

Alfred Marshall and Partial Equilibrium Theory

WITH ALFRED MARSHALL (1842–1924) we come to the group of economists that many have called the second generation of marginalists. There is little doubt, however, that Marshall himself would have preferred to be classified as belonging to the first. He liked to point out that he had come far in working out the new approach as early as the 1860s, but the fact is that he did not publish his version of it until 1890. But even if he was later to publish than Jevons, Menger, and Walras, Marshall gave the new theories a form that made them more accessible both to professional economists and others, and more useful as practical tools for applied economic analysis.

Alfred Marshall's father was a cashier in the Bank of England, but there is little indication that the central bank connection kindled the son's interest in economics. His father wished him to study theology in Oxford, but Marshall wanted to study mathematics and physics, and with the assistance of a wealthy uncle he began his studies at the University of Cambridge in 1861. He gradually turned more toward philosophy and economics, and according to his own account, his interest in economics stemmed from a desire to do something to improve the standard of living of the poorest in society. He began his economic studies by reading Ricardo and Mill, using his mathematical skills to give their theoretical analyses a more precise mathematical form.

After the completion of his studies in 1865 Marshall obtained a fellowship at St. John's College in Cambridge, and he also began to teach economics. In 1877 he married Mary Paley who had been his student and who was also an economist. The couple moved to Bristol, where they both lectured at the newly established University College, and they also collaborated on a book, *The Economics of Industry*, which was published in 1879. Among specialists on Marshall there has been some disagree-

ment about the respective shares of the two authors in the work that went into this book. There can be no doubt that from the beginning it was Mary's book, while her husband gradually came to play a more important role as coauthor. With this book, which Marshall later tended to speak about in rather patronizing tones, Mary Marshall's career as an economics writer was over, and she devoted the rest of her life to support her husband's work.

From Bristol, Marshall moved to the University of Oxford, but after two years he returned to Cambridge as professor of economics, a position that he occupied for twenty-three years. That Marshall should have been the obvious choice for the only chair in economics at his old university is a little surprising. At that point in his career he had published little. He had plans about a book on international trade theory, but what he wrote on this topic remained unpublished in his lifetime and was only read by a small circle of colleagues and students.¹ He had begun work on the book that was destined to become his major achievement, but nothing of this material had so far been published. Nevertheless, he had achieved a position and reputation that made him the undisputed leader of academic economists in the English-speaking world. This position was strengthened when the *Principles of Economics* was finally published in 1890. The book appeared in eight editions, and a large part of Marshall's time was spent in revising and extending it, particularly by adding an increasing number of appendices. Originally, Marshall had planned this as the first volume of a multivolume work, but he never completed the other volumes (we recall that Menger and Walras had similar plans that did not succeed). However, in his later years he managed in spite of poor health to realize at least part of the plan with the two books *Industry and Trade* (1919) and *Money, Credit, and Commerce* (1923). They were based on material that he had been working on for decades and seemed at least in part to be dated already at the time of publication. They therefore became far less influential than the *Principles*.

¹ His best-known and most highly regarded work in this field is the chapter draft "The Pure Theory of Domestic Values" (reprinted in Whitaker 1975). It was there that Marshall introduced his so-called "offer curves," which he used in a geometric version of John Stuart Mill's analysis of price formation in international trade (see chapter 5).

STYLE AND AMBITIONS

Many have wondered why Marshall needed such a long time to publish his ideas. Keynes (1933) thought that one explanation was Marshall's high demands on the standard of his published work. Another explanation lies in his sensitivity to criticism; he was especially keen not to publish anything that could hurt or provoke others. In this connection it is interesting to note the review that he wrote in 1872 of Jevons's *Theory of Political Economy*, which had appeared a year earlier. The review is on the whole positive, although the tone is rather chilly. If it is true that Marshall had already arrived at many of the same results, it is easy to imagine his frustration at reading an author whom he felt had overtaken him in terms of time of publication. Some of his criticism of the style and contents of Jevons's book also reveals something about Marshall's attitudes toward theoretical innovation in economics, as when he writes:

The main value of the book, however, does not lie in its more prominent theories, but in its original treatment of a number of minor points, its suggestive remarks and careful analyses. We continually meet with old friends in new dresses. . . . Thus it is a familiar truth that the total utility of any commodity is not proportional to "its final degree of utility." . . . But Professor Jevons has made this the leading idea of the costume in which he has displayed a large number of economic facts. (Marshall 1872; Pigou, ed. 1925, p. 95)

The remark on utility theory does not testify to a clear understanding of the theoretical novelty of Jevons's book. Clearly, Marshall had also reacted negatively to Jevons's revolutionary tone and his tendency to downgrade earlier writers;² maybe there is also an element of jealousy in the picture. He is also critical to Jevons's use of mathematics. He says that the recent application

² Marshall frequently stressed the historical continuity of economic thought and the close connection between his own theoretical framework and that of the classical economists, especially Ricardo and Mill. By contrast, he was disinclined to refer to and give credit to the work of his contemporaries, and in his later years he seems to have lost interest in the new theoretical developments that took place.

of mathematics to economics by several writers both in England and on the Continent has led to several "valuable suggestions." However,

all that has been important in their reasonings and results has, with scarcely an exception, been capable of being described in ordinary language. . . . The book before us would be improved if the mathematics were omitted, but the diagrams retained. (Marshall 1872; Pigou, ed. 1925, p. 99)

It is remarkable that someone with a solid mathematical background should have this attitude to the use of mathematics in economics. Marshall admitted that mathematics could indeed be helpful, but only for the theorist's private use. If his mathematical analysis led to new economic insights he should be able to express them in "plain English," and when that had been achieved the mathematics could be "burned." If, on the other hand, it turned out to be impossible to express the results of the mathematical analysis in plain language, it was necessarily of little interest and value to the public to which it was addressed. When writing the *Principles*, Marshall followed up this view by relegating all formal analysis to footnotes and a separate mathematical appendix.

What was the nature of the public that Marshall tried to reach? His *Principles* was clearly intended as a textbook for students, and as such it was very successful. But it was also a scientific treatise directed toward other economists, and it became very influential as an authoritative statement of the state of the subject in 1890 and the following decades. In addition, another of Marshall's ambitions was that the book should be read by practical men of business. It is more doubtful to what extent this aim was achieved, but it exerted a significant influence on the structure and style of the book.

The *Principles* are divided into six main parts, or "books." Of these it is book 5 that has received most attention by later economists, because it is there that Marshall establishes the theoretical framework for partial equilibrium analysis that was to have such an important influence on the development of economics. But the other books are also of great interest, not least because they demonstrate Marshall's broad perspective on economy and society.

SUPPLY AND DEMAND

It is likely that the modern reader of the older literature of economics will first recognize the theoretical framework of modern textbooks (at least in microeconomics) in Marshall's *Principles*. Partial equilibrium theory—the analysis of price formation in a single market—is forged into an operational tool of analysis that can be used to analyze a range of theoretical and applied problems. An important aspect of his price theory was also that it provided an integrated view of the relationship between the classical approach and the new view that was associated with the marginalist breakthrough.

The price theory of the classical economists was a cost-of-production theory; the unit cost of production determined the price. However, they made an exception for goods that existed in fixed quantities, such as rare coins or works of art. In such cases price would be determined by scarcity. This dichotomy was unsatisfactory because it did not establish a *general* theory of price formation. One of Marshall's most important contributions was that he developed an analysis that effectively buried the controversy surrounding the respective roles of demand and supply in the determination of prices. The essence of that contribution was the now well-known supply and demand diagram, where an upward-sloping supply curve and a downward-sloping demand curve were drawn in the same diagram and where equilibrium is represented by the point of intersection between the two curves—the "Marshallian cross," as it has been called.³ Keynes writes that "after Marshall's analysis there was nothing more to be said" (Keynes 1933, p. 182). Even if this is an exaggera-

³ Actually, it was Marshall who introduced the convention of drawing this diagram with price on the vertical and quantity on the horizontal axis, the reverse of what Cournot had done in 1838. This was motivated by his conception of the "supply price" as a function of the quantity produced; the supply price is accordingly the price that the producer must receive in order to supply a specific quantity. With the demand curve similarly defined in terms of the demand price it therefore became natural to think of supply and demand prices as the dependent variables and quantity as the independent variable for firms and consumers, and of equilibrium as defined by the equality of supply and demand prices. In modern theory we have long ago reverted to Cournot's way of thinking, while sticking to the geometrical convention established by Marshall.

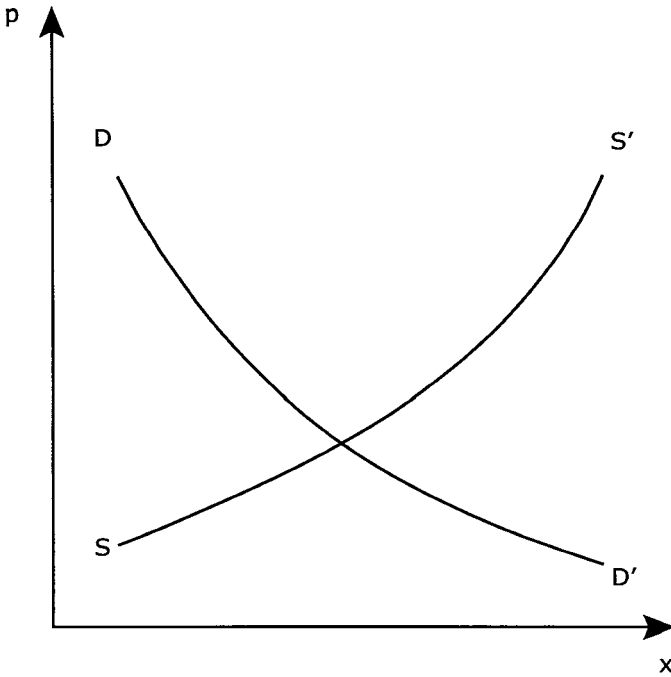


Figure 10.1. Marshall's partial equilibrium diagram. The equilibrium price (p) and quantity (x) are determined by the intersection between the demand curve DD' and the supply curve SS' . Note that Marshall, in contrast to Cournot, measures price on the vertical and quantity on the horizontal axis.

tion, there can be no doubt that the diagram clarified the logic of competitive price theory and was a major improvement over the treatment in Jevons (1871; 1970). Marshall gives supply and demand equivalent roles in the process of price formation and emphasizes with a famous metaphor that none of them can have priority over the other:⁴ "We might as reasonably dispute whether it is the upper or the under blade of a pair of scissors that cuts a piece of paper, as whether value is governed by utility or cost of

⁴ However, the metaphor can also be found in Mill's *Principles* as an illustration of the futility of ascribing to one of two causal factors a decisive role for the outcome. But Marshall's use of it is obviously especially striking because the image of the pair of scissors reminds us of the supply and demand diagram.

production" (Marshall 1890; 1920, p. 348).⁵ With Marshall's clarification the two versions of price theory that can be found in the work of the classical economists become just special cases of a more general theory: price is determined by the cost of production in the case where the supply curve is horizontal, while in the case of fixed supply, represented by a vertical supply curve, it is determined by demand. But between these two extreme cases there is a continuum of possibilities.

How pathbreaking was this insight? Historians of thought have disagreed about this. Keynes (1933) maintains that it was one of Marshall's most important innovations, while Stigler's (1990) attitude is that Walras in the general equilibrium theory of his *Éléments* had already clarified this issue. Even if we accept Stigler's view as correct in principle, however, there can be no doubt that Marshall gave the theory a much simpler and more comprehensible form, and his formulation was quickly accepted as the correct way to regard the problem of price formation in competitive markets.

A central and important implication of Marshall's approach is that the relative importance of supply and demand as determinants of prices depends on the time perspective of the analysis and not only, as the classics had maintained, on the nature of the commodity (manufactured goods versus rare coins). He illustrates his discussion of the general theoretical point by an example taken from the fishing industry (Marshall 1890; 1920, pp. 369–371). From day to day there will be fluctuations around a normal price level for fish, which is mainly determined by the cost of capital and labor input in the fisheries. This input, which determines production capacity, must in a day-to-day perspective be considered as fixed. In the short run, which in the example could amount to a couple of years, changes in demand will cause production capacity to change also. As an example of what might cause a change in demand Marshall mentions a change in preferences from meat to fish as a consequence of an animal disease that makes it dangerous to eat meat. This type of shift in demand might be imagined to last for a couple of years before the pattern of demand returns to its original state. Obviously, even

⁵ All quotations and page references to the *Principles* relate to the eighth edition from 1920, which is identical to volume 1 of the 1961 *Variorum Edition*.

in this time perspective the population of fishermen and part of the capital stock must be considered as fixed; however, part of the population which otherwise would have gone to work in the commercial fleet would now become engaged in the fisheries, and vessels that had been laid up or used for other purposes would be reequipped for fishing. But this can only happen if the producers receive a price that makes the restructuring profitable. The conclusion is therefore that in the short run a change in demand will lead to an increase in the price of fish.

In the long run the conclusion may be a different one. If the shift in demand in favor of fish becomes permanent, there will be an increased inflow of capital and labor to the fisheries. In a number of cases this could come about without any increase in the unit cost of production, so that in the long run an increase of demand would leave the price unaffected. One could even imagine that the price would fall; the increased activities in the fisheries might lead supporting industries like shipbuilding and tools production to organize themselves more efficiently and exploit economies of scale to such an extent that the unit cost in the fisheries would fall.

The distinction between short-run and long-run analysis may perhaps appear to be a rather trivial one, but Marshall made it into an important theoretical distinction by linking it to the scope for capacity adjustment. This actually became of great importance for economic theory. The best-known application of it is due to Marshall's most famous student, John Maynard Keynes, who in his *General Theory* (1936) made this distinction play a central analytical role in his macroeconomic theory.

PARTIAL AND GENERAL EQUILIBRIUM

Marshall's analysis of the workings of the market economy laid the foundations for what we now call partial equilibrium theory. "Partial" should be understood in contrast to the general equilibrium theory that had been pioneered by Walras, and it is natural to ask whether Marshall's analysis did not represent a step backward relative to that of his French predecessor. Is it not necessarily the case that the partial approach must be less general and therefore of less scientific value? The answer to this question is

not quite as obvious as it may seem. We may note as a fact that after more than a century has passed since the time of Walras and Marshall, economists as a whole have not wished to discard any of the two approaches. Each of them has their strong and weak sides, some areas where its application is fruitful and others where it is less suitable.

Marshall was aware that a weakness of partial equilibrium theory was that it might neglect causal factors that were important for the solution of a concrete problem. His main defense of the approach was that the human intellect had "limited powers," so that it was necessary to simplify complex problems in order to understand and be able to solve them. But it was essential to be conscious of the simplifications that one made; one had to be aware of the factors that were disregarded during the analysis but which ought ideally to have been included. This technique of analysis he characterized by means of the Latin term *ceteris paribus*—everything else equal. One area where this technique was especially fruitful and valuable, in Marshall's view, was related to the time dimension of economic problems, but the following presentation of the approach is actually quite general:

The element of time is a chief cause of those difficulties in economic investigations which make it necessary for man with his limited powers to go step by step; breaking up a complex question, studying one bit at a time, and at last combining his partial solutions into a more or less complete solution of the whole riddle. In breaking it up, he segregates those disturbing causes, whose wanderings happen to be inconvenient, for the time in a pound called *Cæteris Paribus*. The study of some group of tendencies is isolated by the assumption *other things being equal*: the existence of other tendencies is not denied, but their disturbing effect is neglected for a time. The more the issue is thus narrowed, the more exactly can it be handled: but also the less closely does it correspond to real life. Each exact and firm handling of a narrow issue, however, helps towards treating broader issues, in which that narrow issue is contained, more exactly than would otherwise have been possible. With each step more things can be let out of the pound; exact discussions can be made less abstract, realistic discussions can be made less inexact than was possible at an earlier stage. (Marshall 1890; 1920, p. 366)

By the intelligent use of this approach the analytical economist would gradually move from a partial to a general perspective, and most modern practitioners believe that partial equilibrium theory has turned out to be so useful that Marshall deserves all the praise that he has received as a pioneer in the field. However, some of his admirers are not satisfied by this. They believe that Marshall in fact *was* a general equilibrium theorist; it is just that this is obscured by the mode of exposition in the *Principles* that was designed in order to reach the broadest possible audience. There are some points that can be made in favor of such a view: in his early unpublished work on international trade theory Marshall used a general equilibrium framework that he had taken from Mill, and in the *Principles* he frequently emphasizes the mutual interdependencies of economic life. In a certain sense, therefore, he can be said to have a *perspective* on the subject that corresponds to that of general equilibrium. Lionel Robbins says in his lectures on the history of economic thought that it is simply “Nonsense!” to argue that Marshall was not a general equilibrium theorist (Robbins 1998, p. 306).

However, to have a certain perspective on the economic system is one thing; formulating one’s perspective in the shape of a formal theory is something else. We have in fact a very reliable source of Marshall’s thinking in his own Note XXI in the mathematical appendix of the *Principles*. Here he writes down a set of equilibrium conditions for an economy consisting of n commodity markets and m factor markets and argues that this model determines the $n+m$ prices in the economy. This is clearly in the Walrasian spirit, but there is a paradox involved in the procedure that he does not appear to realize. Marshall’s model determines not only relative prices but—in spite of the fact that there is no money or unit of account in the model—also the absolute price level. As we saw in the previous chapter this fundamental problem had been solved by Walras several years before, but Marshall seems not to have known it or to have misunderstood Walras’s analysis.⁶ On this point, therefore, we have to conclude that although Marshall may have had a general equilibrium

⁶ Robbins (1998) says that the mathematical appendix shows that Marshall understood Walras’s contribution “perfectly well.” But this is unconvincing in view of his misunderstanding of this crucial point.

perspective on economic theory, he had not developed a general equilibrium *model*.

UTILITY, DEMAND, AND WELFARE

Marshall's theory of consumer demand is based on marginal utility considerations, even if he shows little interest in utility theory as such. His critique of Jevons that was cited above is repeated in the *Principles*: Jevons "exaggerates"—one of Marshall's favorite words of criticism—the importance of marginal utility. However, Marshall makes good use of the concept, although with a modest degree of formalization. He assumes that the marginal utility of each good is decreasing and that the consumer will choose his demand so that the marginal utility of consumption, measured in terms of money, is equal to the price. Because marginal utility is decreasing, an increase in price must lead to a point of adjustment where marginal utility is higher than before and the amount of consumption is lower. The demand curve is accordingly a decreasing function of the price.⁷

Marshall realized that this line of reasoning was based on a simplifying assumption. Marginal utility as measured in money must reflect not only the marginal utility of the good as such but also the amount of income that the consumer has. When the price of a commodity falls, the purchasing power of money and therefore the real income of the consumer goes up, and this leads to a more complex relationship between price and demand. However, Marshall considered this complication to be of less importance, and he assumed it away with the formulation that the marginal utility of income is constant. He believed that this was a justifiable assumption as long as the commodity in question only made up a small share of the consumer's budget.⁸

⁷ This reasoning presumes that the marginal utility of a good depends only on the quantity consumed of that good and not on the consumption of other goods. This is the assumption also made by Gossen, Jevons, and Walras, and Marshall obviously saw no need to generalize it.

⁸ Since what is important for demand is the change in *real* income, we may find the effect of a price change on real income by deflating nominal income by a price index where the individual prices are weighed together by means of the budget shares of the commodities. If we now consider a situation where only

Later experts on Marshall have spent much effort in trying to reformulate this assumption in more rigorous terms, but it seems clear that Marshall was on the track of the modern distinction between income and substitution effects of a price change. The assumption of constant marginal utility of income implies in economic terms approximately the same as the disregard for income effects.

The main reason why Marshall made this somewhat artificial assumption was probably that he wanted to use his consumer theory not only as the foundation of the analysis of demand, but also for welfare considerations. When we can neglect the effect of price changes on the marginal utility of income, this means that the individual consumer's demand curve will correspond to his marginal utility of the commodity in question, or to his demand price, to use Marshall's own concept. Suppose that the price of a commodity falls. We can now ask the question: What is the utility or welfare gain to the consumer of this fall in price? The answer can be shown by considering figure 10.2. Marshall defined the *consumer surplus* as the difference between the maximum amount that the consumer would have been willing to pay for some given quantity OH , and what he actually pays. It is easy to see that the maximum amount that he would have been willing to pay is the area below the demand or marginal utility curve to the left of H while the amount paid is the quantity OH times the price HA which is the rectangle $OHAC$. In other words, the consumer surplus is the area between the demand curve and the price line,⁹ and the value of a decrease in price becomes equal to the increase of consumer surplus.

In practice, it is virtually impossible to observe individual demand curves. If the concept of consumer surplus is to be of any practical use, it must therefore be possible to apply it to the demand curve for the market as a whole. At the conceptual level, we arrive at the market demand curve by taking the horizontal sum of the individual demand curves, and we can now use a similar geometric construction to calculate the consumers' sur-

one of the prices changes and this commodity has a very small budget share, Marshall's argument is that the effect on real income can be neglected.

⁹ Marshall does not refer to Dupuit's analysis, which is closely related to his own (see chapter 7).

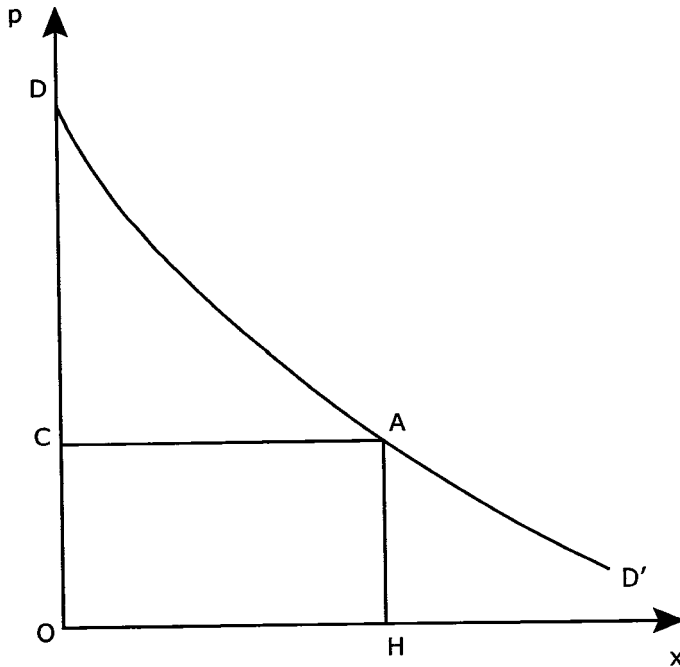


Figure 10.2. The consumer surplus corresponding to the quantity consumed OH and the price OC or HA . The consumers would at the maximum be willing to pay the area $OHAD$ for this quantity, while they in fact pay the amount $OHAC$. The difference between the two areas is the consumer surplus, CAD .

plus for the market as a whole. One problem with this procedure is that we take the sum of marginal utility curves for consumers with very different incomes. We cannot decide from the change in the aggregate consumer surplus whether a price decrease mainly benefits the rich or the poor. If one is concerned with the redistributive aspects of a price change or a tax reform, one must therefore go behind the consumer surplus analysis and study the effects on particular individuals or groups.

The aggregate social surplus of a certain volume of production cannot be measured only by the consumer surplus. In addition one has to take account of the producer surplus, which is revenue minus the cost of production. Adding the consumer and producer surplus together, we obtain the total social surplus, which

is the area between the demand and supply curves. If this area is to be as large as possible, consumption and production must be at the point of intersection between the demand and supply curves (see figure 10.1), in other words, at the point corresponding to the competitive equilibrium. This is Marshall's interpretation of what he regards as the "general doctrine," namely, that

a position of (stable) equilibrium of demand and supply is a position also of *maximum satisfaction*. (Marshall 1890; 1920, p. 470)

In this context, "maximum satisfaction" evidently refers to market agents as a group or even to the group of all economic agents in the economy. This is a central and important conclusion, which Marshall might, although he does not do so, have related to Adam Smith's argument about the invisible hand. He also provides an interesting elaboration of it: if, for instance, the demand price is higher than the supply price—if the consumers' marginal benefit is higher than marginal cost—one can increase the social surplus by increasing output and share the extra surplus in a way that makes either the buyer or the seller or both better off. Here Marshall comes close to the concept of optimality that is associated with Pareto, which will be discussed in the next chapter.

However, if we are to acquire a deeper understanding of the meaning of maximum satisfaction we must take account of the problems with the summary measure of social surplus that are associated with the distributive effects of economic reforms. Marshall is very much aware of this: he argues, for example, that in the case where the producers are significantly poorer than the consumers, aggregate satisfaction can be increased by restraining production so that the price goes up and some of the social surplus is transferred from consumers to producers. This clearly involves the value judgment that a shilling is worth more to the poor than to the rich. Still, the assumption of the simple surplus analysis that the worth of a shilling is the same for all is, according to Marshall, a legitimate simplification; we only have to keep in mind the nature of the simplifying assumptions that we have made.

The concept of consumer surplus—or, more generally, the social surplus—turned out to have a number of possible applications, especially in the analysis of economic policy. It could be used to analyze problems as diverse as the efficiency of alterna-

tive forms of taxation, price setting in public firms, the effects of protectionist trade policies, and several other issues. However, it also had its clear limitations. It was unsuited for studying the effects of public policy on the distribution of income and welfare, and it could not be used to analyze the interplay between markets. But social surplus analysis has survived to this day as part of the economist's tool kit, even if later theorists have developed more sophisticated measures of welfare and economic efficiency. It must therefore be counted among one of Marshall's most important contributions to economic policy.

THE CONCEPT OF ELASTICITY

One of Marshall's innovations that from a purely theoretical viewpoint may be considered as almost trivial, but which has been of great practical importance, is the concept of price elasticity. He introduces the price elasticity of demand (Marshall 1890; 1920, p. 102) by pointing out the usefulness of having a measure of the sensitivity of demand to a change in the price. In the main text of the *Principles* the definition of the elasticity is not very precise; he says that the price elasticity in a market is great or small depending on whether the quantity demanded increases by much or little as the price falls, or diminishes much or little when the price goes up. But in a footnote he provides a graphical interpretation, and in an appendix he presents a mathematical definition in terms of the relative change in demand divided by the relative change in price. This measure of price sensitivity is important because it is independent of the units that we use in measuring quantity and price, thereby making it possible to compare the price sensitivity of demand across markets.¹⁰

Corresponding to the definition of the elasticity of demand one may also define the elasticity of supply, but in the discussion of this concept Marshall is a bit more guarded (Marshall 1890;

¹⁰ Marshall could conceivably have got the idea for his elasticity concept from his early reading of Mill's *Principles*. As shown in chapter 5, Mill used a similar concept in an example illustrating his price theory for international trade, and Marshall may have developed his own concept while trying to put Mill's theory into mathematical form.

1920, p. 456). The reason for his caution is that the price elasticity of supply must be assumed to be very different in the short and the long run, a complication that in Marshall's opinion was of much less relevance for the elasticity of demand.

In his overview of Marshall's most important contributions, Keynes (1933) puts great emphasis on the introduction of elasticities. He says that with regard to the development of terminology and theoretical concepts, this was Marshall's greatest service to economics. This may be putting it too strongly, even if it obviously is difficult to distinguish clearly between terminology and conceptual issues on the one hand and more substantial theoretical progress on the other. George Stigler has a quite different view of this part of Marshall's work; elasticities, he says, often give an elegant form to theoretical results and give rise to an unlimited number of examination questions—and that is all (Stigler 1990, p. 3). This, although amusing, is too negative. The use of elasticities enables economists to compare the price sensitivity of demand or supply by a single number that is comparable between different goods, time periods, and countries, and the invention of this concept must therefore be regarded as a significant achievement.

EXTERNAL EFFECTS

Marshall is often credited with being the originator of the concept of external effects or externalities. In a certain sense this is clearly true, but in comparison to the modern use of it Marshall's focus is rather special. He was primarily interested in an explanation of why the long-run supply curve under perfect competition could be decreasing. His view that this possibility was of practical relevance was based on a conviction that an increase in demand frequently led to a lower price, and this could only be true if the supply curve was declining. But this result raised a difficult problem for theory: under perfect competition the supply curve of the individual firm must be equal to its marginal cost curve, and decreasing marginal cost is inconsistent with the assumption of perfect competition. His solution to the problem was to introduce the concept of "external economies" as a term describing factors beyond the control of the individual producer,

which led to lower costs for the firm. These factors are external to the firm, but internal to the branch or industry. The individual firm will always confront increasing marginal costs, but an increase in demand that has as its immediate effect a higher price will lead all firms in the industry to increase their output, and this expansion of the industry could possibly lead to lower costs at the level of the individual firm.

The concept of external economies has been specially designed to describe a relationship of this kind, and Marshall also introduced "external diseconomies" to represent the opposite case where the long-run supply curve is increasing because industry expansion leads to increased costs for the individual firm. In the following, we shall use the terms positive and negative external effects, even if they are currently used to describe a much wider class of phenomena than those that Marshall was interested in. In Marshall's sense, both positive and negative external effects imply that the market does not function efficiently, because each single firm does not take account of the fact that changes in its own volume of output will have an effect—positive or negative—on the costs of other firms.

What are the causes of these external effects? As regards the positive effects, Marshall argues that industry expansion within a limited geographical area may lead to improved information and technological progress within the single firm. It may also imply improved access to highly qualified labor and to more exploitation of economies of scale through the emergence of specialized support activities.¹¹ In the case of negative external effects he refers to the example of the fisheries, where a decline in the stock of fish as a consequence of excess fishing can in the long run lead to increasing marginal and average costs, even if the individual firm experiences constant returns to scale. With less access to fish, fishermen must travel further and use longer time to catch a given quantity, so that unit costs go up. In this discussion, Marshall expresses himself with characteristic caution concerning the underlying reality of the example, which was a controversial issue in the contemporary debate about fisheries policy.

¹¹ This way of thinking has a descendant in the modern theory of "clusters" and the so-called new economic geography.

Having shown that both positive and negative external effects lead to market inefficiencies, Marshall suggests that one ought to tax increasing cost industries and use the revenue to subsidize industries with decreasing costs (Marshall 1890; 1920, p. 472–473). The point is that when there are positive external effects and therefore decreasing unit costs for the industry, the single firm will not take account of the lower costs that its own activity entails for the other firms in the industry. By subsidizing the firms, thereby stimulating them to increase output, one is able to compensate for this lack of incentives. On the other hand, with negative external effects and increasing unit costs for the industry, firms will expand too much, and a tax will provide an incentive to reduce output and thereby the costs of the other firms in the industry. This is a “simple plan,” he says, although he immediately turns to a number of qualifications as regards its practical implementation. The costs of collecting the taxes and distributing the subsidies may be considerable and could also involve attempts at fraud and corruption. He also points out that the desire to benefit from the subsidies could lead businessmen to transfer their attention away from the management of their firms and toward attempts to influence the public authorities in charge of the subsidies.

FACTOR MARKETS AND INCOME DISTRIBUTION

Book 6 in the *Principles* is concerned with problems of income distribution. Marshall begins with a review of the classical economists’ theory of income distribution, especially their theories of the determination of wages and rent. Ricardo and Mill tended to assume that both the wage rate and the return to capital were given magnitudes; the wage rate, according to Malthus’s theory of population, would be equal to the subsistence minimum, while capital owners were assumed to require a rate of return on investment that determined the interest rate. According to Marshall, this is not in line with factual observations, and he goes on to develop his own theory. The point of departure for his theory of wages is the analysis of the decisions of the profit maximizing producer: How many workers should he hire? Given the assumption of decreasing marginal productivity of labor, Marshall (1890; 1920, pp. 516–517) shows, using a numerical example, that it is profitable to hire more workers as long as the value of the

marginal productivity exceeds the wage rate, which the producer takes as determined in the market. This, Marshall argues, is an example of a general principle: for all types of labor it will be the case that the wage rate is equal to the value of its marginal productivity. He warns, however, about regarding this as a complete theory of wages. Even if he does not clearly say why, it is reasonable to interpret him as implying that marginal productivity represents only the demand for labor, and that a complete theory must also include a theory of labor supply. In a later chapter he presents a theory of the supply of labor that is based on marginal utility analysis. Bringing demand and supply together, wages are determined by demand and supply in the labor market, and the "iron law of wages" of the classical economists is no longer valid in modern society.

In a corresponding manner, Marshall presents a theory of the demand for capital, where profit maximization implies that the marginal productivity of capital will be equal to the rate of interest. In this way he establishes a theory of the demand for the factors of production that in its fundamental structure is symmetrical between labor, capital, and other inputs in production. Elements of this theory of the rewards to the factors of production can be found in the earlier literature (e.g., in the work of Thünen), but Marshall's version of it was illuminating and became of great importance for the further work on this topic.

However, Marshall's theory of wages and the labor market is in fact far more complex than his discussion of the marginal productivity perspective might lead us to believe. Thus, in his criticism of the classical theory of wages, he points out that earlier writers tended to underestimate the positive effects of higher wages on productivity, and he suggests that this may be an important part of the explanation of the historical increase in real wages. There may also be other reasons why the productivity of labor increases over time. Parents are motivated to save for their children but perhaps even more motivated to *invest* in them (Marshall 1890; 1920, p. 562). They can do this above all by paying for a good education for the children,¹² but also by ensuring that they grow up in a good home and family environment. In

¹² Actually, Marshall writes in this connection not about children but about sons. In his view of women's rights and their role in the labor market, Marshall was a far less progressive thinker than John Stuart Mill.

his discussion of these issues Marshall appears as an important forerunner of the modern theory of human capital.

While parents will invest in their children without regard for their own gain, the case of human capital investment in the labor market is more problematic. An employer who trains his workers to master skills that are valuable also outside of his own firm has no property rights in the capital that he has helped to create. This is the property of the worker who can take it with him to his next employer. But Marshall does not draw the natural conclusion that the labor market will offer too little training and education. He accepts the possibility that employers can be motivated by more than their own profits, and when he describes this motivation he moves a good distance away from his own marginal productivity theory of wages:

In paying his workpeople high wages and in caring for their happiness and culture, the liberal employer confers benefits which do not end with his own generation. For the children of his workpeople share in them, and grow up stronger in body and in character than otherwise they would have done. The price which he has paid for labour will have borne the expenses of production of an increased supply of high industrial faculties in the next generation: but these faculties will be the property of others ... neither he nor even his heirs can reckon on reaping much material reward for this part of the good that he has done. (Marshall 1890; 1920, p. 566)

To the extent that this is intended as a descriptive theory of the behavior of employers (and not as an encouragement to employers to adopt an idealistic view of their profession), it becomes natural to ask what perspective Marshall really had on economic behavior. In his more formal derivation of the marginal productivity theory, the employer is a coolly calculating person whose actions are driven by comparisons between wages and productivity. In the quotation above he is an altruist who spends money for the good of society with little or no compensation for his own effort. It is not easy to see how the two perspectives can be reconciled. In fact, however, Marshall considers this problem at a more general level in one of the introductory chapters of the *Principles*, where he also presents his famous definition of economics as a field of study:

Economics is a study of men as they live and move and think in the ordinary business of life. But it concerns itself chiefly with those motives which affect . . . man's conduct in the business part of his life. Everyone who is worth anything carries his higher nature with him into business; and, there as elsewhere, he is influenced by his personal affections, by his conceptions of duty and his reverence for high ideals. (Marshall 1890; 1920, p. 14)

The reconciliation of the two views is not easy. A reasonable interpretation of what Marshall had in mind could be that although the actions that people take in the business part of their lives can at some level be explained by rather narrow theories like profit maximization, their actions are also constrained by moral and social concerns. In order to fully understand the way in which the economy and society functions, one must also take these considerations into account.

ECONOMY AND SOCIETY

Above all, it is Marshall the analytical economist, the author of book 5 in the *Principles*, who has received most attention by historians of thought. Modern readers have tended to shrug their shoulders at the more philosophical side of Marshall's work, of which we have already seen some examples. They have problems with accepting his somewhat patronizing attitude to "the lower classes" and his moralist view of the higher and lower parts of human nature. Nevertheless, Marshall's reflections contain a number of interesting points that deserve the attention of the modern reader, especially because the problems that he raises to a large extent have been neglected in contemporary economics.

As we have seen, Marshall kept an open mind about the motivation of economic agents: it could be quite complex, going beyond the single-minded goal of profit maximization or the desire to obtain the highest possible individual standard of living. A minor modification of the maximization hypotheses was the great emphasis that he put on family considerations, as in his discussion of parents' investment in their children. But in addition he maintains that managers and other men of business are also driven by motives that are socially conditioned. Foremost

among these are social responsibility and the desire for recognition by others. Social responsibility, or a sense of duty, may induce monopolists to charge a lower price than called for by pure profit maximization because they take account of the burden that a high price will impose on the customers. Similarly, trade union leaders may moderate their wage claims in order that their members may not be too much out of step with the wage level of other workers. The desire for recognition may lead to behavior that is in particular favor with public opinion, thereby encouraging social conformity. But it could also result in a strengthening of the competitive spirit, as when recognition is won not simply by doing well but by being the best.

Marshall was a strong adherent of free markets. Part of his justification of this attitude was the conventional one: freedom of industry and free competition led to an efficient use of resources. But in addition he emphasized the view that such a system was good for the building of character; it made men become hard-working, conscientious, and prudent. This would have a long-run effect on economic development and growth, for these characteristics would be inherited—socially if not genetically—by later generations. We do not necessarily need to agree with Marshall about the details of his argument in order to feel that these are interesting and important issues.¹³

MARSHALL'S IMPORTANCE

Marshall's standing as an economist varies a good deal among those who have studied him carefully. Some believe that he is one of the most important economists in the history of the subject, while others regard him chiefly as one who consolidated the knowledge of his time, but who himself possessed only a small degree of originality.

Scientific originality is not easy to define. Some cases are simple: there can be no doubt that Cournot was a highly original scientist. He gave a rigorous formulation of new theories in an area

¹³ Marshall's thoughts on the relationship between the economic system and the general development of society have been further described by Whitaker (1977).

that, at least in part, was completely unexplored before his time, and the originality of his work is easy to see. By way of contrast, John Stuart Mill is an economist that for a long time occupied a modest place on the scale of originality (not least because of his tendency to gloss over his own innovations), while during the last forty to fifty years his star has been rising. We should probably realize that a scientist can be original in terms of his ability to integrate and consolidate the existing knowledge in his field. In this respect Marshall is similar to Mill: he wrapped up his original contributions in a way that made them difficult to see, and his exposition of the field as a whole was so well rounded that the conflicts and disagreements that are the roots of progress did not come to the surface. A balanced evaluation must be that Marshall was an original economist both by virtue of his own extensions of economic theory and his ability to integrate old and new contributions to the development of the field.

Marshall is also one of the first among the important economists who exerted an important part of his influence through his teaching, even if his lectures appear to have been almost chaotic. His wife told John Maynard Keynes that Marshall's teaching philosophy was that, by never presenting his topics in a well-ordered and systematic way, he would encourage the students to think for themselves. Keynes, who followed his lectures at a relatively late point in Marshall's teaching career, clearly felt this to be in line with his own experience: "I think that the informality of his lectures may have increased as time went on. Certainly in 1906, when I attended them, it was impossible to bring away coherent notes" (Keynes 1933, p. 196).

In addition to his teaching and tutorial activities, Marshall also did much to establish economics as a central field of study in Cambridge. His students—among whom were Pigou, Keynes, and many other great names of English economics—were strongly influenced both by his teaching and personality. Pigou's development of the theory of external effects and Keynes's distinction between the short and the long run in macroeconomics were both strongly inspired by Marshall's teaching and writings. However, there are also those that have wondered whether this strong influence—both the personal one and the status of the *Principles* as the Bible of economics—was all to the good for English economics. There emerged a belief among English econ-

omists that all theoretical insights of any importance could be found in Marshall, and this attitude may in the long run have contributed to the relative decline of economics in England.

Many textbooks on the history of thought pay more attention to Marshall's work than to that of any other of the great economists. The most important reason for this may be that his *Principles* forms the bridge between the old and the new, between the literature that—with some exceptions—now seems remote and that which is closer to the economics of our own time. It says much about the book that it has managed to hold this position for so long.

FURTHER READING

Marshall's *Principles* is not a difficult book to read for modern economists. The theoretical chapters give a good impression of the state of the subject at the end of the nineteenth century, and the mixture of theory with institutional and empirical facts may still be inspiring reading. The last revised edition to appear in Marshall's lifetime is the eighth edition from 1920. It has been reproduced in a so-called *Variorum Edition* (sometimes misleadingly referred to as the ninth edition) that was published in two volumes in 1961. The first volume is a reproduction of the 1920 edition, while the second volume presents an account of the changes that were made between the various editions of the book. It also contains extracts from Marshall's other publications and correspondence, which throw light both on the origin of the book and on Marshall's scientific development.

The major biography of Marshall, covering his life, work, and intellectual environment, is the book by Peter Groenewegen (1995). Shorter surveys of Marshall's contributions to economics with emphasis on the *Principles of Economics* can be found in a number of books in addition to the standard texts, for instance, Hutchison (1953) and Stigler (1941; 1994). Frisch (1950) is a classic exposition of the main features of Marshall's price theory. A collection of articles edited by John Whitaker surveys his research and professional activities in a number of different areas (Whitaker 1990). Whitaker (1975) is also the editor of a selection of

Marshall's early works—from the end of the 1860s to 1890—where he has written an extensive introduction that describes Marshall's life and thought in this period of his life. Keynes's (1933) elegant and interesting essay on Marshall testifies to the student's respect for a treasured teacher but also contains some critical reflections on Marshall as an economist.