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The Split between History and Theory in Europe, 1870–1914

The Professionalization of Economics

In the closing decades of the nineteenth century, economics, like many other disciplines, became professionalized. It came to be dominated by men (there were few women) who specialized in the subject. Most of them were full-time academics. This marked a dramatic contrast with the world of Smith, Malthus, Ricardo and their contemporaries. This change took place in both Britain and the United States. In addition, research began to be published in specialist journals, such as the *Quarterly Journal of Economics*, established in 1886, the *Economic Journal* (1890) and the *Journal of Political Economy* (1892).

In continental Europe these changes had taken place earlier. In Germany, with a long tradition of *Cameralwissenschaft* (the science of economic administration), centred on the training of public servants, academics had dominated economics for much of the century. The Humboldt University of Berlin, as it later came to be known, founded in 1849, had established a strong research tradition on the basis of providing professors with security and freedom from pressure to teach particular doctrines. This freedom was later extended to other German universities by Bismarck. Specialist academic journals had been established much earlier than in the English-speaking world – the *Zeitschrift für die gesamte Staatswissenschaft* (which has since become the *Journal of Institutional and Theoretical Economics*) in 1844 and the *Jahrbücher für Nationalökonomie und Statistik* (*Yearbook of Economics and Statistics*) in 1863. In France, economic ideas had been developed by university professors such as Say and Cournot, and by engineers in elite colleges such as the *École des Ponts et Chaussées*.

There were also important changes in the intellectual environment in which economic ideas were developed. Newtonian ideas inspired economists for much of the eighteenth and nineteenth centuries. Smith and Malthus both saw their work as deriving Newtonian laws applicable to the social realm. Even in the seventeenth century, science had influenced the way in which economic questions were tackled. In the nineteenth century, however, the idea of the 'scientist' became established, the term being coined by William Whewell (1794–1866) in 1833. People stopped referring to science as 'natural philosophy', and the gap between science and philosophy widened. This affected economics in several ways. People with backgrounds in natural science turned to economics. They sought to emulate the achievements of science notably physics, widely regarded as the most successful science. Some sought to strengthen the foundations of economics through basing it on experimental psychology (very different from Bentham's psychology). Others were inspired to apply Darwinian ideas on evolution to economics (the *Origin of Species* was published in 1859).

These developments were associated with changes in the way in which economics was conceived. Though many of the questions tackled by the subject remained the same, economics moved, or at least appeared to move, away from its origins in political philosophy. By 1900 the term 'economics' was beginning to displace 'political economy' as the generally preferred label for the discipline. The use of mathematics was becoming more common (although it remained a minority activity), and the idea that students should be able to specialize in economics, rather than coming to it through mathematics or philosophy, was gaining ground.

Jevons, Walras and Mathematical Economics

Throughout the nineteenth century there had been French and German economists who had used mathematics. In France this tradition went back to Condorcet's social mathematics and

included Cournot and the engineers at the *École des Ponts et Chaussées*. In Germany there were the examples of Thünen and Hermann Heinrich Gossen (1810–59). The bulk of the subject, however, remained non-mathematical. In Britain, if we leave aside Ricardo's use of numerical examples, none of the classical economists used mathematics. From the 1870s, however, mathematical analysis began to be used much more widely, as economists sought to follow the example set by physics. Along with this came several other changes: there was a greater focus on individual behaviour, and the subject moved away from the classical themes of long-term development to focus on narrower problems. Two people were at the forefront of this process: in Britain, William Stanley Jevons (1835–82) and, at Lausanne, the French economist Léon Walras (1834–1910).

Jevons was a meteorologist, a chemist and the author of *The Principles of Science* (1874), a widely read treatise on scientific method. He was also a utilitarian. These elements in his background had a major influence on his approach to economics. Although his training in economics was (typically for the time) based on Mill's *Principles*, he reacted strongly against Mill and the Ricardian tradition in economics in his *The Theory of Political Economy* (1871). He disagreed with Ricardo over the theory of value. Ricardo, following Smith, had argued that, although a good must have utility if it is to have value, its value is determined by its production cost, not by its utility. Jevons argued that this was wrong, and that value depended entirely on utility. In particular, value depended on the benefit a consumer received from the last unit consumed (the marginal utility or, as Jevons put it, the 'final degree of utility'). There was a link between value and cost of production, but it was indirect. He summarized it as follows:

Cost of production determines supply;
Supply determines final degree of utility;
Final degree of utility determines value.¹

Jevons started *The Theory of Political Economy* by arguing that economics was inherently mathematical because it dealt with quantities. He was optimistic about the possibilities of measuring

economic quantities, pointing out that numerical data abounded – in account books, price lists, bank returns, government data and so on. The problem was not the absence of data but that economists did not know how to use them, and that the data were incomplete. Establishing economics as a science was, for Jevons, closely linked to the exact measurement of economic quantities.

Jevons's starting point was Bentham's theory of utility, in which utility was defined as the ability to increase pleasure or to reduce pain. Though feelings and motives could not be measured directly, Jevons argued that it was possible to measure them indirectly. The goods someone buys or sells will depend on comparisons of the pleasure to be obtained from various goods, which means that comparative pleasures can be measured by observing behaviour in the marketplace. He used an analogy with the measurement of gravity through measuring the movements of a pendulum. Jevons thus devoted much attention to the problem of defining utility and working out how it might be measured, drawing extensively on contemporary psychology. Only then could he use the theory to analyse economic phenomena.

In *The Theory of Political Economy* Jevons used utilitarianism to explain behaviour. This involved assuming that individuals sought to maximize their utility – to increase pleasure and reduce pain as much as possible. He suggested four ways in which this might be accomplished, and analysed each in turn: (i) allocating stocks of a good between different uses in the best possible way; (2) exchanging goods with other people; (3) working to produce goods; and (4) through employing capital. He used differential calculus to express the conditions for utility maximization in each of these four settings. In the context of exchange, for example, he derived the condition that utility would be maximized when the ratio of the marginal utility of two goods was equal to the relative price of the two goods. For example, if an apple costs twice as much as a banana, the pleasure obtained from the last apple purchased must be twice as large as the pleasure of an additional banana. If it were less, the individual would give up an apple to get two extra bananas. With labour, the equivalent result is that a worker works the number of hours such that the pain of an additional hour's work is exactly equal to the pleasure obtained

from the additional commodities that that hour's labour enables him or her to purchase.

Walras, too, was concerned to make economics scientific through making it mathematical, and he developed many of the same results as Jevons concerning consumer behaviour and the determination of prices in competitive markets. However, he reached these conclusions by a very different route, and his focus was also very different. Walras was not a utilitarian but instead started from the notion – well established in the French tradition going back through Say to Condillac – that value depended on scarcity. He measured this scarcity in terms of what he called '*rareté*' – the intensity of the last want satisfied. Using this he derived conclusions similar to those worked out by Jevons. However, whereas Jevons analysed markets in terms of exchange between two individuals (allowing for competition with other potential traders), Walras focused on an organized market in which everyone faced a market price. In this situation, an individual would decide how much of each commodity he or she wished to buy or sell. This led Walras to construct demand and supply curves, relating desired purchases or sales to price: as price rose, demand would typically fall and supply would typically rise. The market would be in equilibrium where the two were equal.

Up to this point there were only minor differences in the conclusions reached by Jevons and Walras. The main difference between them was that Walras went on to discuss the problem of multi-market equilibrium – the problem of how prices are established in a large number of markets at the same time. He started by deriving demand and supply curves for the case of two-commodity exchange. People have stocks of two commodities, and exchange them with each other so that they end up with the combination of the two commodities that they prefer, given the relative price of the two commodities. Walras then extended his analysis to the exchange of many commodities. After that he introduced production, assuming that entrepreneurs moved resources from one activity to another until all opportunities for profits were eliminated. Introducing production meant bringing in markets for factor services (markets for renting the labour and

machinery used to produce goods). Finally he added a market for credit, in order to explain the rate of interest. This was then used to link the rental rates on capital goods to their purchase price.

The end result was that Walras had a mathematical model – a set of simultaneous equations – describing an entire economy in which everything, in principle, depended on everything else. For example, a change in fashion might reduce the demand for beer and increase demand for tea. This could affect not just the prices of beer and tea but the prices of all other goods, wages, and even the rate of interest. Given the complexity of the set of equations and the very abstract level of his analysis, Walras confined his attention to doing two things. First, he sought to show that his set of equations had a solution: that there was a set of prices and quantities that satisfied all his equations. This is the problem of *existence* of equilibrium. He achieved this by counting the number of equations and showing that it was equal to the number of unknowns (the prices and quantities). Second, he sought to show that the solution to his set of equations was stable in the sense that, if the economy started with any arbitrary set of prices, it would end up with the set of prices that satisfied his equations. This is the problem of *stability* of equilibrium. Walras's method was to postulate that if supply of a commodity exceeded the demand the price of the commodity would fall, and vice versa. This was the *tâtonnement* process, through which an economy 'groped' its way towards the equilibrium.

Walras knew that real economies did not solve sets of simultaneous equations. He claimed that the *tâtonnement* described the trial-and-error process through which real-world economies determined prices, but argued that the economist could reach the same solution by solving the simultaneous equations. Both methods gave the same answer. The theory he had derived was 'pure' economics, and it needed to be applied. However, while Walras applied his ideas to a variety of policy issues, he failed to get much attention for them. His most radical proposal was for a tax on increases in land values or rents. He used his model to argue for the Ricardo-like conclusion that, over time, the share of rents in national income would rise. This meant that, over time, a tax on the increase in rents would yield more

and more revenue. Such a tax was consistent with Walras's views on justice. To tax labour income would be unjust, because people were entitled to the fruits of their own labour, whereas the value of land derived from society, which meant that it was legitimate for it to accrue society in the form of taxation.

Jevons also saw his abstract mathematical theory as comprising only part of economics. His applied economics was statistical and inductive. This was consistent with his view about science being to do with measurement. He became famous for *The Coal Question* (1865), in which he examined the effects of Britain's coal reserves becoming exhausted. When Britain ran out of coal, he concluded, growth would cease. He made this case with detailed statistics, not only on stocks of coal but also on the expansion of British industry. He was, however, wrong, for he failed to appreciate how technological change would transform the situation. In the 1860s he also tackled the question of the effect of the Californian gold discoveries on the price of gold. The main characteristic of this work was his use of index numbers to quantify the rise in prices that had taken place during the 1850s. However, perhaps Jevons's most innovative work was on the trade cycle. He used statistical series to establish the existence of fluctuations in economic activity every ten years. At the time, sunspots were believed to affect the weather, and so he sought to establish a correlation between sunspot activity and the business cycle on the assumption that there were strong links between the weather and the harvest. To test this idea he collected and analysed large quantities of data on prices.

Walras and Jevons came to their ideas about marginal utility and prices independently (Jevons had presented his ideas almost a decade earlier, but no one had taken any notice of them). They discovered each other's work in the mid-1870s, and agreed to cooperate in furthering mathematical economics and opposing Ricardian doctrines. During the following decade, however, the spread of mathematical economics was slow. They were both social reformers, Walras going so far as to call himself a socialist on the basis of his views on land taxation. Jevons, in contrast, used his utilitarianism as the basis for a series of piecemeal,

pragmatic suggestions for reform, much in the manner of J. S. Mill.

Economics in Germany and Austria

In the second half of the nineteenth century, German economics was dominated by the historical movement – usually divided into the ‘older’ historical school, headed by Wilhelm Roscher and the ‘younger’ historical school, headed by Gustav Schmoller (1838–1917), even though the former was much less of a school than the latter. Classical economics could be found in Germany, but it drew on Smith and French theorists such as Condillac, not on Ricardo. Before the emergence of the historical schools there was no orthodoxy in German economics, merely a variety of groups, such as the so-called ‘Romantic’ school, having little in common with each other. The term ‘Smithianism’ was associated with an extreme variety of liberalism.

The historical movement in German economics was established by Roscher with his *Grundriss zu Vorlesungen über die Staatswissenschaft nach geschichtlicher Methode (Outline of Lectures on Political Economy According to the Historical Method)* of 1843. In this book, Roscher argued not that classical political economy was wrong, but that it was inappropriate given the political and industrial conditions in the Germany of his day. Economic theories needed to take account of the circumstances in which different countries found themselves. It was, furthermore, important to work out laws and stages of historical development. However, despite such views, the works of the older historical school did not differ markedly from those of Smith or Mill, both of whom mixed extensive empirical and historical material with their theoretical arguments.

The younger historical school was more radical. Schmoller shared the older historical school's attitude towards classical economics, and sought to broaden the subject to include what would now be termed economic sociology. He was sceptical

about the idea of laws of history, arguing that they were frequently no more than dubious generalizations or psychological truths – they bore no relationship to the laws of the natural sciences. It was, he argued, important for economic propositions to be based on detailed empirical observation, for only then could proper account be taken of the circumstances of particular times and places. He was not opposed to theory, but he argued for extreme caution in ascertaining the facts of the case before making any generalizations. The method by which the necessary empirical basis would be established consisted of detailed historical studies.

Politically, Schmoller was conservative, a supporter of the Hohenzollern monarchy. However, he was a social reformer committed to the view that economists should be involved in the process of economic and social change. To this end, he organized committees that would work out desirable social policies within the Verein für Sozialpolitik (Union for Social Policy), founded in 1872. The members of this organization became known as academic socialists. They were liberal but were supporters of the existing regime, and were equally opposed both to communists and to ultra-liberals. They were committed to piecemeal studies that could result in social reform on topics such as working hours, social insurance and factory legislation.

In Austria, a different type of theoretical economics was offered by Carl Menger (1840–1921), in his 1871 *Grundsätze der Volkswirtschaftslehre* (translated into English as *Principles of Economics*). Though an Austrian, based in Vienna, he drew on the German tradition of supply-and-demand analysis established by writers such as Rau, Hermann and Roscher. In contrast to Jevons and Walras, Menger was not seeking to make economics scientific according to the standards of contemporary physics. Rather, his approach was closer to Aristotelian philosophy with its desire to uncover the essence of economic phenomena – to discover their real nature. However, despite this radically different perspective, he also argued that value was determined at the margin – by the value of an additional unit of a commodity.

Menger started from the presupposition that the purpose of economic activity was the satisfaction of human needs. Goods

were things that contributed to this purpose:

If a thing is to become a good... all four of the following propositions must be simultaneously present:

1. A human need.
2. Such properties as render the thing capable of being brought into a causal connection with the satisfaction of this need.
3. Human knowledge of this causal connection.
4. Command over the thing sufficient to direct it to the satisfaction of the need.²

To be a good, not only must a thing be able to satisfy human needs, but also people must know about how they can use it to this end, and they must have sufficient control over it.

What about things that appear to satisfy no human needs? Menger's answer is that goods may satisfy needs either directly (he called these low-order goods) or indirectly (higher-order goods). Goods can thus be arranged in a hierarchy, with goods that satisfy needs directly at the bottom and ones that satisfy them extremely indirectly at the top. Bread would be at the bottom, whereas steelworks would be much higher up.

From here, Menger went on to define value as the importance of a good in satisfying needs: it is the satisfaction derived from command over a good. The value of a particular commodity is thus the needs that would not be met if the good were not available. Menger assumed that this value fell as the quantity of the good increased – the concept of diminishing marginal utility. This was a concept that could easily be extended to higher-order goods – to goods that do not satisfy human needs directly: ‘The value of a given quantity of a particular good of higher order... is equal to the importance of the satisfactions provided for by the portion of the product that would remain unproduced if we were not in a position to command the given quantity of the good of higher order.’³ What Menger is saying here is that if a higher-order good (for example, a kilogram of wheat) is not available, a certain quantity of lower-order goods (two loaves of bread) will not be produced. The value of the kilogram of wheat is the human needs satisfied by the two loaves of bread.

As defined by Menger, the concept of value does not involve either exchange or price. Price enters only with exchange, and is

determined by values. In an exchange between two isolated individuals, all that can be said about price is that it will be between the limits set by the values which the two individuals place on the goods being exchanged, otherwise one of them would opt out. Where there is competition, the level of indeterminacy will be less.

Menger's verbal analysis of price determination can be compared with the mathematical analysis of Jevons and Walras. All three assumed that prices depended on marginal utility and rejected the Ricardo–Marx labour theory of value. However, simply to bracket Menger with the other two is to overlook important points to which his, less formal, analysis drew attention. Menger did not assume that markets were in equilibrium, with individuals maximizing utility. On the contrary, individuals would frequently have limited knowledge of the possibilities available to them. Entrepreneurs emerge as people who seek out and take advantage of opportunities for profit, creating goods that previously did not exist and finding new ways to create existing goods. Competition, therefore, was for Menger a dynamic process that had much more in common with Adam Smith's view of competition than with the static concept found in Walras or Jevons. For Menger, competition was not the absence of monopoly but a process through which monopolies were progressively eliminated: 'the need for competition calls forth competition, provided there are no social or other barriers in the way'.⁴

A further characteristic of Menger's economics was his stress on the way in which institutions arose from the nature of goods. The most important of these institutions was private property itself. Property, he argued, 'is not an arbitrary invention, but rather the only practically possible solution to the problem that is... imposed upon us by the disparity between requirements for, and available quantities of, all economic goods'.⁵ The legal order, therefore, had an economic origin. However, while institutions might have had economic origins, they had often not been designed by anyone. Rather, they emerged as the unintended consequences of individuals' actions. For example, money, Menger claimed (seemingly overlooking the substantial evidence

concerning the role of the state in setting monetary standards), was not planned, but arose unplanned from the actions of individuals seeking to satisfy their needs as best they could.

Menger's *Grundsätze* was dedicated to Roscher, the founder of the historical school. His subjective-value theory continued the earlier German tradition, and met with little resistance. There was no sense of a break with the past. In 1883, however, Menger published a methodological critique of the (younger) historical school as it was developing under Schmoller. He sought to provide a rigid distinction between theoretical and historical economics. Theoretical economics, he argued, dealt with 'exact' laws based on assumptions of pure self-interest, omniscience and freedom of movement. To test the resulting theory involved a misunderstanding, because it was based on abstractions: in the real world, 'pure self-interest' cannot exist any more than can 'pure oxygen'. Menger also objected to mathematical economics, on the grounds that all that mathematics could demonstrate was relationships between quantities: it could not establish the essence of economic phenomena, which was his concern. To analyse interdependence and mutual determination, as did Walras, was to lose sight of causal connections. Menger also put forward two doctrines that, though minor themes in the book, subsequently became very important in Austrian economics. One was methodological individualism (the idea that all analysis must start with the individual, not with aggregate or collective concepts). The other was the idea that there is a spontaneous order underlying social phenomena.

Schmoller reviewed Menger's book very critically, and the outcome was a bitter controversy – the *Methodenstreit*, or Struggle over Method. In the ensuing discussion, many issues were confused. It has been argued that the dispute was as much over policy (Schmoller supporting protection and Menger opposing it) and about jockeying for dominance as about substantive issues. It is arguable that Schmoller and Menger could otherwise have agreed that different methods were needed to answer different questions. The disagreement had, however, the effect of splitting the economics profession in Germany.

Historical Economics and the Marshallian School in Britain

In Britain, historical methods were advocated by Richard Jones (1790-1855), who used them to criticize Ricardo's theory of rent. With Malthus he established the Statistical Society of London, later the Royal Statistical Society. However, the writer who bore most responsibility for stimulating debate on the issue of whether economics should be a historical subject was Thomas Edward Cliffe Leslie (1827–82). In 1870 Leslie took up the point, made by the German historical schools, that economic laws were not universal, but varied from place to place. He also challenged the prevailing conception of Smith's *Wealth of Nations*. Smith, Leslie contended, had adopted an inductive approach (though he had not taken this far enough) and he had not assumed that behaviour was selfish. Leslie called for the replacement of abstract political economy with a more inductive, historical approach that took into account the whole variety of human motivations and the evolution of economic, political and social institutions. Competition and movement of capital were increasing the complexity of the world and also increasing uncertainty, undermining the assumptions of orthodox theory.

These arguments – that economics had become too abstract and that the conclusions of political economy were of limited relevance – were developed by other writers in the following years. The 1880s also saw the appearance of pioneering works on English economic history by J. E. Thorold Rogers (1823–90), William Cunningham (1849–1919) and William James Ashley (1860–1927). One of the most influential (perhaps because he died so young and came to be regarded by many of his generation as a saint) was Arnold Toynbee (1852–83), who popularized the term ‘the Industrial Revolution’. Toynbee was committed to social reform, and succeeded in inspiring a generation of Oxford students to take up economics in order to achieve this end. He refused to accept that ethics could be separated from economics, at least on questions of distribution, and he insisted that to understand current economic and social problems it was necessary to consider their history. He argued the case for

economic and social history as autonomous from, though dependent on, other types of history.

Though there were sharp differences between the advocates of theoretical and historical economics, British economics avoided being split in the same way as the German profession. One reason for this was the attitude of Alfred Marshall (1842–1924), the economist who, from his position as Professor of Political Economy at Cambridge, dominated the British economics profession from the 1880s until around 1930. Another was the different structure of the British university system, which did not have any centralized process of appointing professors.

Marshall came to economics through translating Mill's doctrines into mathematics, a task he undertook during the late 1860s. This involved mathematical representations of demand and supply. In attempting this, he was strongly influenced by the German writers, notably Rau, Hermann and Thünen. After reading Jevons's *The Theory of Political Economy*, he grafted utility theory on to his theory of supply and demand by using it to explain the demand curve. The result was a system of equations describing a static equilibrium, comparable to those of Jevons or Walras. However, whereas Walras's analysis remained at a very abstract level, Marshall continually sought to be realistic. In particular, he wished to take proper account of time. To do this, he could not analyse general equilibrium, allowing for all the possible instances of interdependence in the economy, but had to deal with one market at a time. He therefore developed the method of partial-equilibrium analysis, in which one part of the economy is analysed on its own.

There was, however, a further reason why Marshall adopted this approach. Like many of his contemporaries, he was very interested in biology, and in particular in evolutionary ideas. Biological metaphors were, he argued, more useful than mechanical ones in dealing with economics. This meant that he was sceptical about the mathematics used by Jevons and Walras, so closely linked with mechanics. This passion for evolutionary ideas came out in several ways. He considered continuous, gradual change as typical of economics, adopting the motto '*Natura non facit saltum*' ('Nature does not make jumps'). He did

not take individuals' behaviour as given, but assumed that they would modify this in response to their environment. Thus if workers spent their income on wholesome goods and activities, the result would be an increase in their strength and intelligence, and their productivity would rise. In contrast, if they indulged in ways of living that were unwholesome, both physically and morally, neither efficiency nor character would improve. Evolution also affected Marshall's view of firms, which he saw as progressing through a life cycle analogous to that of the individual. They began young and vigorous, but after a period of maturity they became old and were displaced by newer, more efficient firms. An industry, therefore, was like a forest – it might remain the same when seen as a whole, even though every tree in it was changing.

The foundation of Marshall's economics is the theory of supply and demand. Time is taken into account through the device of distinct periods. These are defined not in terms of calendar time but in terms of what is free to change within each period. The calendar time involved in each period might vary from one problem to another. The shortest possible time period is defined as the market period. There is a certain quantity of goods available, as there is no time to produce more. If the commodity is perishable, such as fish (before the advent of refrigeration), it will be sold for whatever it can fetch. Price will be determined entirely by demand. But if the commodity can be stored without great expense (for example, wheat), price will be governed primarily by the price that sellers expect to prevail in the future: sellers will be reluctant to accept a lower price, even if demand is low. The result is that demand will determine sales, not price.

Marshall's next time period, the short run, is sufficiently long to allow variations in the level of production to take place. In the short run, firms are able to alter the quantity of unskilled labour they employ, but not the amount of skilled labour and machinery, or their production methods. The result is that output can be increased, but only at increasing unit cost. Supply and demand therefore determine price. If demand increases, price will rise, because of rising production costs caused by the limited stock of skilled labour and machinery.

In the long run, Marshall's next longest time period, however, firms have time to change the skilled labour and machinery they use and to organize in different ways. Under these circumstances, Marshall believed, expansion of output will result in falling costs. An increase in demand will therefore result in output increasing and price falling.

Finally, Marshall postulated a very long period, in which 'there are very gradual or *secular* movements of normal price, caused by the gradual growth of knowledge, or population, or capital, and of the changing conditions of demand and supply from one generation to another'.⁶

Like Toynbee and so many others of his generation, Marshall came to economics because he believed it offered a way to improve society. Social reform was providing a partial replacement for the Christian faith that was being lost. However, Marshall was equally concerned that economics be established as a scientific discipline. This meant that he was extremely reluctant to get involved in public controversy, for he believed that this would undermine the authority of the subject. The role of the economist was not to propound truths about the economy, but to develop an agreed body of economic principles that could be used to tackle economic problems. This was one of the reasons why, in his *Principles of Economics* (first edition 1890, eighth edition 1920) – a book that was still used as a textbook as late as the 1950s – he presented his results verbally in the text. Diagrams were relegated to the footnotes, and algebra was banished to an appendix. In this way, he hoped, the subject could be made accessible to businessmen as well as to professional economists. Such an arrangement also accorded with his suspicion of mathematical arguments.

Marshall was trained as a mathematician, and developed his economics using mathematics. He was an innovative theorist, developing many of the theoretical concepts that have become standard in modern economics. However, he always remained very sceptical about the use of mathematics in economics. He wanted economics to be realistic, but the use of mathematics made it very easy to derive results that had no foundation in reality. If mathematical results could not be translated into

English, he was suspicious of them. His papers, for example, contain a mathematical model of economic growth, but, because he was doubtful about the value of the equations, he did not publish it. His methodological pronouncements emphasize the need for quantitative and statistical methods, but, unlike with Jevons, the empirical evidence he used appears anecdotal rather than statistical, and illustrative rather than essential. This is true not only of the *Principles* but also of *Industry and Trade* (1919), a volume that contained an enormous amount of information on the organization of industry. This attitude towards evidence must have arisen, at least in part, from his strong desire to keep theory and reality close together.

A similar ambiguity underlay Marshall's attitude towards history. As a young lecturer, Marshall was enthusiastic about history. In the first edition of the *Principles* he began with economic history. He mixed factual material and history in most chapters of the book, and argued that only one part – on the general relations of supply, demand and value – should be considered ‘theory’. However, in later editions the historical element was played down and moved into appendices. When the time came to appoint a successor to the chair at Cambridge, Marshall supported A. C. Pigou (1877–1959), strongly inclined towards theory, in preference to the historian H. S. Foxwell (1849–1936). The historical content of the first edition of the *Principles* had been strongly criticized by Cunningham (his review was entitled ‘The perversion of economic history’). Marshall may have decided that it was safer to avoid controversy and to accept a disciplinary division of labour, in which history was left to historians.

European Economic Theory, 1900–1914

By the start of the twentieth century, marginalist economics – economics based on marginal utility and individual maximization – had become well established. Walras's successor in the chair at Lausanne, Vilfredo Pareto (1848–1923), had developed and

refined his general-equilibrium system. A fellow Italian, Enrico Barone (1859–1924), had applied general-equilibrium theorizing to the problem of a hypothetical socialist economy. In Sweden, Knut Wicksell (1851–1926) had integrated Walras's general-equilibrium theory with Böhm-Bawerk's capital theory (see pp. 211–12). In their work, marginal-productivity theory displaced classical theories of wages and profits. In England, Marshall had imposed his view of economics on Cambridge and dominated the discipline, promoting a supply-and-demand analysis that built on the French and German traditions as well as on British writers. Economics had ceased to be political economy and was in the process of becoming dominated by an abstract, 'pure' economic theory. At the London School of Economics, established by the historians and socialists Beatrice and Sidney Webb (1858–1943 and 1859–1947), and at Oxford, a slightly more historically minded economics was being pursued, but these institutions were dwarfed by Marshall's Cambridge. Furthermore, because LSE, despite the socialist element in its origins, was committed to free inquiry, it also included economic theorists and supporters of laissez-faire. (By the 1930s, with Lionel Robbins and Friedrich von Hayek – see pp. 239 and 217 – these elements had become very prominent.) Theory and history, despite Marshall's desire to keep them together, had separated. In England (unlike in the United States), historical economics was about to turn into economic history, leaving economics behind. In the German-speaking world, the *Methodenstreit* had split the profession and reduced chances of cooperation.

Not only was mathematics, in particular differential calculus, increasingly used, but economics had almost lost the classical concern with long-run dynamics. Static theory – more amenable to treatment with the mathematical tools economists had begun to use – received more attention. However, some economists were concerned with dynamics. Several economists investigated the business cycle, notably Arthur Spiethoff (1873–1957), a student of Schmoller's, Mikhail Ivanovich Tugan-Baranovsky (1865–1919), a Russian influenced by Marx, and Albert Aftalion (1874–1956), a professor in France, though born in Bulgaria. In 1912 Joseph Alois Schumpeter (1883–1950) – an Austrian working in

the tradition of Friedrich von Wieser (1851–1926) and Böhm-Bawerk (Menger's two disciples) – published *Theorie der Wirtschaftlichen Entwicklung* (*The Theory of Economic Development*), in which he argued that technical progress was the motive force underlying the cycle and economic growth. Innovation moves the economy out of equilibrium, creating new opportunities for entrepreneurs to make profits and causing an expansion as these are taken up. When these opportunities are exhausted, slower growth and depression occur as the economy settles down to a new equilibrium before it is disturbed by a new wave of innovations. Such ideas, however, can be regarded as marginal to the pure theory that was becoming increasingly prominent.

This divide between theorists and historians extended to questions of economic policy. Theorists tended to support free trade, whereas historians (in both Germany and England) were more sympathetic towards protection. This was starkly revealed in England in 1903 when fourteen British economists (including Marshall, Francis Ysidro Edgeworth (1845–1926) and Pigou) wrote a letter to *The Times* supporting free trade. This was an attempt to bring the authority of the profession to bear on an urgent political issue. However, its effect was to show that the British profession was split. With two exceptions, the theorists supported free trade and the historians protection.

Most of the economists involved in these developments were social reformers. Though they were far from being Marxists, they were not content with the status quo. If their work was ideologically motivated, their goal was to develop policies that would reduce poverty and improve the condition of the working class. They generally favoured piecemeal reform and were opposed to radical schemes such as those of Marx or the American Henry George (1839–97), whose enormously successful and widely read book *Progress and Poverty* (1879) proposed replacing all taxes with a single tax on rent. But they were by no stretch of the imagination doctrinaire defenders of capitalism. Even the Austrians, who were such strong critics of Marx, wrote of the need for capitalism to be reformed. However, economics had become an academic discipline. Most economists were motivated by strong social concern, but the discipline had

become much more clearly separated from politics than was the case in the classical era.