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The term ‘English marginalism’ generally refers to the work and outlook of a small group of economists working in England in roughly the last quarter of the 19th century. These may be thought of as pioneer neoclassical economists and include, as major figures, Jevons, Marshall, Edgeworth and Wicksteed.¹ Edgeworth was Anglo-Irish, and Jevons developed his earliest ideas in Australia, but it is obviously appropriate to group them under English marginalism. Distinctions along such national lines are of course not necessarily solid, particularly as, following the lead set by Jevons, this period can be regarded as the ‘high period’ in the international exchange of ideas. And as Hutchison (1955, p. 9) stated, ‘Edgeworth, Wicksteed, Auspitz and Lieben, Wieser, Bohm-Bawerk, Wicksell, Walras, Pareto, Barone and Fisher all drew on a broad, internationally known literature’. Important and original works were, ‘constructed essentially on the basis of a wide, eclectic, cosmopolitan reading of their contemporaries and immediate predecessors’ (Hutchison, 1955, p. 9).²

Nevertheless, it is possible to discern differences, in views and influences, between English and continental writers during this period. Walras developed his analysis of exchange, quite independently of the English writers, as an extension of Cournot’s model of trade between regions involving a single good. Indeed, despite an extensive correspondence, his relationship with English authors cannot ultimately be described as congenial, particularly after Edgeworth’s review of the *Elements* where he criticised, among other things, the ‘exuberance of algebraic foliage’. It is true that there are traces of the influence of Cournot on Marshall’s early unpublished work, available in Whitaker (1975), but the main influence in producing his offer curve analysis of trade was clearly J.S. Mill. Communication among the English marginalists was obviously facilitated by closer proximity, particularly in London. There was of course the long-established Political Economy Club, and Herford (1931, p. 119) reports that between 1884 and 1888 there were regular economic discussions at the house of Henry Beeton. The circle included Wicksteed, Edgeworth, Foxwell, Sidney Webb and Bernard Shaw (Jevons had of course died in 1882).³ This circle saw debates

¹Wicksteed was later a strong influence on Robbins, who provided leadership for a later generation of marginalists; see O’Brien (1988).

²However, Hutchison (1955, p. 10) also makes the interesting point that, despite Edgeworth’s international sympathies, publications by non-English economists in the *Economic Journal* were negligible. Furthermore, the *Journal* played no part in securing translations of major works, and it seems that the only translation which Edgeworth encouraged was that of N.G. Pierson’s *Principles* in 1902.

³In addition, the Junior Economic Club was formed at University College in 1890. The formation of the Royal Economic Society is discussed below.

between Wicksteed, who produced his Jevonian critique of Marx in 1884, and the Fabian Socialist, Shaw. Earlier, around 1879 Edgeworth came into contact with Jevons, a near neighbour in Hampstead, through a mutual friend James Sully and their membership of the Savile Club. This led to Edgeworth's rapid shift of attention from moral philosophy towards economics, marked by his *Mathematical Psychics* published in 1881.

Furthermore, the English marginalists were not always in agreement. Even though Edgeworth and Wicksteed may be described as disciples of Jevons, they were by no means slavish followers. Edgeworth (1881, p. 109) defended Jevons's 'trading body' in terms of 'a sort of typical couple', but the point of departure of his work was the need to examine the role of the number of traders as an extension of Jevons's framework, where price-taking behaviour was simply assumed. Jevons and Edgeworth also had completely different attitudes towards authority, with Jevons famously rejecting any role and Edgeworth always ready to quote an authority in support of his argument, viewing authority as almost equivalent to empirical evidence. And Jevons took Edgeworth to task for the lack of transparency in his writing. Furthermore, Edgeworth criticised Wicksteed's use of linear homogeneous production functions. Despite Edgeworth's admiration for Marshall, there were strong disagreements between them, for example over indeterminacy in exchange (the 'barter controversy') and Giffen goods.⁴ Furthermore, Marshall stressed the evolution of ideas and continuity with classical economics, while the others took a more revolutionary stand. Marshall saw a clear line of filiation from Smith and Ricardo through J.S. Mill, while Jevons famously explicitly rejected Mill.

The term 'English marginalism' also requires discussion. This is undoubtedly the most common description used in the secondary and textbook literature. It appears to give primacy to the emphasis on the margin or the use of calculus, so that derivatives of utility and production functions became ubiquitous (though the term 'marginal utility', replacing such awkward terms as 'final degree of utility', owes its origin to Wicksteed). It is true that Jevons, Edgeworth and Wicksteed all produced extensive apologia or justifications for the use of mathematics in economics and that, despite relegating his analyses to appendices, many of Marshall's innovations were arrived at via the use of mathematics and diagrammatic analyses. Nevertheless, it is worth stressing that the period marks a distinct change of emphasis, rather than

⁴On contrasts between Marshall and Edgeworth, see also Creedy (1990).

simply of technique, in the study of economics. Instead of the concentration by the classical economists on the great dynamic themes of growth and development, and the important and highly sophisticated monetary debates associated with the numerous banking crises of the first half of the 19th century, the emphasis of the neoclassical economists was on the nature of exchange.

Exchange was seen (particularly by Jevons, Edgeworth and Wicksteed) as the ‘central’ problem in economics. For example, Hicks (1984) referred to the early neoclassicals as ‘catallactists’, in order to emphasise their exchange focus. This neologism of Whately, used also by Edgeworth, was extensively used by Hearn (1864) in his *Plutology*, which appears to have had some influence on Jevons, who is known to have attended a lecture by Hearn while in Australia.⁵ Hicks stressed (1984, p. 250) that, ‘while the classics looked at the economic system primarily from the production angle, the catallactists looked at it primarily from the side of exchange. It was possible, they found, to construct a “vision” of economic life out of the theory of exchange, as the classics had done out of the social product. It was quite a different vision’ (1984, p.250). Edgeworth (1925, ii, p.288) summarised the position by suggesting that, ‘in pure economics there is only one fundamental theorem, but that is a very difficult one: the theory of bargain in a wide sense’.⁶ Similarly, Schumpeter (1955, p. 911) wrote, ‘they realised the central position of exchange value’ which ‘is but a special form of a universal coefficient of transformation on the derivation of which pivots the whole logic of economic phenomena’. Furthermore, in considering the central position of exchange theory, Fraser (1937, p.104) stated that the view of costs in terms of foregone alternatives is ‘merely the extension of the exchange relationship to the whole of economic life’.

The great success of the early marginalist or neoclassical economists was also associated with the fact that they provided a foundation for their exchange model in the form of a utility analysis. Utilitarianism was of course the dominant moral philosophy (despite lively debates during the period with idealists and social Darwinists) among the English marginalists, influenced particularly by J.S. Mill and Sidgwick, although none was perhaps as strong in his adherence as Edgeworth. Although it is sometimes remarked, following Hutchison (1955), that in ‘marginal utility’, the adjective is more

⁵Jevons also praised Hearn in the introduction to his *Theory of Political Economy*.

⁶Edgeworth also stressed, ‘the fundamental principle of international trade is that general theory which Jevons called the Theory of Exchange ... which constitutes the “kernel” of most of the chief problems of economics’ (1925, ii, p. 6). He added, ‘distribution is the species of exchange by which produce is divided between the parties who have contributed to it’ (1925, ii, p. 13).

important than the noun, a utility approach allowed for a deeper treatment of the gains from exchange and the wider consideration of economic welfare. Furthermore, this type of welfare analysis survived the replacement of a cardinal utility concept with an ordinal concept, or the idea of a simple preference ordering. Indeed, Hicks stated that ‘welfare economics was captured by the catallactists and it has never got quite free’ (1984, p. 253).⁷

The success of their agenda can thus be attributed to the fact that they did indeed manage to produce a unified theory on such foundations. In looking back on the dominance of the ‘marginalists’, Hicks (1984, p.252) argued, ‘I would therefore maintain that the principal reason for the triumph of catallactics – in its day it was quite a triumph – was nothing to do with socialism or individualism; nor did it even have much to do with the changes that were then occurring in the “real world”. The construction of a powerful economic theory, based on exchange, instead of production and distribution, had always been a possibility. The novelty in the work of the great catallactists is just that they achieved it’.

It is only when the perceived central position of exchange analysis is recognised, along with the place of the principle of utility maximisation as the foundation, that it is possible to have some appreciation of the attitude behind Edgeworth’s (1881, p. 12) remark, after discussing the extension of utility analysis to subjects such as production and labour supply, that, “‘Mecanique Sociale” may one day take her place along with “Mecanique Celeste”, throned each upon the double-sided height of one maximum principle, the supreme pinnacle of moral as of physical science ... the movements of each soul, whether selfishly isolated or linked sympathetically, may continually be realising the maximum energy of pleasure, the Divine love of the universe’. Of course, other writers were much more prosaic in their expressions than Edgeworth, but his view nicely encapsulates something of the pioneering spirit of the early neoclassical economists. This spirit is also displayed in Jevons’s letters to his sister and brother.⁸ Schumpeter argued that the utility analysis must be understood in the context of exchange as the central ‘pivot’, and ‘the whole of the organism of pure economics

⁷Hicks was of course directly involved in developing the ‘new welfare economics’. The issues were discussed in the famous book by another later marginalist, Robertson (1952).

⁸Jevons, writing to his sister, suggested that, ‘in treating of Man or Society there must also be general principles and laws which underlie all the present discussions & partial arguments ... each individual must be a creature of *cause* and *effect*’: see Black (1977, ii, p. 361). His letter to his brother stated that he had, ‘fortunately struck out what I have no doubt is *the true theory of economy*, so thorough-going and consistent, that I cannot now read other books on the subject without indignation’: see Black (1977, ii, p. 410).

thus finds itself unified in the light of a single principle – in a sense in which it never had before’ (1954, p. 913). However, Marshall did not share in this enthusiasm.

The famous ‘equations of exchange’ illustrate both a point of similarity and difference between Jevons and Walras. Using similar two-person two-good exchange models, they independently produced (in Walras’s case, with help from his mathematician colleague Paul Piccard) the two simultaneous equations involved, and they both concentrated on price-taking solutions. It is recognised that some commentators would dispute this point, placing much stress on different interpretations of Walras’s famous *tâtonnement* process. But in the formal models it is hard to escape the fact that, just as in Jevons’s approach, individuals are price-takers and in the equilibria considered, all exchange takes place at the corresponding prices. Jevons left the equations expressed in terms of quantities exchanged, leaving the equilibrium price ratio to be determined by the resulting ratio of quantities. Recognising the nonlinear nature of these equations for most forms of utility function, so that explicit solutions could not be obtained, Jevons therefore did not formally derive demand functions for the two goods in terms of relative prices. Edgeworth subsequently developed his indifference curve analysis of exchange within his box diagram and, given his emphasis on indeterminacy rather than price-taking, gave priority to the contract curve rather than demand curves.

Walras (1874) instead had previously extended Cournot’s model of trade between two regions, involving a single good, to produce a non-utility analysis of the exchange of two goods between two traders. He produced his general equilibrium demand and supply curves in which the quantity demanded or supplied is expressed as a function of the relative price. He had explored the form these curves might take, in particular, showing that in general the supply curves would be expected to be ‘backward bending’, essentially because suppliers also have a demand for the good of which they hold stocks. Hence, when faced with the equations of exchange, he realised that instead of trying to solve them in terms of quantities of the two goods, the concept of reciprocal supply and demand allowed him to replace one of the quantities with the product of a relative price and the other quantity, since $y/x = p_x/p_y$, where x and y are the amounts exchanged and p_x and p_y are the respective prices. This reciprocal demand relationship had of course been recognised by many earlier economists, but in order to produce an exchange model, this idea needs to be combined with the idea of demand as a function of relative price. Walras is therefore credited with showing

explicitly how general equilibrium demand and supply functions can be derived from utility functions: these are not the partial equilibrium demand functions which, partly through Marshall's influence, later came to dominate economic analysis.

Formally, persons A and B hold endowments, a and b respectively, of goods X and Y . Where x and y are the amounts exchanged, utility after trade takes place can therefore be written as $U_A = U_A(a - x, y)$ for trader A , while for B it is $U_B = U_B(x, b - y)$: Jevons actually used additive utility functions. The 'keystone' of the theory is the result that for utility maximisation, *'the ratio of exchange of any two commodities will be the reciprocal of the ratio of the final degrees of utility of the quantities of commodity available for consumption after the exchange is complete'* (Jevons, 1871, in 1957, p. 95). This gives rise to his famous 'equations of exchange', which can be expressed using modern notation as:

$$-\frac{\partial U_A/\partial x}{\partial U_A/\partial y} = \frac{dy}{dx} = -\frac{\partial U_B/\partial x}{\partial U_B/\partial y} \quad (1)$$

The term dy/dx is the ratio of exchange of the two commodities at the margin. Jevons recognised that the integration of these differential equations presents formidable difficulties, and for this reason he restricted his attention to price-taking equilibria, using his 'law of indifference' whereby there are no trades at disequilibrium ratios of exchange and 'the last increments in an act of exchange must be exchanged in the same ratio as the whole quantities exchanged' (1957, p. 94). This means that y/x can be substituted for dy/dx in (1), giving two simultaneous equations in x and y . Jevons recognised that y/x is equivalent to the ratio of prices of the two goods, $p = p_x/p_y = y/x$, but he preferred to leave p out of the equations until the equilibrium values of y and x are obtained. Recognising, as noted above, that in general the equations in (1) would be nonlinear, he did not take their formal analysis further,⁹ although he added the important but rather cryptic comment that the theory is 'perfectly consistent with the laws of supply and demand; and if we had the functions of utility determined, it would be possible throw them into a form clearly expressing the equivalence of supply and demand' (1957, p. 101).

Walras explicitly considered the step to which Jevons had merely alluded, and replaced y with px in order to suggest that the resulting equations could be solved for x and y in terms of p . He did not do this for fully specified functional forms for utility functions, and indeed the equations can be solved explicitly only for certain

⁹However, he showed how they can be used to examine some 'complex cases'; see Creedy (1992).

special cases. Launhardt (1885) was later to be the first to do this, using quadratic utility functions. Curiously, this important step taken by Walras was not discussed by the English marginalists at all. Indeed his associated demand and supply curves seem to have been almost entirely ‘lost’; they do not appear in any history of economics or microeconomics texts.¹⁰ They received their most extensive development by Launhardt (1993), whose analysis was used heavily in a rather terse treatment by Wicksell (1895).¹¹

The above discussion has focussed on the essential characteristics and preoccupations of the British marginalists, and some differences from contemporary continental European writers. However, it is worth considering the special context in which these economists worked. Hicks is quoted above as describing the nature of the ‘victory’ of the catallactists, but it is nevertheless true that any kind of victory from the point of view of the attitude of the profession as a whole had to wait many years.

British economics in the 1870s was going through a period of pessimism, reflected in Bagehot’s (1880, p. 3) comment that it ‘lies rather dead in the public mind. Not only ... it does not excite the same interest as formerly but there is not exactly the same confidence in it’. A further symptom of the negative attitude was the attempt to exclude economics from the British Association (Section F, ‘Economic Science and Statistics’). There was also substantial tension between analytical economists and economic historians, such as Cunningham, and also the historical economists, such as Ingram, who were sympathetic to the German School.

The new technical innovations of the marginalists were greeted with the argument that economics was losing touch with reality. Jevons’s *Theory of Political Economy* was greeted with more criticism than praise, particularly regarding his use of mathematics. Marshall (in Black, 1981, p. 146) suggested that, ‘the book before us would be improved if the mathematics were omitted but the diagrams retained’. Cairnes (in Black, 1981, p. 152) argued that, ‘when mathematics are carried further ... without constant reference to the concrete meaning of the terms for which the mathematical symbols are employed, I own I regard the practice with profound

¹⁰For further discussion see Creedy (1999).

¹¹The curves were discussed very briefly, in the comprehensive review of Walras’s equilibrium economics, by van Daal and Jolink (1993, p. 26). They commented that, ‘it did not get much following’, and referred to the ‘undeniable complexity of the figures’. The only treatment in general works on the history of economic analysis seems to be the terse mention by Stigler (1965, p. 96), who also referred to Wicksell, but not to Launhardt.

distrust'.¹² Jevons's reputation was indeed initially based on his applied and policy analyses. And Edgeworth did not really establish his position until after the extensive work on index numbers, in his role as secretary to the British Association Report on Index Numbers, which produced three volumes in the late 1880s. His first professorial appointment, at King's College London, was in 1890 when he was 45 years old. Edgeworth's most important publication, *Mathematical Psychics*, was privately published in 1881 and, apart from the reviews by Marshall and Jevons, it was largely ignored for many years.

The Royal Economic Society (initially the British Economic Association – BEA) was not established, along with the *Economic Journal*, until 1890 and, despite Edgeworth's editorship, the early issues contained a very broad range of studies – technical and analytical work was in a very small minority. The new journal cannot be said to have reflected a clear marginalist agenda. Indeed it was important, as Marshall stressed, to appeal to as wide a group as possible.¹³ This was not even the first economics journal in Britain: the Oxford University branch of the Christian Social Union launched its *Economic Review* before the *Economic Journal*, a move which significantly worried those who were planning to set up the BEA.

Economic debate during the period was by no means dominated by academics. Coats (1968, p. 370) shows that in 1891, of the 501 members of the British Economic Association who could be identified, only 86 could be described as university teachers. To this it must also be added that there were very few students of economics – even the academic economists were drawn from other disciplines. The small number of economists produced by Cambridge was a regular source of complaint by Marshall, and it took him many years to establish the economics degree (the Tripos) in Cambridge.

The introduction of a marginal utility analysis of exchange also came at a time when there was much debate in Britain regarding moral philosophy. Utilitarianism may have been dominant in Cambridge, under Sidgwick, but Oxford was dominated by Idealists such as T.H. Green and F.H. Bradley who were heavily influenced by

¹²The anonymous reviewer in the *Saturday Review* concluded that, 'whether anything can or cannot be done in the direction indicated – and we by no means say that it cannot – Mr. Jevons has taken us a very short way'; see Black (1981, p. 157). Cliff Leslie wrote, 'we regret that so much of Mr. Jevons' [sic] own reasoning is put into a mathematical form, because it is one unintelligible or unattractive to many students of considerable intellectual power and attainments'; see Black (1981, p. 160).

¹³In the same spirit no entry barriers were placed on membership of the Association; for further discussion, see Coats (1968).

Hegel and Kant. Other approaches, such as social Darwinism, with enthusiasts such as Herbert Spencer, were also becoming popular. Thus the welfare economics and technical analysis based on utility maximisation did not initially fall on fertile ground. While it is easy from the present perspective to write in terms of a victory for English marginalists, it is nevertheless the case that economics in England during the last quarter of the 19th century was carried out by a significantly heterogeneous group of writers. Furthermore, the marginalists themselves did not form a unified group with a single-minded agenda. The early death of Jevons left the marginalists without a pioneering and passionate leader, and Marshall – with his much wider sympathies and broader vision – became the undisputed leader of British economics for a generation.

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