

Macroeconomics

for Emerging East Asia

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3. Microeconomic Fundamentals

Microeconomics deals with how resources are allocated and incomes are distributed. Demand and supply are the crux of the matter.

Resources are scarce and human wants unlimited – this is the fundamental economic problem. It follows that choices must be made. A couple's choice to save money for a future down payment on a home means giving up vacation travel today. An aspiring young author's choice to write a novel means foregoing the steady wages of an office job. A farmer's choice to plant vegetable crops means diverting land from the production of grain. A society's choice to fight a war means sacrificing consumption, either now or in the future when the loans come due. The notion of cost in economics is based on this principle that every choice involves giving up other opportunities. **Opportunity cost** is defined as the best alternative foregone in the exercise of a choice.

In a market economy, choices on how to allocate resources are conveyed through demand and supply. In this chapter, we outline the mechanics of demand and supply focusing initially on product markets under conditions of perfect competition. Free markets operating under perfect competition yield an allocation of resources that is efficient in the sense that just the right amount of a good or service is produced so that the value of the marginal unit to users is equal to the cost of producing it. Against this stylized vision of a market economy we consider how in reality impediments to perfect competition arise and what that means for efficiency. We then shift attention from product markets to the markets for factor inputs to production. Finally, we conclude by explaining why an understanding of microeconomics is important to the study of macroeconomics.

Demand & Supply in Competitive Product Markets

Demand and supply interact in markets to determine the prices and quantities of goods and services traded. A strengthening of demand pushes the price of an item up attracting more resources into production of it. An expansion of supply brings the price down enticing customers to make additional purchases. Microeconomics provides a systematic framework for understanding these processes.

We focus initially on perfectly competitive product markets. Under perfect competition, individual buyers and sellers are **price takers** in the market. Being small relative to the overall size of the market, individual players are unable to influence price. In many situations the assumption of perfect competition is reasonable. One shopper cannot bargain for lower prices at the super market by threatening to take his business elsewhere; nor can one wheat farmer force crop prices up by withholding her output. In these situations, market participants must accept prevailing prices and can transact any volume of trade within their capacity without causing prices to budge.

Our focus is on product markets initially as distinct from factor markets. In product markets households are the buyers and business firms the sellers. The demand side of product markets thus embodies household preferences while the supply side reflects business costs.

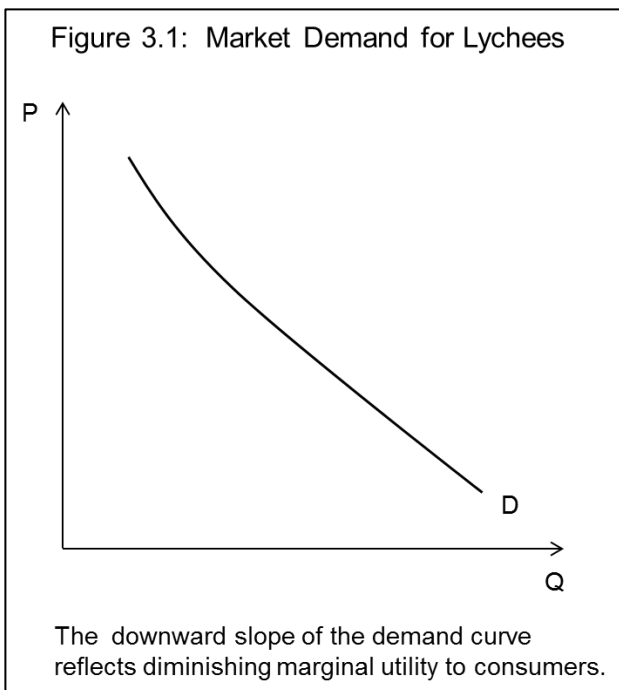
Conversely, in factor markets households are the sellers and firms the buyers. Households exercise property rights over the sale of labor, capital, land, and entrepreneurial talent which firms buy as the factor inputs to production. In factor markets then, the supply side conveys household preferences while the demand side reflects businesses responding to the ultimate demand in product markets for the goods and services they produce. (In this simple scheme, we ignore government as a buyer or seller.)

Demand

Demand in product markets is an expression of consumer preferences. People buy things to gain satisfaction, or in the language of economics, **utility**. Utility cannot be directly observed or measured. It cannot be compared across individuals or aggregated within societies. Rather, utility is a theoretical construct designed to aid in the interpretation of consumer behavior. Only indirectly through the way consumers reveal their preferences in the marketplace do we infer how utility plays a part.

Manifest in this utility shadow play is a gradual process of satiation. The more a person consumes of any given product, the lower the value she places on an additional unit of it at the margin. The paradox of diamonds and water famously illustrates this point. That a frivolous (or often frivolous) commodity like diamonds commands such a high price while the water essential to life is cheap by comparison may seem counterintuitive at first. But it is the relative scarcity of diamonds that makes them expensive at the margin, not their essentialness or lack thereof. Only because water is, in general, abundant does it hold such low value at the margin despite its inestimable utility in total. For a thirsty man stranded in the desert, of course, water would be worth more than its weight in diamonds.

The principle of diminishing marginal utility is reflected in the downward slope of the demand curve. Figure 3.1 depicts the demand for lychees. Quantity (Q) is plotted on the X-axis axis and the price (P) buyers are willing to pay for an incremental unit of lychees on the Y-axis. The first lychee consumed as the fruit comes into season is an exquisite treat and valued preciously. With each additional lychee consumed, however, the pleasure subsides a bit more. At some point as our consumer continues to partake, a point of satiation is reached and an additional lychee brings little, if any, enjoyment. The downward slope of the demand curve indicates that as quantity increases, the **demand price** that buyers are willing to pay for an additional unit at the margin falls.

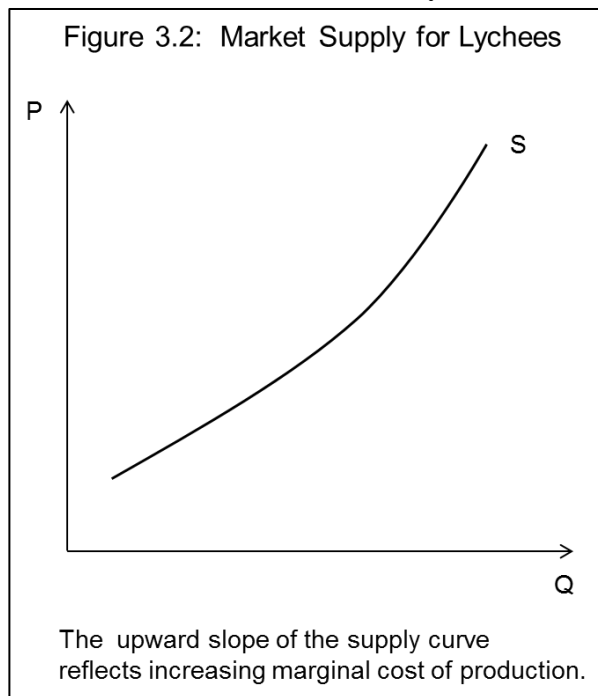


Supply

Supply in product markets is a reflection of the opportunity cost of resource inputs to production. Inputs may be drawn into a given use only if compensation is tendered for the

sacrifice of their foregone contributions elsewhere. Labor must be paid a wage that attracts it from alternative endeavors. Investment funds must be raised through the payment of competitive interest rates. Material inputs to production command prices that reflect their value in the marketplace to competing users.

The essential premise behind the supply curve is that resources are differentially adaptable to various uses. Certain land is well-suited in soil and climate conditions to growing lychees, for example. The area under lychee cultivation can be expanded but only by diverting land from other crops at ever increasing sacrifice. Moreover, to coax decent yields out of lands that are less amenable to lychee production requires more inputs of such complementary inputs as labor, fertilizer, and machinery. Commensurately, these other resources themselves must be



drawn at ever higher sacrifice in terms of their alternative uses. Some people are inclined by aptitude and training to be good lychee farmers. As those whose talents are better suited to other activities are drawn increasingly into lychee cultivation, the costs in terms of foregone contributions rise. All in all, this means the cost of lychee production increases at the margin as output expands, and hence so must the **supply price** of lychees increase.

The principle of increasing marginal cost is captured in the upward slope of the supply curve shown in Figure 3.2. Quantity is again plotted on the X-axis, and the price producers will accept to cover marginal cost on the Y-axis. As quantity increases, the supply price too increases in order to cover the rising marginal cost of production.

Equilibrium in Competitive Product Markets

Bringing the demand and supply curves together in the same graph allows us to examine their interaction. It is useful to distinguish between **demand** as a curve or schedule relating a continuum of quantities and prices and **quantity demanded** as a particular point on a given demand curve corresponding to a particular price, and similarly between **supply** as a curve or schedule and **quantity supplied** as a point on a given supply curve corresponding to a particular price. The idea of “supply increasing” or “demand decreasing” refers to a shift in an entire curve. In contrast, the idea of “quantity supplied increasing” or “quantity demanded decreasing” refers to a movement along a given curve. (This distinction is not adhered to outside the classroom, but for pedagogical purposes it works.)

Demand and supply jointly determine the price and the quantity traded in a market. Price and quantity are the endogenous variables of the model, meaning they are determined within the model. An outcome is arrived at through a process of equilibration. When the market is not in

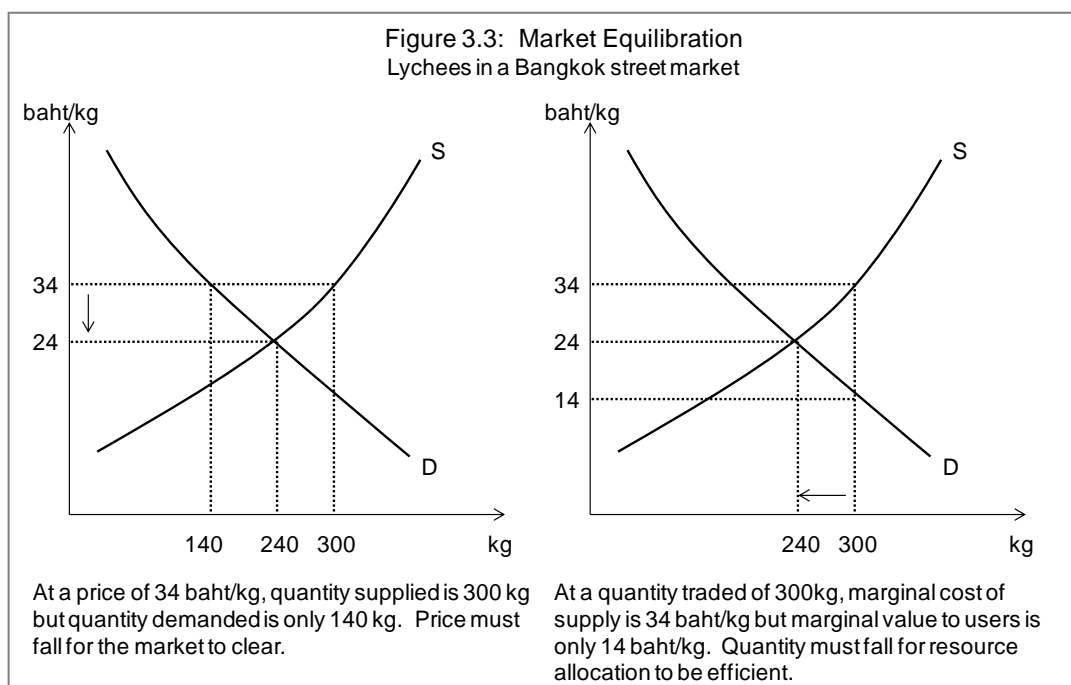
equilibrium, forces will drive it in that direction. Once an equilibrium is reached, there is no tendency for further change. When factors exogenous to the model impact supply or demand, the result is captured as a shift in an entire curve. In the wake of such a shift, a new equilibrium price and quantity will be arrived at.

The mechanics of market equilibration can be interpreted by reading from either the price axis or the quantity axis. Reading from the price axis, the story is one of decentralized market activity achieving order. The notion of the “invisible hand” of the market dates back to Adam Smith and the *Wealth of Nations* published in 1776. Smith wrote of self-interest as the great motivator of “the butcher, the brewer, or the baker” to provide the goods society desires with the market acting as arbiter. But competitive markets achieve something more profound and compelling than order as is revealed when the graph is interpreted from the quantity axis. The story told from this perspective is one of markets achieving efficiency in the allocation of scarce resources.

From the Price Axis – An Orderly Outcome

Trade in lychees in a Bangkok street market is depicted in Figure 3.3. In the version of the graph shown on the left we interpret equilibration from the price axis. At the relatively high price of 34 baht per kilo, sellers supply a plentiful 300 kilos of lychees. Buyers, on the other hand, are reluctant to purchase such expensive fruit demanding only 140 kilos. An excess supply of 160 kilos languishes on the market. Sellers find they must compete among themselves to attract customers and in doing so bid the price down. When the price reaches 24 baht per kilo, the intentions of sellers and the wishes of buyers coincide such that 240 kilos of lychees are bought and sold. If the price were to sink below 24 baht per kilo, the opposite scenario would play out. An initial excess demand would prompt buyers to bid the price up. Thus from any position other than 24 baht per kilo the price tends to move to this point, and when at 24 baht per kilo it tends to remain there. Twenty-four baht per kilo is a stable equilibrium price. It clears the market leaving no tendency for change.

Price competition pushes markets to clear. Buyers and sellers enter markets with certain intentions at prevailing prices, and if their intentions are not realized prices adjust until a resolution is achieved. In actuality, the process of adjustment is ongoing. Markets are buffeted relentlessly by forces that shift demands and supplies, in response to which equilibrium prices and quantities must be arrived at anew. That a market economy can constantly redirect resources in such a way that consumer demands are met is what inspired Adam Smith to conjure up the “invisible hand”. Without a central plan, without a grand auctioneer, without a feudal order or a caste system or the strictures of tradition to direct resource use, an orderly outcome is nonetheless achieved, “tumult resolved into a chord” in the words of Robert Heilbroner in *The Worldly Philosophers*.



From the Quantity Axis – An Optimal Outcome

That free markets bring order to economic activity is no mean feat. But there is more to the story. In the version of the graph shown on the right of Figure 3.3 we interpret the equilibration process from the quantity axis. At a hefty quantity of 300 kilos of lychees in our Bangkok street market, the marginal cost of supply is 34 baht per kilo. In the short term this high supply price on a particular street market reflects the opportunity cost of diverting existing produce from other markets including the logistics costs involved. In the longer term, it reflects the foregone opportunities of farmers to produce other crops, or more generally of resource inputs including farmers to be allocated from other uses. As it turns out, such abundance of lychees in the market is not commensurately appreciated by the market's customers. The marginal utility of 300 kilos of lychees to local consumers is reflected in a willingness to pay just 14 baht per kilo. The marginal opportunity cost to suppliers exceeds the marginal value to users to the tune of 20 baht per kilo. Resources have been over allocated to supplying lychees to this market. Better uses are to be had for the resources involved. With buyers unwilling to pay the price sellers must receive to cover costs, quantity will be cut back. A sustainable equilibrium is ultimately reached at 240 baht per kilo. At this quantity the marginal cost to supply lychees to the market is just equal to the marginal value to consumers at 24 baht per kilo.

Alfred Marshall placed quantity on the X-axis of his original demand and supply graph so as to tell the story of market equilibration from the standpoint of allocative efficiency. Marshall's own rendering is reproduced in Box 3.1. The quantities of goods produced and consumed under competitive market conditions are such that at the margin the opportunity costs of supply just equal value in use. To allocate any more resources to a given purpose would push the marginal supply cost above the marginal value to users. To allocate any less would leave the marginal value to users above the marginal supply cost. The resource allocation achieved by competitive markets is thus optimal. Marshall's framework lies at the heart of neoclassical economics, which is explored more thoroughly in Box 3.2.

Box 3.1: Alfred Marshall's rendering of market equilibrium

STABLE EQUILIBRIUM.

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When demand and supply are in stable equilibrium, if any accident should move the scale of production from its equilibrium position, there will be instantly brought into play forces tending to bring it back to that position; just as, if a stone hanging by a string is displaced from its equilibrium position, the force of gravity will at once tend to bring it back to its equilibrium position. The movements of the scale of production about its position of equilibrium will be of a somewhat similar kind¹.

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CH. III.
Oscilla-
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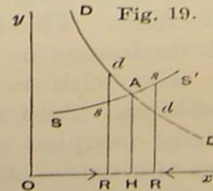
But in real life such oscillations are seldom as rhythmi- cal as those of a stone hanging freely from a string; the comparison would be more exact if the string were supposed to hang in the troubled waters of a mill-race, whose stream was at one time allowed to flow freely, and at another partially cut off. The demand and supply schedules do not in practice remain unchanged for a long time together, but are constantly being changed; and every change in them alters the equilibrium amount and the equilibrium price, and thus gives new positions to the centres about which the amount and the price tend to oscillate.

are seldom
rhythmi-
cal.

These considerations point to the great importance of the element of time in relation to demand and supply, to the study of which we now proceed. We shall gradually discover a great many different limitations of the doctrine

Looseness
of the
connection
between
the supply
price of a
commodity

¹ To represent the equilibrium of demand and supply geometrically we may draw the demand and supply curves together as in Fig. 19. If then OR represents the rate at which production is being actually carried on, and Rd the demand price is greater than Rs the supply price, the production is exceptionally profitable, and will be increased. R , the amount-index, as we may call it, will move to the right. On the other hand, if Rd is less than Rs , R will move to the left. If Rd is equal to Rs , that is, if R is vertically under a point of intersection of the curves, demand and supply are in equilibrium.



This may be taken as the typical diagram for stable equilibrium for a commodity that obeys the law of diminishing return. But if we had made SS' a horizontal straight line, we should have represented the case of "constant return," in which the supply price is the same for all amounts of the commodity. And if we had made SS' inclined negatively, but less steeply than DD' (the necessity for this condition will appear more fully later on), we should have got a case of stable equilibrium for a commodity which obeys the law of increasing return. In either case the above reasoning remains unchanged without the alteration of a word or a letter; but the last case introduces difficulties which we have arranged to postpone.

The fundamentals of demand and supply as set forth by Alfred Marshall in 1890 hold up to this day. Because Marshall did not want technical material to weigh down the narrative, he relegated the graphs to footnotes as shown in this page image from the third edition of *Principles of Economics* (1895).

Box 3.2: What is neoclassical economics?

Neoclassical economics is rooted in a theory of value based on marginal utility and marginal cost. Alfred Marshall is its leading light. Historian of thought David Colander places the origins of the neoclassical school in the period that began around 1870 and ended with a transition to “modern economics” in the 1930s and ‘40s. Colander argues, however, that the term has evolved to encompass such a mishmash of meanings that in his view the best course may be to retire it from use altogether.

The classical precursor to the neoclassical school is represented by such luminaries as Adam Smith, Thomas Malthus, David Ricardo, and John Stuart Mill. Neoclassical continuity with these thinkers is evident in the focus on understanding the process of exchange and in the *laissez faire* bent of the conclusions. The classical notion of value, however, is limited to the cost side of the market with the basis for cost vested fully in labor. The demand side of the market and the opportunity cost of inputs to production other than labor were absent from the analysis.

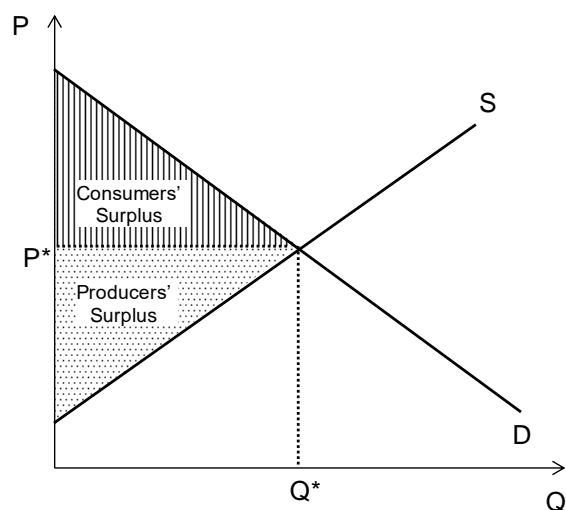
Advances in neoclassical economics culminated in 1947 with Paul Samuelson’s *Foundations of Economics*. Samuelson formulated formal models of household and firm behavior as the basis for generating demand and supply curves. Households are posited to maximize utility subject to a budget constraint and firms to maximize profits subject to given technology for converting inputs to outputs. The marginal utility and marginal cost interpretations of demand and supply are formally derived from these premises.

Against the neoclassical orthodoxy, heterodox approaches to economics have vied for recognition. The term “neoclassical” was coined in 1900 by institutionalist Thorstein Veblen who saw a need, in counterpoint to the rarefied abstractions of Marshall’s households and firms, for more thoroughgoing analysis of the complexities of human “habits, propensities, aptitudes, and conventions.” Other institutionalists, along with Marxists and their radical offshoots who emphasized social class and early macroeconomists who were concerned with the failure of labor markets to resolve unemployment, took issue in diverse ways with the neoclassical focus on competitive market equilibrium. Over time, the moniker “neoclassical” came to be applied generally – and usually pejoratively – to mainstream economics by any group identifying as outside the mainstream even as the mainstream itself expanded in content and evolved in analytical approach. Of note, in microeconomics game theory came into prominence and macroeconomics took shape to account for phenomena such as unemployment and the business cycle that lay beyond the scope of a standard market equilibrium framework. To absorb all of the modern mainstream under the neoclassical banner would move us far from the original conception.

Finally, adding one more complication, the term “neoclassical synthesis” has found application within macroeconomics. We will take up this issue in Chapter 9. For now, suffice to say that the neoclassical synthesis holds that while Classical principles of market equilibration apply as long run tendencies, the process can get sufficiently bogged down in the short run – in particular with respect to labor markets achieving full employment – as to justify a role for government in expediting it.

Colander’s wish for the term “neoclassical economics” to be expunged from the language will probably not be realized. At best, we can hope to understand the different ways in which the term is used and to discern by context the intent of the user. In this text, “neoclassical economics” will refer to the marginalist approach to understanding the allocation of resources and the distribution of income.

Figure 3.4: Consumers' & Producers' Surplus



Consumers' surplus is the excess of the marginal value to users over the market price.
Producers' surplus is the excess of the market price over the marginal cost of production.

The sense in which the competitive market outcome is optimal is examined more closely in Figure 3.4. At the competitive equilibrium output, Q^* (read "Q-star"), marginal cost of supply and marginal value to users are equated. Inside the margin, however, for all units of output less than Q^* , marginal value exceeds marginal cost. For these infra-marginal units, the market price that must be paid, P^* , is less than the marginal value to users. The area above P^* and below the demand curve is known as "consumers' surplus". Further, the market price received by sellers for all units below Q^* exceeds the marginal cost of supply. The area below P^* and above the supply curve is known as "producers' surplus". The combined area of consumers' and producers' surplus is maximized when output is at Q^* .

The concepts of consumers' and producers' surplus are applied by economists

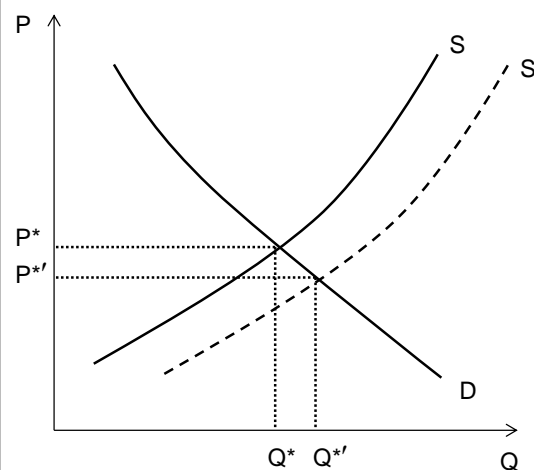
to analyze the impact of government policy measures that distort markets. Price controls, taxes and subsidies, and regulatory interventions all divert resources from their theoretically optimal allocations under competitive market assumptions. The degree to which such policies impact social welfare can be assessed through estimation of the effects on consumers' and producers' surplus.

Comparative Statics

Real world markets are in a constant state of flux, supplies and demands ever buffeted by myriad forces. Comparative static analysis provides a way of examining the impact on market equilibrium of changes in variables exogenous to the model. We isolate the market impact of a particular force under the assumption of *ceteris paribus*, which translated from the Latin means "all else equal".

As an example, suppose that, *ceteris paribus*, an advance in technology reduces the cost to produce a good. Graphically, this is represented as a rightward shift of the supply curve, as shown in Figure 3.5. For any given quantity along the X-axis, the supply price at which sellers can cover marginal cost is lowered. Or reading from the Y-axis, at any given price more resources can be

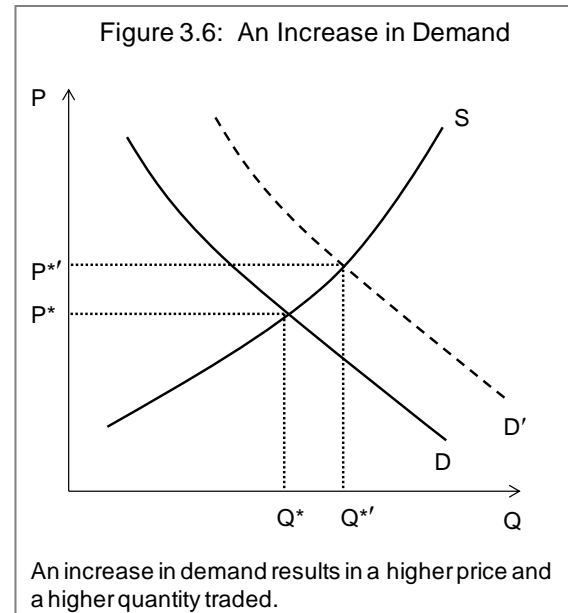
Figure 3.5: An Increase in Supply



An increase in supply results in a lower equilibrium price and a higher equilibrium quantity traded.

drawn into production so that a greater quantity is supplied. The shift in the supply curve yields a new market equilibrium. The equilibrium price falls from P^* to $P^{*'} (read "P-star-prime")$ and the equilibrium quantity rises from Q^* to $Q^{*'}$. The rightward shift in the supply curve results in a movement along the existing demand curve to the new equilibrium. Stated differently, an increase in supply results in an increase in quantity demanded following from the drop in equilibrium price.

Consider another example, this time affecting the demand side of the market. Suppose that, *ceteris paribus*, incomes rise broadly due to a generally strong economy. For a normal good this results in an increase in demand, or a rightward shift in the demand curve, as shown in Figure 3.6. The new demand curve reflects higher demand for the good at all prices. The equilibrium price rises from P^* to $P^{*'}$ and the equilibrium quantity from Q^* to $Q^{*'}$. The rightward shift in the demand curve results in a movement along the existing supply curve to the new equilibrium. Put another way, the shift in demand results in an increase in quantity supplied following from the increase in equilibrium price.



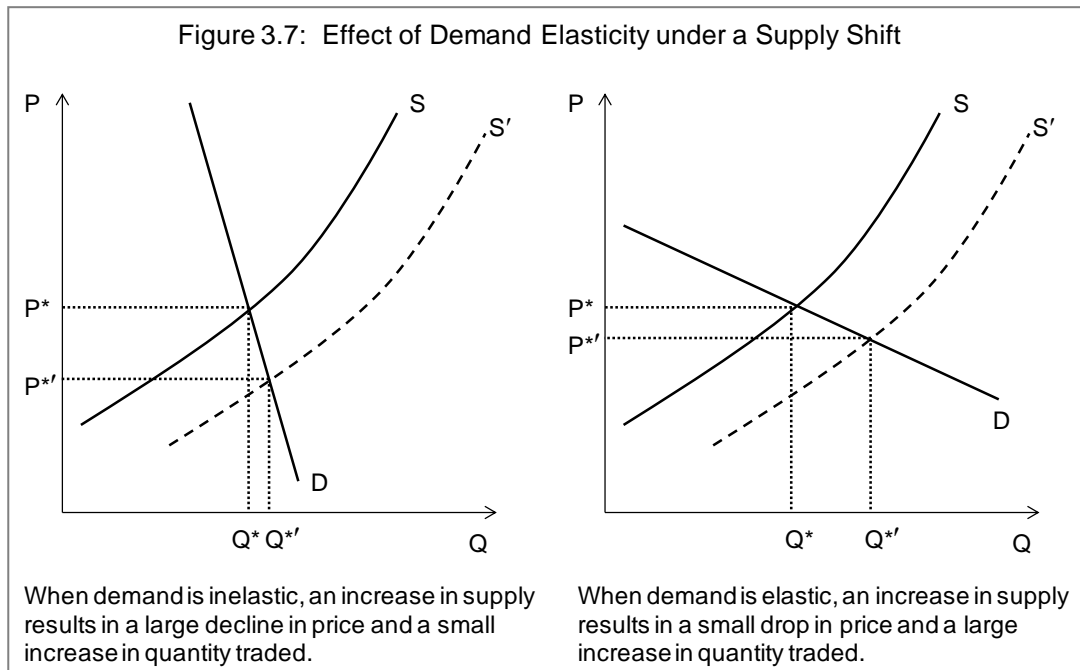
Exogenous factors other than income, changes in which can cause the demand curve to shift, include: consumer tastes and preferences; prices of goods that are substitutes for or complements to the good in question; expectations about the future; and government policy measures. And on the supply side, exogenous factors other than the technology example given, changes in which can cause a shift, include: prices of inputs to production; prices of related products; expectations about the future; and government policy measures.

How the expectation of future price changes influences prices in the present is worth elaborating on for its importance in macroeconomics. On the demand side, the expectation of higher prices in the future motivates buying sooner rather than later to beat the increase. Consequently, the current demand curve shifts to the right. For sellers, the expectation of higher prices in the future provides the incentive to withhold output to take advantage of higher returns later. The current supply curve thus shifts to the left. These dynamics reinforce each other to accelerate the expected price increases making for a self-fulfilling prophecy. On an economy-wide scale, expectations of generalized high inflation tend to be similarly self-fulfilling. This can make it difficult for authorities to rein in inflation.

Elasticity

The demand and supply framework holds that quantities respond in given direction to price changes. Elasticity provides a measure of the degree of this response. Elasticity is calculated as the percentage change in quantity demanded or supplied divided by the percentage change in price. If a one percent change in price yields more than a one percent change in quantity (in absolute value) the demand or supply curve is said to be elastic; if the response is

less than one percent, it is said to be inelastic. Figure 3.7 illustrates. In both panels an increase in supply results in a movement along the demand curve to a lower equilibrium price and a higher equilibrium quantity. In the case represented on the left, the demand curve is inelastic so the supply increase drives the price down steeply to generate only a modest increase in quantity demanded. By contrast in the case represented on the right the demand curve is elastic so that just a slight drop in price delivers a large increase in quantity demanded.



The degree of *price elasticity of demand or supply* is generally sensitive to the time frame under consideration. Quantity responses tend to be greater the longer the passage of time. On the demand side, changes in household patterns of consumption rest on adjustments in habit and lifestyle that do not necessarily play out quickly. On the supply side, for firms to make major changes in production requires expanding or closing plants, hiring or laying off workers, and adopting alternative technologies. The oil price shocks of the 1970s presented a vivid illustration of long run versus short run responses to price. Oil price increases were forced by a cartel of oil producing nations that agreed to collectively restrict output. With only modest supply cutbacks, the price of oil quadrupled in 1974, and doubled again with renewed tightening of supply in 1979. After each initial shock, however, oil prices went into a long downward slide. This was because over time on the demand side, consumers cut back use by switching to smaller, more fuel-efficient vehicles and installing better insulation in their homes, among other things. And on the supply side, countries that did not belong to the cartel developed other sources of production. In the long run then, both demand and supply proved quite elastic, and price increases moderately significantly.

The response of demand and supply to factors other than price is captured by various other measures of elasticity. These applications of the concept are captured graphically by the horizontal shift in an entire demand or supply curve taken at the initial equilibrium price level. The *cross-price elasticity of demand* measures the percentage change in quantity demanded of

one good relative to a percentage change in price of another good. To continue the fuel oil example, we might expect the cross-price elasticity of demand for oil with respect to the price of natural gas to be fairly high, at least in the long run since oil and gas are close substitutes. The **income elasticity of demand** captures the responsiveness of demand to changes in income. For example, above a certain threshold of need, the income elasticity of demand for food is low. The **elasticity of substitution** between two inputs to production is defined as the percentage change in the ratio of the input quantities to a percentage change in the ratio of their prices. Agriculture, for example, exhibits a fairly high elasticity of substitution between capital and labor inputs as illuminated by the widely differing approaches to farming seen across countries at different stages of economic development.

Relaxing the Perfect Competition Assumption

The model of perfect competition assumes that all buyers and sellers are price takers. In many markets, this assumption clearly does not apply to any reasonable approximation. Sometimes sellers, or buyers, are sufficiently dominant that they can wield influence over market price. As opposed to being price takers, they have **market power**. In the extreme case, a monopolist exercises total control over price – but not over both price and quantity simultaneously. In setting a higher price, the monopolist or any seller with market power must accept a reduction in sales.

Market power results from market concentration among a small number of sellers or buyers. Market concentration among sellers may come about for a variety of reasons. Some industries exhibit substantial economies of scale. This means that as output increases, the cost of production falls, which gives larger producers an advantage over smaller ones. Examples of industries where economies of scale limit the market to one or a small number of producers include the manufacture of jet planes and the local distribution of electric power. In other industries, barriers to entry may impede competition. Sometimes these barriers to entry are created by government conferring licenses or awarding patents and copyrights, and with good reason. Licenses ensure that standards are met while patents and copyrights are intended to incentivize innovation and creative endeavor. In still other industries market power derives from branding and product differentiation. Consumers become loyal to a particular make of car or brand of ice cream, for example. While the car manufacturer or the ice cream maker still faces competition from other brands, it nevertheless has some latitude for setting price beyond the iron dictates of a perfectly competitive market.

Under pure competition an individual firm effectively faces a perfectly elastic demand curve: at the market price the firm can sell any feasible level of output; but at any price above the market price it can sell nothing. By contrast, a firm with market power faces a downward sloping demand curve: it can increase sales only by lowering price. In choosing a price/quantity combination, the firm with market power will consider the impact on total revenue of its pricing decisions. Total revenue is equal to price times quantity, represented graphically as the area of a rectangle, as captured in Figure 3.8. When the firm raises price from P' to P'' (read “P-double-prime”) it loses revenue from a reduction in sales, but this is more than offset by the higher price per unit generated on remaining sales. The elasticity of the demand curve determines whether lowering price will increase or decrease revenue. If demand is inelastic, raising price will increase revenue, as in Figure 3.8, because the effect of the price increase more than makes up

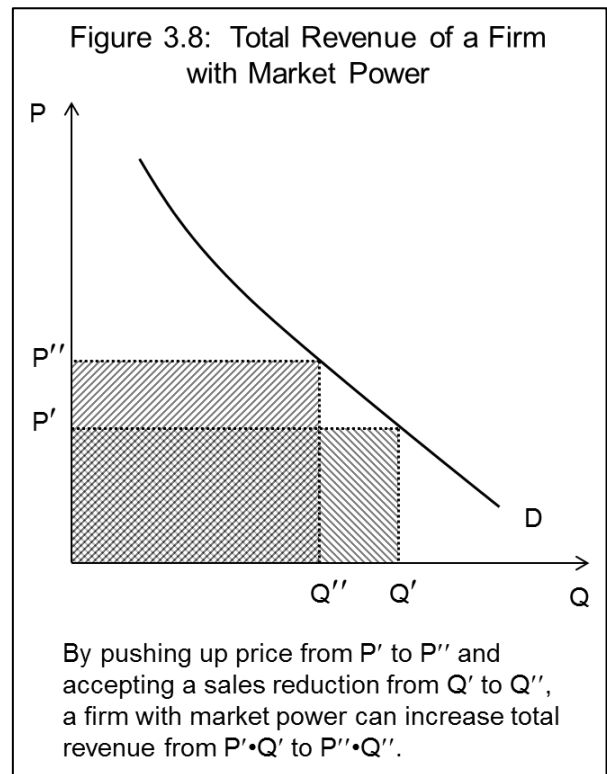
for the loss in sales. Conversely, if demand is elastic, raising price will decrease revenue because a small price increase will result in a relatively large reduction in sales. How elastic an individual firm's demand curve is depends importantly on the availability of close substitutes. Firms that rely on branding and product differentiation to carve out a niche in the marketplace tend to face fairly elastic demands for their products. On the other hand, true monopolies created by significant economies of scale or barriers to entry may have a great deal of pricing power if left unregulated.

In the model of perfect competition, the assumption that buyers and sellers are price takers yields the appealing result that markets will allocate resources efficiently. Just the right amount of a good will be produced and consumed so that at the margin the value to consumers is equal to the cost to producers. In markets where firms are not price takers, however, this result does not hold. Competition among firms is essential to drive price down to meet marginal cost. Without competition a firm can raise price above marginal cost by limiting output. The wedge between the price, which aligns with the marginal willingness to pay by users, and the marginal cost of production implies that resources are under-allocated to the production of the good. The case for free markets is thus not so compelling when perfect competition does not prevail.

When market conditions are not conducive to perfect competition, governments sometimes get involved. In some cases this means government taking ownership, particularly in industries that are natural monopolies due to their economies of scale. Public utilities are a prime example. In other cases, private ownership may be permitted but with government stepping in to regulate investment and pricing decisions. Even for industries that lend themselves to competition, government has a role to play in safeguarding against collusion or blocking mergers and acquisitions that would concentrate market share unduly. Of course, government intervention in markets often leads to less than ideal outcomes in other ways. In practice, finding the best mix of public and private, regulation and free market, is an ongoing exploratory process.

Factor Markets

Factor markets pertain to land, labor, capital, and entrepreneurship. These factors of production are remunerated, respectively, in the form of rent, wages, interest, and profits. The notion of profit in economics refers to an above normal rate of return to capital where the normal rate of return is indicated by the market rate of interest. Positive economic profits act as the reward to innovation and risk taking – the essence of the entrepreneurial contribution to an economy. The presence of economic profits in an industry acts as a magnet to new investment.



The expansion of output that results drives prices down until returns in the industry are aligned with those elsewhere in the economy and economic profits disappear. Conversely, when economic profits are negative, businesses are pushed to close down or cut back production which causes prices to rise until economic profits are restored to zero. Sustained economic profits are a sign of barriers to entry and the existence of market power.

For the other three factors of production, demand and supply function under competitive market conditions to determine rates of compensation and levels of utilization. As in product markets, buyers and sellers in competitive factor markets are price takers and the neoclassical logic of the margin applies. Let us reason through the process with respect to labor. An individual firm takes the market wage for labor as given and makes the hiring decision based on the marginal productivity of labor relative to the wage. In the short-run, the firm's plant and equipment are fixed. As the firm adds more workers to its existing physical capacity, at some point the productivity of additional workers begins to decline. As long as an additional worker generates an increment to output that exceeds the wage the worker commands, the worker is worth hiring. Once the value of the marginal product of labor is just equal to the wage, employment has reached an optimal level. Adding further workers with marginal productivity falling short of the wage would decrease the firm's net revenue.

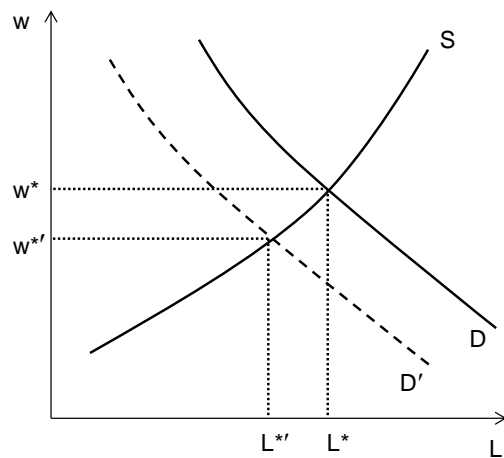
On the supply side of the labor market, devoting more workers to a particular use requires that they forego alternative pursuits. Workers differ in their skills, aptitudes, and preferences. Allocating people to a particular activity involves repurposing them at ever increasing opportunity cost from other things they like doing and are good at. A given market wage will attract a supply of labor into an activity until at the margin the foregone return in alternatives is just matched.

The market for a particular kind of work reaches equilibrium at a wage that equates the quantity of labor demanded with the quantity supplied. The level of employment at this equilibrium wage is such that the value of the marginal product of labor on the demand side is equal to the marginal opportunity cost of labor on the supply side. This outcome represents an efficient allocation of labor to a given use. To apply any less labor to such use would mean that the contribution of an additional worker at the margin would exceed the opportunity cost of that worker, while to apply any more would mean the worker's contribution at the margin would fall short of his opportunity cost.

Markets will arrive at an efficient allocation of labor among uses provided that the buyers and sellers of labor are competitive wage takers. If either buyers or sellers of labor are able to exert market power over the wage rate, the outcome will deviate from optimality. On the demand side, large firms that dominate employment for particular skills or in a particular geographic locations may be able to exercise market power over the wage. And on the supply side, workers have sometimes succeeded in forming unions to exert market power.

The demand for labor is derived from the demand for the final goods and services produced. Changes in product markets feed back to changes in the demand for labor through their impact on the value of labor's marginal product. A decrease in demand in a product market lowers the equilibrium price of the product which in turn reduces the value of the marginal product of the labor that produces the product. Figure 3.9 captures this as a leftward shift of the labor demand curve and a movement along the labor supply curve to a lower equilibrium wage, $w^{*'}$, from the initial wage, w^* . Equilibrium employment drops from L^* to $L^{*'}$. Labor is released

Figure 3.9: A Decrease in Labor Demand



An decrease in labor demand results in a lower wage and a lower quantity of labor employed.

to other uses because the wage rate in this particular use no longer covers the opportunity cost of worker time.

An important determinant in the elasticity of demand for labor is the degree to which capital can be substituted for labor in the production process. In some industries capital is readily substituted for labor making the demand for labor quite elastic. In other industries, available technologies prescribe more rigid capital-to-labor proportions and the demand for labor consequently tends to be more inelastic.

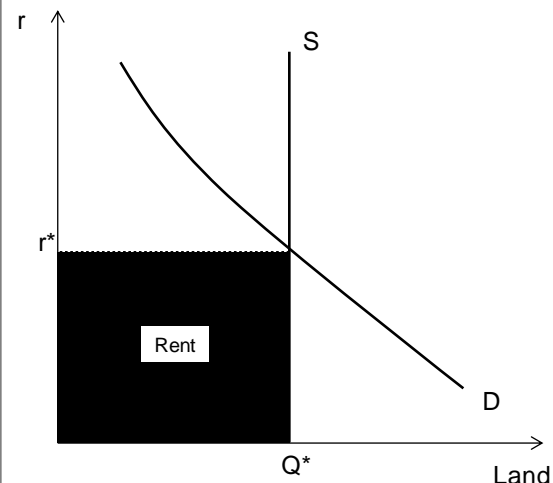
Land is unlike other factors of production in being completely immobile. The market for land in a given location is thus characterized by a perfectly inelastic supply curve. Land defined by location has no opportunity cost as it cannot but be

available precisely where it is. Regardless of the rental rate, r , the supply is fixed, as depicted in Figure 3.10. As a result, the rental price for land is determined entirely by the demand side of the market. Those desiring to make use of land in a particular location must compete against each other to obtain rights to it. The land's value thus reflects its scarcity, not the opportunity cost of it departing for better terms.

A more general concept of **economic rent** follows from the properties of land rent. Broadly speaking, economic rent refers to a return above supply cost. Often economic rents arise out of government policies that limit market competition. Governments grant monopolies, confer licenses, engage contractors, and impose regulations that can potentially generate returns to factors in excess of their opportunity costs. To gain advantage from such preferential opportunities, enterprising individuals engage in "rent seeking" behavior. Often, this is perfectly legal. But sometimes, rent seeking crosses the line into corruption – government officials extracting kickbacks, say, for awarding generous construction contracts or facilitating health and safety inspection approvals. Legal or otherwise, rent seeking is generally not economically productive but rather draws its rewards from the redistribution of economic benefits. Good policy design thus aims at minimizing the existence of opportunities for rent seeking.

Capital inputs to production (buildings, equipment, land improvements) are distinguished by their long lives. New capital assets are mobile with respect to how and where they are to be

Figure 3.10: The Market for Land



The rent paid to land reflects its scarcity value.

utilized. Once assets have been situated into production facilities, however, they can lose much of this mobility. On the supply side, the price of new assets reflects their costs of production. On the demand side, firms will acquire new assets to the point where at the margin the expected rate of return covers the interest cost of investment funds. As time passes, however, expectations are not necessarily realized. Once established in use, plant and equipment take on something of the fixity of land. The sunk costs associated with the initial production of the assets then lose relevance in the decision to continue to employ them. The value of assets in place is determined more narrowly by the returns they are expected to generate in their current or any alternate uses. Existing assets in place will be engaged as long as the rate of return covers the variable costs of maintenance and operation.

For factors of production of all types, demand is derived from the markets for end products. Supply, on the other hand, varies in nature depending on the factor. Land being fixed by location, cost of production vanishes from the calculus. Price is determined solely by demand-driven scarcity. Of course, if we think of land supply by form of usage within a locality much fungibility exists, and supply of land to one use will reflect opportunity cost in other uses. Labor is for the most part highly mobile by location, by industry, and by function. The wage at which labor will be supplied to any particular use or location thus reflects its opportunity cost in other uses or locations. Capital is a hybrid, mobile *ex ante* but largely fixed *ex post*. The initial supply of a capital asset into any given use reflects the opportunity cost of resources absorbed in its production. Once in place, however, the sunk costs of the initial outlay do not matter. What is relevant to utilization decisions for an asset in place is the cost of continued maintenance and operation versus any liquidation value it may have. Under competitive market conditions, factor inputs will in general be allocated to alternative uses to the point where marginal product is aligned with marginal opportunity cost. Market determination of wages, interest rates, and rents drive this equilibration process.

Entrepreneurial talent is not traded on such well organized markets as the other factors of production. It is too hard to quantify and price. Rather, entrepreneurs act as the residual claimants of the returns to productive activity. After the other factors have received their due, entrepreneurs claim the economic profits or bear the economic losses. It is up to them to allocate their abilities to the highest return uses. That is what makes them entrepreneurs.

Micro Fundamentals for the Study of Macro

Microeconomic tools will prove useful in two ways for our study of macroeconomics. For one, we will invoke them, in a very stylized way, to thinking of the economy as a whole as one big demand and supply system. More pointedly, we will apply them to analyzing key markets that function at the level of the economy as a whole.

The basic concepts of demand and supply can be extended to an economy-wide level. Generalizing to an aggregate notion of output and an overall price level, we can conceive of aggregate demand and supply functions that yield an equilibrium outcome. Following the lessons of micro, when aggregate demand increases (that is, the aggregate demand curve shifts right), the price level and aggregate output will rise. When aggregate demand decreases (or the aggregate demand curve shifts left), the opposite happens. When aggregate supply increases (or the aggregate supply curve shifts right), aggregate output rises and the price level falls, and vice versa. This model will take us some distance in interpreting macroeconomic phenomena and

analyzing government policies that affect demand or supply in broad terms. The aggregate demand / aggregate supply framework will be laid out in full in Chapter 9.

The model of equilibrium in the aggregate is ultimately unsatisfying, however, in view of the all too obvious tendency for economies to function at less than full capacity for extended periods. The equilibration process clearly does not work in a timely or fulsome manner to eliminate unemployment and keep plant and equipment operating at full steam. Moreover, economies tend to cycle through periods of slump – with unemployment high and growth sluggish – and overheating – with inflation mounting and growth hitting unsustainable levels. A theory centered on equilibrium is at odds with such observed cyclicalities that tends to involve sustained periods of under performance. Indeed it effectively denies the very processes of core interest to macroeconomists. While the neoclassical theory of the market may function satisfactorily to explain activity at the micro level for the vast majority of labor force participants who are employed even in bad times, its inability to explain a significant minority of workers being jobless for long stretches is an untenable failing from a macro standpoint. Macro theory must then consist of more than an aggregate demand and supply framework rooted in the principles of micro.

Microeconomic theory comes into its own in the analysis of two particular markets of special relevance for the economy as a whole. These are the markets that set the prices for loanable funds and foreign exchange. The price of loanable funds is the interest rate. The interest rate is key to guiding credit growth, which in turn acts as a catalyst for economic growth broadly. The exchange rate at which foreign currency trades for domestic currency is pivotal in determining exports and imports, again with significant consequences for overall economic growth. Demand and supply will prove essential tools for understanding these markets in the macroeconomic context.

Bibliographic Note

Alfred Marshall's *Principles of Economics* is the primordial source for the demand and supply graphs that remain at the heart of modern microeconomic textbooks. First appearing in 1890, Marshall's volume went through eight editions over the ensuing 30 years. Marshall's nephew, C.W. Guillebaud, has done the great man's followers a service in tracing the roots of every passage contained in the eighth edition to its first appearance in a previous edition. Guillebaud's exegeses was published in 1961 as *Principles of Economics: Volume II – Notes*, in conjunction with a re-release of Marshall's eighth edition. Guillebaud's painstaking review led him to conclude that the third edition represented the expository peak of the *Principles*, subsequent revisions having served on balance to "devitalize" it.

Marshall's ideas had antecedents among the classical economists Adam Smith, Thomas Malthus, David Ricardo, and John Stuart Mill. The concept of utility that undergirds the principle of demand is due to Jeremy Bentham. A highly readable history of thought that traces the ideas of these pioneers in economic science is Robert Heilbroner's *The Worldly Philosophers* (the quote in this chapter being taken from page 5). A more deeply analytical treatment is provided by Joseph Schumpeter in his *History of Economic Analysis*.

Bibliographic Citations

Bentham, Jeremy, 1789. *An Introduction to the Principles of Morals and Legislation* (London: T. Payne, and Son).

Colander, David, 2000. "The Death of Neoclassical Economics", *Journal of the History of Economic Thought*, Vol. 22, No. 2, pp. 127-143.

Guillebaud, C.W., 1961. *Principles of Economics*, 9th (Variorum) Edition with Annotations, Volume II Notes (London: MacMillan).

Heilbroner, Robert L., 1962. *The Worldly Philosophers: The Lives, Times, and Ideas of the Great Economic Thinkers* (New York: Time Inc.).

Malthus, Thomas, 1803. *An Essay on the Principle of Population* (London: T. Bensley).

Marshall, Alfred, 1895. *Principles of Economics*, 3rd Edition (Cambridge, UK: Cambridge University Press).

Mill, John Stuart, 1848. *Principles of Political Economy* (Boston: C.C. Little & J. Brown).

Ricardo, David, 1817. *Principles of Political Economy, and Taxation* (London: John Murray, Albemarle-Street).

Samuelson, Paul, 1947. *Foundations of Economic Analysis* (Cambridge, MA: Harvard University Press).

Schumpeter, Joseph A., 1954. *History of Economic Analysis* (New York: Oxford University Press).

Smith, Adam, 1776. *An Inquiry into the Nature and Causes of the Wealth of Nations* (London: W. Strahan; and T. Cadell).

Veblen, Thorstein, 1900. "The Preconceptions of Economic Science. III", *The Quarterly Journal of Economics*, Vol. 14, No. 2 (Feb.), pp. 240-269.