "greedier" in the second market than in the first. Rather it is because production costs rise faster in the second than the first and so there are more units of the good or service that are sold with "high margins" (e.g. with relatively high profits on those units). Remember that supply curves simply reflect the marginal cost curves of the sellers in the market and their numbers. The flatter these MC curves are and the more firms there are competing for consumers, the flatter the market supply curve tends to be (and the lower supply profits).

Likewise, it is not that consumers are dumber in the second market than in the first, but rather than the marginal benefits from the good or service for the average consumer is relatively high and diminishes rapidly as additional units of the good or service are purchased. It is the nature of the marginal benefit curves of each consumer and the number of consumers that determines how "flat" a market demand curve is, and thereby the extent to which consumers realize the lion's share of the gains to trade or somewhat smaller shares.

However, it is clear that each side of the market always benefits because otherwise trade would not take place! All market transactions (except those mandated by governments) are voluntary—although consumers would always like a lower price and firms would like a higher one. It is ultimately economic pressures (Supply and Demand) that determine both market prices and the manner in which the net benefits from exchange are realized.

Focus of Chapter 3: Why Prices Change

Chapter 2 provides a general explanation for the prices that we observe when we shop for goods and services. Chapter 3 focuses on factors that cause price to change and provides a general theory of the factors that cause prices to rise and those that cause prices to fall.

Generally, the factors focused on in this chapter are in a sense "natural" one—they are factors associated with nature and human nature, rather than governmental policies—which can also induce prices to change in various ways as developed later in this course.

In general, any change in circumstances, preferences, or expectations that affects the marginal benefits of a good or service (for most consumers in the market of interest), will affect the location of the market demand curve. And any change in circumstances that affects the marginal cost of producing and selling a good or service (for most firms in a market) will affect the location of the supply curve.

The geometry of supply and demand imply that a shift in either the market demand curve or the market supply curve tends to change the prevailing market price for the good or service sold in the market of interest. In general, an increase in demand tends to increase prices

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whereas an increase in supply tends to reduce them—other things being equal.

II. Factors that Tend to Shift the Demand Curve

Demand curves reflect the effect of prices on the quantity demanded by everyone in a particular market. So, a change in the price of a good (almost) never shifts a demand curve. Instead, it causes movement along the curve. Shifts in a market demand curve occur when the marginal benefits of the good or service of interest change for some reason.

Sometimes the marginal benefit of a good varies with the weather other things being equal. For example, consider the demand for umbrellas. If one lives in a climate where it never rains, there is little benefit to owning an umbrella, and so the MB of umbrellas tend to be low, which implies that an average individual's demand for umbrellas is low in such regions. On the other hand, if one lives in a place where it rains 4 days a week, the marginal benefit associated with an umbrella or two (or three) tends to be higher and so an average individual's demand for umbrellas tends to be higher in such reasons than in drier ones. The average person in the wet region will own more umbrellas than the average person living in dry regions if the price of umbrellas in both places are about the same.

Other examples of **weather dependent** (or conditioned) marginal benefits (and therefore demands) include barbeque grills, picnic tables,

waterproof coats, sandals, fans, air conditioners, convertibles, golf clubs, windows, swimsuits, cold drinks, bicycles, swimming pools, irrigation systems, boots, gloves, furnaces, heat pumps, warm coats, skis, ice skates, hot drinks, and snow mobiles. All these goods have marginal benefits curves that are partly determined by weather. A change in weather or location will, thus, change the demand for such goods. (Many folks from farther south purchase their first winter coats during their first winter at WVU.)

This is true at the individual level and therefore at the market level of demand. If a change in weather increases the MB associated with owning a good or purchasing a particular service, then then the market demand curve tends to increase in response to such weather.

Some marginal benefits vary with **expectations**. If one expects rain to occur, the MB of bringing an umbrella on a trip is higher than when one does not expect rain. Similarly, if new information makes one expect greater marginal and total benefits from a particular good than one had before the information was received and digested, then one's marginal benefit curve shifts up and one's demand for the associated product increases. For example, during the covid year prior to the vaccine, many news sources said that masking would lower one's probability of contracting covid which increased the expected marginal benefits associated with masks, so individual and market demands for masks

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increased dramatically. Similarly, if information about the health benefits of a particular lifestyle or type of food suggests that "it" is better for one's health than previously thought, then the MBs of that lifestyle or food increase and the demand for that lifestyle or food increases.

Changes in income also affects the MBs associated for many goods, because one's marginal benefit associated with an additional unit of a good is one's willingness to pay for that unit of the good. (Remember that marginal benefits are in terms of the dollar amounts (or other currencies) that one is willing to pay for another unit of the good. The higher is one's income, the more money one has, and (generally) the more money one is willing to pay for an addition unit of most goods. So, as consumer income increases, demand for all **normal (and superior) goods** increase. (There are a few goods where, as one's income increases, one is less likely to purchase fewer of such goods—such as good purchased at thrift shops. Economists call such goods "inferior" goods.)

The prevailing **price of substitutes or complements** also affect the marginal benefits (reservation price) for particular goods. If one is wearing a raincoat, the MB of an umbrella is less. Raincoats are substitutes for umbrellas, although not perfect ones. So, if the price of raincoats decreases, the MB of umbrellas tend to decrease as well. A substitute (raincoat) can be used instead of the good of interest

(umbrellas). A complement is something that you tend to use along with the good of interest. A beach towel is used with a swimsuit. A daypack is used with hiking shoes. A textbook or a particular set of webnotes (such as these) is used along with a college course. As the price of complements increase, the marginal benefits of the good of interest tends to decrease. So, an increase in the price of a complement causes demand to diminish (shift to the left), whereas an increase in the price of a substitute tends to cause demand to increase.

There are a huge range of changes in circumstances and expectation that can affect the marginal benefits of a good. What may be a bit surprising is that any change that increases the marginal benefits or expected marginal benefits of a good or service has the same effect on an individual's demand. It increases demand. If the same change affects most people in a market, then the market demand also increases.

And, when market demand increases—and the supply curve does not change—then price tend to rise, as indicated by figure 3.2 below.



Figure 3.2 The Direct Effects of an Increase in Consumer Demand

.Notice that the effect of an increase in demand on price is to increase the quantity of the good produced for sale by sellers, because an increase in price increases the profits that firms realize by additional production at the margin.

As prices increase, the marginal revenue of each firm increases, which induces firms to produce additional units of output. (Note that the figure to the right depicts the effect of a higher equilibrium price on a typical seller-producer.) The increase in profits by a typical firm is the area denoted with the "+" signs. This increase in production and sales implies that prices do not rise as much as would have happened without the adjustment to higher prices by firms.

III. Factors that Tend to Shift the Supply Curve

Equilibrium prices can also be affected by changes in supply (e.g. shifts in the supply curve). Such changes are induced by any factor that affects either then number of firms in the market of interest or the marginal cost of production borne by a typical firm in that market or industry.

Weather is, as for demand, a factor that can affect supply. It may do so by changing marginal cost directly or by changing the productivity of the process used to produce and bring the products of interest to market. For example, a late frost may greatly reduce the productivity of farms producing various fruits and vegetables. Indeed, for a subset of farmers (agricultural firms) a late hard frost may eliminate its production of many fruits and vegetables. For example, a few decades ago Florida was a major producer of oranges and orange juice, and a heavy frost could wipe out most of the oranges in a typical orange grove either by damaging the orange blossoms, the fruit on the tree, or in some cases the trees themselves. Bad weather such as a late flood, a drought, or, in some cases, excessive rains, can directly reduce the market supply of a broad range of agricultural products. Such reduction in supply tend to increase prices for the products of interest and thereby indirectly reduce the supplies (by increasing marginal costs of other products such as orange juice, pasta sauce, or bread that are made with the fruits, vegetables, and grains most affected by bad weather.

Any change in circumstances that induces input prices to increase tends to increase the marginal costs of products created with those inputs. Production is often undertaken by a series of firms that make up a "supply chain" of inputs used to produce the goods ultimately sold to consumers. Any change in the inputs or outputs along the supply chain tends to increase the marginal cost of producing the "final" goods and services sold to consumers, and thereby tends to reduce the quantity of goods that can be supplied at a given price.

Inputs include, for example: fruits and vegetables, various mined minerals [copper, iron, lithium, aluminum, etc.], intermediate goods [steel, computer chips, electricity, cardboard, transportation services, etc.], and the many types of labor used to produce the final goods sold to consumers. Increases in any of those "inputs" increases the marginal production cost of the final products ultimately sold to consumers and thereby reduces market supply. Each firm in the final goods market has higher marginal costs and so their supply curves shift back to the left and so does the market supply.

Another factor that can change the marginal cost of a product is technology. Innovations in productive methods generally reduce the marginal cost of production. Innovations that increase cost without improving quality, naturally, are not adopted by firms because such "innovations" increase their marginal costs and reduce their profits. So, only cost reducing innovations tend to be adopted and all such inventions reduce marginal costs for the typical firm in the supply chain, and thereby tends to reduce the marginal cost of producing goods that use those inputs.

Competition among sellers for consumer "dollars," in turn induces producers to pass on most or all of their cost savings. So, profits tend to increase for firms benefiting from improved production technologies which is what induces such technologies to be induced (at least in the short run). However, profits increase by less than the amount saved from marginal cost reduction because of competition among sellers for the purchase of consumers of their products.

Any change in circumstances (shock) that tends to reduce the marginal cost of production tends to increase market supply (shift the market supply curve out to the right) which—other things being equal—tends to cause the equilibrium price to fall, which tends to benefit all consumers who realize greater net benefits (consumer surplus) from their purchases of the goods with lower prices. (The area that characterizes a consumer's increase in consumer surplus is marked with "+" signs in figure 3.3.) Increases in the marginal cost of production have opposite effects.

Figure 3.3 The Direct Effects of an Increase in Supply



Many consumer goods are much less expensive today (in inflation adjusted dollars) than they were a decade or two ago, reflecting both the effects of innovation on production methods and the quality of final goods throughout the chain of producers that bring final goods to markets. Exceptions occur in areas where innovation is more difficult or impossible—as with higher education (so far)—whose prices have increased in real terms over the decades as universities compete for talented workers (professors) in the labor market for such persons.

Shifts and Both Supply and Demand

There are many cases in the real world where a change in circumstances affects only market demand curves or market supply curves, but there are others—such as unusually bad or good weatherthat affects both sides of the markets at the same time. In such cases, both the demand and supply curves change simultaneously, and predictions about sales (Q*) and prices (P*) may not be as clear as in the cases in which only one side of the market is affected.

In some cases, a shift in supply (upward) may cause prices to fall while an associated shift in demand (upward) and the result will depend on which effect is larger. Nonetheless, the diagrams still help to illuminate what is going on in the product market of interest, and also help explain why the result may be ambiguous as far as theory (economic principles) are concerned.

There are also cases in which the adjustments take place through time and the short run and long run effects of a demand shock or supply shock differ somewhat in the long and short run. In general, the adjustments to sales or output levels tend to be greater in the long run than in the short run—while the price effects are often smaller in the long run than in the short run for reasons developed in the next section.

IV. Long Run and Short Run Adjustments

In addition to factors that directly affect consumer marginal benefits and firm marginal costs, there are also price adjustments that take place through time as consumers and firms adjust their plans, because more factors can be taken into account and adjusted in the "long run" than in the "short run."

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Differences between the long and short run occur because many changes in plans or methods requires time. A college degree takes three or four years to finish. Thus, changing from a person with a high school degree and such a persons' employment opportunities to one with a college degree with quite different employment opportunities takes several years to implement. Similarly, change from one location to another takes a bit of time as some research may be necessary and financing and contracts take time to implement—in this case less than earning a college degree but more than grocery shopping.

Similarly, many of the adjustments that economic organizations can undertake take time to execute. It takes time to build a new factory, order specialized capital equipment and have it delivered and installed, and to train people to effectively use the new facilities. It also takes time to train (and or identify) relatively talented employees and even more to relocate the organization's productive or sales facilities from their present location to a new location.

Consequently, time matters—and adjustments to new prices, new technologies, or long-term shifts in demand or supply can take many years to occur. Such adjustments in "plans" may also affect both demand and supply as they are implemented. For example, the supply of trained or diligent people increases as more persons seek and obtain useful college degrees. An increase in the supply of such persons may induce firms to reorganize their production methods to take advantage of an increase in the numbers of such persons. A new method of production—better robots, AI-enhanced inventory and quality control, changes in the locations where important inputs are produces, and so forth may induce facilities to be modified and relocated. Such changes generally increase supplies for consumers and change the pattern of demand for inputs (including both many types of labor and capital).

Such long-term adjustments by both consumers and firms to new economic circumstances implies that long-run demand and long-run supply curves are more price-sensitive (e.g. flatter) than short run demand and supply curves whenever price changes induce significant changes in plans for or methods of future consumption or production.

Modeling Long and Short Run Supply





The most common way that economists have modeled the difference between short and long run decisions by firms it to assume that at least one factor of production (usually capital) cannot be varied in the short run. Since that factor cannot be varied in the short run, it cannot affect short run marginal cost, because it is a "fixed cost" rather than a variable cost. Because one cannot increase capital to expand output over the current level, marginal costs for expansion are higher than they would otherwise have been. Moreover, because one has more fixed capital than ideal for reduced output levels, reductions in output is "cheaper" in the short run than they would have been with the proper amount of capital. (That is, in a sense, fixed costs are higher than they would have been, with the cost-minimizing level of capital.) So short run MC is greater than long run marginal cost for expansions, but lower than long marginal costs for reductions in output. The lefthand diagram of figure 3.4 above illustrates this effect. Thus, every firm's LR marginal cost is "flatter" than its SR marginal cost for a "given" amount of capital—where that "given amount" is the amount that the firm regarded to be optimal for the particular level of production anticipated in the past—namely, its profit maximizing level for the price anticipated at that time.

This relationship has implications for the firm's long run and short run demand, because the same logic used in Chapter 2 applies for both a firm's short run and its long run supply curve. A firm's short run supply curve is constructed from a subset (possibly all) of the points on its short run marginal cost curve. The same firm's long run supply curve is constructed from a subset (possibly all) of a firm's long run marginal cost curve. Thus, a firm's long run supply curve is flatter (is more price sensitive) than its short run supply curve, as illustrated in the righthand graph of figure 3.4. Note that the market LR supply is flatter than the market SR supply.

That same diagram shows how prices adjust through time in response to an increase in demand for the product or service of interest. In the short run, relatively little can be done to increase supply because of fixed capital (and possibly limits on other factors). In the long run, those factors are adjusted to maximize profits (e.g. to reduce the cost of higher

levels of output). At the long run equilibrium price (where the new demand curve D2 crosses the LR supply curve), firm's have optimized their production levels and prices fall relative to the short run price.

That lower price tends to increase consumer surplus over what it would have been at the higher price.

Moreover, in this case, the last price movement is not caused by shifts in LR supply or demand, but rather by adjustments to the higher prices and firm outputs generated by adjustments by firms to the new level of demand.

A good recent example of this effect is the supply of N95 masks. The spread of covid 19, a potentially deadly disease, was said to be reduced if one wore an N95 mask. This greatly increased the demand for those masks and supplies were very limited. Prices did not rise fast enough to clear the market, and N95 masks disappeared from store shelves at both drug stores and building supply stores. Gradually, production was ramped up, and they became available again—albeit at prices that were triple or more than their previous prices. During the course of a year or so, production increased again as more equipment was installed, and prices gradually fell back to about their pre-covid levels. And supplies were sufficient that many people had a dozen such masks that they kept in coat pockets and in their glove compartments. Fortunately for "us" the spike in mask demand was temporary and lasted only two or three years in the U.S. in part (1) because vaccines were developed which reduced infection and death rates somewhat, and in part (2) because Covid 19 fortunately evolved in a manner that made it less deadly.

A Digression on Ricardian vs Marshallian LR Supply

There are two models of LR supply used by economists. The one used in this course (and text) is the Ricardian model. In that model all firms have somewhat different cost function (LR marginal cost curves) and LR output adjustments are mainly by the firms currently in the industry. There may be some marginal producers that enter when prices increase, but they make up a relatively small part of the overall increase in market output. In the Ricardian model firms realize different profits because of their different cost structures.

In the Marshallian model all firms in an industry are identical and operate at efficient scale in LR equilibrium. In such a market, LR output adjustments are all ultimately the result of entry and exit into the industry. Here one can imagine, changes in the supply of coffee shops or bars in response to changes in the demand for coffee or booze and nightlife. Coffee shops and bars are (mostly) all about the same size and all use very similar technologies.

In cases, in which firms use different technologies, are of different sizes, and may have better or worse management and access to inputs or good weather, the Marshallian model is inappropriate (even if it does simplify mathematical models) and the Ricardian one is most apt. It is for that reason that the Ricardian models are used in this course. They also simplify the geometry and logic of long run adjustments. Entry and exit do occur, but mostly by the least profitable firms.

LR and SR Consumer Demand

Although most microeconomic textbooks discuss differences between LR and SR supply, relatively few texts discuss differences between LR and SR demand for final goods and services (e.g. demand by consumers). However, there are many consumer demands that are also affected by their holdings of capital goods such as an automobile, house, cell phone, or computer. Such holdings are fixed in the short run although adjustable in the long run and so long run demand tends to be more price sensitive (price elastic) than short run demand for goods that are complements to or inputs for their fixed capital goods.



Figure 3.5 Long and Short Run MB and Demand

For example, suppose that the price of gasoline tripled to European levels. In the short run, gasoline consumption would not change very much because every consumer of gasoline has a particular car, SUV or truck and particular places that "have to" drive them. So, consumer demand for gasoline would not initially change much. There would be some adjustments as leisure drives were reduced and carpooling increased, but basically the result would be very much higher expenditures on gasoline, nearly 3 times as much as before the price rise induced by a supply shock of some kind or new public policy.

In the long run, however, those capital goods could be changed and smaller cars or hybrid or electric ones purchased to replace their "gas hogs." And, one might move closer to work to reduce commuting

expenses or take a somewhat lower paying job closer to home. So, the long run quantity of gasoline demanded at the new higher price would be much less than in the short run.

Figure 3.5 illustrates the effect that would be associated with a "local" public policy shift for a product sold on world markets. In this case, the local supply curve is essentially flat, because it is a small part of a much larger market for gasoline and the effect on gasoline prices is generated by a local regulation or tax. In the short run, there is a small reduction in purchases (from Q1* to Q', but a larger one in the long run, from Q' to Q2*.

In a diagram with upward sloping supply curves, prices would also fall a bit as the adjustment to long run demand occurred. This does not happen in the diagram because of the assumption that the supply effects were local rather than global (induced by local regulations or taxes) rather than global shocks on the world supply of gasoline.

V. Some Conclusions about Price Movements

Microeconomics focuses on the fundamental aspects of choice settings that explain most prices and most changes in prices. It rarely works perfectly, but nearly always works pretty well—and nearly always better than any other theory of prices or prices changes. The previous chapter demonstrated that ideas associated with the "marginal revolution" that took place during the 1870s can account for the fact individual markets tend not to have excess inventories and yet are able to—in most cases—serve all the customers wanting to purchase a particular product or service.

This chapter has shown that changes in the marginal benefits of most consumers will cause demand curves to shift and the result tends to be new equilibrium prices. If demand increases (shifts to the right), prices tend to rise. If demand decreases (shifts to the left) prices tend to fall. Similarly, changes in the marginal cost associated with producing goods or services for sale in markets tend to cause supply curves to shift. An increase in MC causes supply curves to shift back to the left and tends to cause prices to rise (and sales to fall). A decrease in MC tends to cause supply to increase (supply curves to shift to the right) with the result that—other things being equal—prices tend to fall.

The analysis of such shifts in supply and demand is normally referred to as "comparative statics," because it focuses on equilibrium outcomes rather than the process through which such outcomes emerge. It is comparative in that it compares outputs in prices at a new market equilibrium with those of an older one. It focuses on "statics" because once a new equilibrium emerges, there is no further reason for prices or outputs to change—unless another "shock" changes the average marginal

benefits of consumers or their numbers or unless some "shock" affects the marginal cost of SR or LR production, or the number of firms.

Nonetheless, although the models focus on equilibria, the models of this chapter can account for environments in which market prices and outputs are changing all the time. Such changes would occur if there were lots of "shocks" being adjusted to—either simultaneously or one after another.

The models insist that one should focus on the underlying source of gains from trade. Potential gains to trade exist whenever the cost of production is less than the highest price that a subset of consumers is willing to pay for the good or service of interest. When marginal benefits fall that price (the reservation price) also falls. The latter reduces potential gains to trade and thus trade tends to diminish. When the marginal cost of production falls, new gains to trade tend to emerge and so trade tends to increase.

Fortunately for markets, the latter has been very common for the past 200 years in the West.

The next chapter takes up the effects of markets on personal income and wealth. These are determined by prices in other markets—not markets for final goods, at last not directly, bur rather markets for inputs of various kinds.