

THE "INTANGIBLE AND FUGITIVE NATURE" OF CONSUMPTION DEMAND:
WILLIAM WHEWELL AND GIFFEN GOODS

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In The Theory of Political Economy, W.S. Jevons drew attention to some early papers by William Whewell which "made the most elaborate attempt to apply mathematical formulae" to political economy. Jevons noted that Whewell's work had "received the least possible attention from economists" and that it failed to "lead to any satisfactory results", although he did not suggest these points were related (Jevons 1871, pp. 15-16). A century after Jevons delivered this verdict, historians of economics began to pay quite extensive attention to Whewell's political economy analyses which had been presented in a series of papers to the Cambridge Philosophical Society (1829, 1831, 1850) and a number of lectures (1861).¹ The recent work by historians has differed from Jevons in identifying a "Whewell group" of mathematical economists and portraying Whewell's work in a more favourable light.²

In a number of articles, James Henderson (1973, 1975, 1985) has argued that Whewell's 1850 "Memoir" used a mathematical statement of a "demand elasticity coefficient as a device to identify Giffen goods ... forty-five years before Alfred Marshall". Noting the difficulty in locating evidence in Giffen's work from which Marshall could have derived his "hint", Henderson suggests Whewell as a possible source. Although Marshall did not refer to Whewell's work, "it is hard to believe" that he was "unaware" of it, so there is "a possible link between Whewell and Marshall with respect to the Giffen paradox" (Henderson 1973, pp. 329, 339).³

In the "Giffen" case discussed in Marshall's Principles of Economics, it was suggested that the bread consumption of "poorer labouring families" would increase with a rise in the price of bread. For Marshall, a Giffen good was a necessity, accounting for a large proportion of consumption expenditure. The explanation for the positive relation between quantity demanded and price (at least over a certain range for a particular group) was that while there would be a tendency to reduce consumption with a price rise, because of the marginal

utility of bread, that effect would be overwhelmed by the effect of changes in the marginal utility of money which would accompany the price rise with a given money income (Marshall, 1961, p. 132).

Although Whewell did suggest that it was possible to depict a situation where quantity demanded would vary positively with price, this note shows that Whewell's explanation for that relationship was quite different from Marshall's. For Whewell's discussion of consumption wants and demand was more consistent with the writings of earlier and contemporary political economists than with subsequent marginalist theory. The note also illustrates some problems in searching for precursors in the history of economics.

I

In 1850, when examining short period market price variations,⁴ Whewell presented a coefficient, m , which could summarise the ways in which the "money demand" (total expenditure) for commodities would vary with price changes. Total expenditure would vary as the price responded to fluctuations in supply and as demand responded to changes in price. Since, for a particular commodity

$$m = \frac{d(\text{Total Expenditure})/\text{Total Expenditure}}{d(\text{price})/\text{price}}$$

it was a coefficient of expenditure rather than demand per se (Whewell 1850, pp. 2-5). For Whewell, the coefficient registered "the specific rate of change of each commodity; meaning thereby, both the change of price when the supply varies, and the change of demand when the price varies" (ibid, p. 5, original emphasis).⁵

In this context Whewell (1850, pp. 3,7) argued that commodities could be grouped in four main classes, based on the magnitude of their "m" values:

C1. "Conventional Necessaries" such as "official dresses, and conventional appendages of persons in office", considered necessary by the wealthy. Here, m was equal to one, since quantity demanded did not vary with the price while total expenditure varied directly with price.

C2. "General Necessaries" such as corn, consumed by the mass

of the population. Here, m was greater than zero but less than one. Quantity demanded was inversely related to price but total expenditure changed in the same direction as price.

C3. "Articles of Fixed Expenditure" such as an "allowance for dress", where people "on average" spent a certain sum each year. m was zero, since total expenditure remained unchanged while demanded varied inversely with the price.

C4. "Popular Luxuries" such as tea or coffee. Here m was negative since quantity demanded varied inversely with price as did total expenditure.⁶

Whewell then noted a further commodity class (referred to here as C0). Because this is the passage from which Henderson has identified a Giffen good analysis, it can be quoted in full:

I suppose that there are no commodities of which a greater quantity would be sold if the price were increased, and a less quantity sold if the price were diminished. It is conceivable that this might be, as a matter of caprice or fashion. For instance, we may conceive that diamonds might in some way (by the discovery of abundant mines or the like) become so common as to grow out of use, so that a less quantity might be sold than at present. If there should be such commodities, they would correspond to values of m greater than 1 (Whewell 1850, p. 7).

Whewell did not develop this fifth classification in detail but a number of propositions can be reasonably inferred from the passage, supplemented by some comments from his earlier work.

First, it seems clear that for Whewell these commodities were normally consumed by the wealthy. This is suggested both by the use of diamonds as an example and that the "conventional necessities" (with a lower m value) were also consumed by the rich. Whewell did not provide a detailed theory of "wants" and demand to explain the hypothesis in the passage above, but relevant material for an explanation was provided elsewhere. In his first "Mathematical Exposition" (1829) he had written that "demand" was unlike "supply" in that it "is of a more intangible and fugitive nature. It consists originally of moral elements as well as physical: of the vehemence of desire, and the urgency of need which men have, as well as of the extent of means" (Whewell 1829.

pp. 9-10). Beyond this he said little in a direct manner. It is possible, however, to recover the basis of the general theory Whewell was assuming, by examining the terminology he used to characterise commodities and their demand. I will first show how the theory explains the adjustment processes in Whewell's diamond case and then consider why the explanation is important for deciding whether Whewell was referring to Giffen goods.

Whewell's analysis depended on ranking commodities in a hierarchy of wants and requirements from necessities to luxuries, which explained the "physical" or "needs" basis of demand. The hierarchy had to be located in a particular historical context because, while there were "general wants of mankind", luxuries in one society could become necessities in a wealthier one. A number of commodities had no real or substantive usefulness based on "need". Instead, their demand was based on "desire" (i.e. the human proclivity to "vanity"). Dependent on changing fashions, such luxury demand was especially characteristic of the rich who engaged in conspicuous consumption.

This account derives from similar ones in Smith's Wealth of Nations and John Rae's Statement of Some New Principles on the Subject of Political Economy (1834).⁷ Adam Smith's distinction between value in use and in exchange (illustrated by water and diamonds) assumed the framework sketched above and, in effect, summarised the results of the previous debates over "luxury",⁸ dealing with the effects of particular types of expenditure on the distribution and accumulation of wealth. Wants for luxuries were based on "artificial" desires although such expenditure could have both positive and negative effects in accumulation processes. The use of the term luxury certainly carried connotations of disdain for particular desires and behaviour (the "moral" aspects), but the reference points of the discussion were far more restricted than they had been, for example, in the "Civic Humanist" (or "Country Ideology") discourses earlier in the century.⁹

Whewell's terminology and characterisation of commodity wants was thus in keeping with that of the classical political economists. As late as 1861, for instance, he cited approvingly Adam Smith's distinction between value in use and in exchange (Whewell 1862, pp. 46-8) although the distinction had been criticised by De Quincey and, subsequently, J.S. Mill.¹⁰

Read in this context, Whewell's discussion of the CO. commodity class with the diamonds illustration can be explained as follows. Those luxury commodities were consumed by the wealthy and had a high price, dependent upon their relative scarcity and the desire for "distinction". Hence the demand depended on "fashion" and conspicuous consumption. With new diamond mines, there would be a lower cost of production, an increased quantity of production and a decline in the long period natural price, with market prices oscillating around the natural price. Now able to purchase diamonds, the less wealthy would begin to emulate the fashion of the rich so that, with widespread consumption, the conspicuous consumption effects would disappear and the rich would reduce their purchases. The emulative behaviour of the less wealthy could then result in the demand for diamonds falling with further reductions in price. Notice that Whewell only suggests this possibility for a limited range of price and quantity.

It should not be thought that Whewell was exceptional in presenting this argument in 1850. Sixteen years before, John Rae had argued in a similar way, using pearls to illustrate the point. Commodities like pearls were purchased for "conspicuous" consumption. Once they could be obtained by the "large mass of consumers", they would lose their "value as a distinction ... Hence arises the necessity for the variety, and seeming caprice of fashion." (Notice the similar terminology in Whewell). With the high value of pearls dependent on their scarcity, if new production techniques reduced the price to "a trifle" and they became "as plentiful as glass beads ... every peasant girl could afford to have a string of them". Consequently, "no lady would wear them, and when ladies ceased to wear them, peasant girls would lay them aside" (Rae 1834, pp. 267, 270, 286). This sequence, like Whewell's, can be described (roughly) as involving a dynamic interaction of "snob" and "bandwagon" effects, so that demand could gradually contract with a decline in price.¹¹

Four years after Rae, Cournot argued that there were exceptions to the "general" rule that demand was related inversely to price:

there are, in fact, some objects of whim and luxury which are only desirable on account of their rarity and of the high price which is a consequence thereof. If anyone should succeed in carrying out cheaply the crystallization of carbon, and in producing for one franc the diamond which today is worth a thousand, it would not be

astonishing if diamonds should cease to be used in sets of jewellery and should disappear as articles of commerce. In this case a great fall in price would almost annihilate the demand. (Cournot 1838, p. 46)

Since Whewell knew of Cournot's "little book" by 1849 (Campanelli 1982, p. 258n) his 1850 discussion of the diamonds case may have drawn on the Recherches. Cournot's explanation, however, was restricted to a "snob" effect. Given the similarity in the arguments and terminology of Rae and Whewell on this point, it is possible that the praise for Rae's book in J.S. Mill's Principles (see James 1965, Ch. 12) may have drawn Whewell's attention to it.

II

It is clear that by the mid-nineteenth century a number of writers, including Whewell, had suggested it was possible to depict a situation in which a commodity's demand could be positively related to its price. There are three reasons, however, for concluding that Whewell's analysis was quite different from Marshall's Giffen good case.

First, the Whewell commodity did not satisfy two key characteristics of a Giffen good. It was not a necessity (demand was "a matter of caprice or fashion"), nor did it account for a large proportion of expenditure when the relevant price decline was considered.

Second, while it is possible to reconstruct a consumption theory consistent with Whewell's argument and terminology, I can find no evidence of a marginal utility theory in his work. Hence, there was no distinction made between the marginal utility of a good and of money. This distinction (subsequently reformulated as that between substitution and income effects) was important for both Jevons and Marshall in explaining the relation between variations in demand and price and is necessary for presenting the Marshallian explanation of a Giffen good. It would be possible, however, to explain the expenditure changes for Whewell's commodity classes simply by means of the want hierarchy coupled with the income effects following any changes in market price. This lexicographic type of analysis (with target consumption levels) is consistent with the way in which Whewell ranked commodities and characterised their demand, but it is inconsistent with a marginalist analysis using continuous utility schedules.¹²

Third, the form of mathematics Whewell used in discussing his expenditure coefficient was not that of the later marginalists. As Jevons (1871, p. 16) noted and Rashid has explained, Whewell did not use the calculus, reasoning instead "as though he was considering only local displacements (or 'differences') ... It is only if he is considering local variations of a differential function that his formula for expenditures, on which the claim ... that he was a precursor in the 'discovery' of Giffen goods is based, is reasonably true" (Rashid 1977, p. 386). (The form of Whewell's mathematics was consistent, however, with a lexicographic type of consumption demand theory.)

As Rashid noted, it has been argued that Whewell was a "precursor" of Marshall so far as Giffen goods were concerned. A precursor is defined in this context as one "who does not make an explicit statement ... but lays the groundwork for those who follow". The groundwork consisted of using a demand elasticity coefficient (η) to classify commodities and considering the "possibility" of a positively sloped demand curve. Marshall then "explained why the demand curve for Giffen goods would be positively sloped" (Henderson 1975, p. 403, original emphasis).

Quite apart from the point that Whewell did not discuss a demand curve, the problem with this argument is that Whewell's explanation appears to have been quite different from Marshall's. The analytical divide between the two explanations thus illustrates a problem with using the category of precursor in constructing histories of economics. Because of the imprecision with which the category is specified, a search is made for statements which appear to have "something in common" with later analyses (e.g. a positive relation between quantity demanded and price). But his procedure can be "misleading if not exactly wrong because of the concentration on superficial similarities which ignores the essentials of the systems of thought which are to be compared" (Groenewegen 1982, p. 124)¹³

Two general conclusions can be drawn from this note. First, while Whewell considered the possibility of the demand for a commodity varying positively with its price, he did not "speculate ... on the Giffen paradox which Alfred Marshall discussed" (Henderson 1973, p. 337.) Although it is unclear whether Whewell's work influenced Marshall as James Henderson has suggested, it must be emphasised that Marshall's analysis was quite different from Whewell's. In this context it is

interesting to note that, given that Whewell's analysis of the CO commodities might be described in the later terms (though not the formal analytics) of a dynamic interaction between "snob" and "bandwagon" effects, his argument had something in common with Veblen's discussion of conspicuous consumption.¹⁴

Second, examination of Whewell's 1850 short period analysis illustrates the ways in which a mathematical treatment of price formation with reference to supply and demand did not necessarily suggest or entail a marginalist analysis. Whewell's approach was in keeping with that of J.S. Mill, explaining price formation by reference to broad groups or general types of commodities. This approach was in contrast with the marginalist representation by Jevons and Marshall which discussed price formation in terms of different market periods.¹⁵ Whewell's approach was also quite different from those later theorists in that two key components of English marginalism, the calculus and a marginal utility theory, were absent from his work. I have suggested that this was because Whewell had a different explanation of consumption demand (quite common in the nineteenth century) which, because of its lexicographic form, did not suggest the use of the calculus in formalising it. Rashid has argued that it is unsatisfactory to represent Whewell's work by means of equations using differential calculus because that procedure effaces "the difference between pioneers and moderns" (Rashid 1977, pp. 386, 382). While this point is correct, it also contains a more general implication for constructing a history of marginalism. Since both Jevons and Marshall had read Whewell's work, an "effacement" or precursor treatment of Whewell creates the impression of an analytical continuity between Whewell and the marginalists which makes the subsequent appearance of marginalism seem more "obvious" or "natural" than was actually the case. That treatment thus involves a teleological approach in writing a history of economics which blocks, to some extent at least, a careful posing of the question, "why marginalism?"

FOOTNOTES

- * Economics Department, Monash University, Clayton, Victoria 3168, Australia. I would like to thank Peter Groenewegen for helpful comments. The usual caveat applies on responsibility for the final product.
- 1. The papers are reprinted in Whewell 1971 (cf. Cochrane 1975, p. 396n) and the lectures in Whewell 1862.

2. Cochrane 1970, 1975; Henderson 1973, 1975, 1985; Rashid 1977; Campanelli 1982. See also Goldman 1983.
3. See also Henderson 1985 (pp. 408, 422) and the exchange between Cochrane (1975, p. 400) and Henderson (1975, p. 403) on this point.
4. Although Whewell's discussion of price formation is confusing, there is little doubt that, in 1850, he accepted the basic approach taken in J.S. Mill's Principles where market-prices were explained by variations in supply and demand, while the long period natural prices of "most" commodities were governed by their cost of production. See Whewell 1850, pp. 8-10; 1862, pp. 44-52.
5. In 1942, D.H. MacGregor argued that $m = 1 + e$, where e was Marshall's measure of the price elasticity of demand (MacGregor 1942, p. 316). This representation has been accepted by most subsequent commentators. Whewell, however seems to have been using first order, rather than second order, differences so that his formula was not the "same" as Marshall's. The relevance of this point is discussed in Section II.
6. In the terms of later supply and demand theory the price elasticities of the commodity classes are perfectly inelastic, inelastic, unitary elastic and elastic. See Cochrane 1975, p. 399.
7. See Smith 1976, Book I, Ch. XI, esp. pp. 178, 180-2, 190-1; Rae 1834, Ch. XI, esp. pp. 267-70. For a more detailed discussion of Rae on luxury expenditure, see James 1965, pp. 159-61.
8. See Smith 1976, pp. 44-5, which contains helpful editorial comments.
9. See Sekora 1977, Chs 1-3; and the chapters by Pocock, Hont, Ignatieff and Robertson in Hont and Ignatieff 1983.
10. See Bharadwaj 1978, pp. 255-6.
11. For discussion of how modern diamond producers have avoided this type of outcome, see D. Pallister et al., "Mr South Africa and the Diamond Conspiracy", The Review (published by the Australian Financial Review), August

1987, pp. 37-8.

12. cf. Earl 1982, Ch. 2. for G.R. Porter's (1847) discussion of consumption in terms of lexicographic orderings with target levels, see White 1987.
13. The same point applies to MacGregor's argument that the "idea of elasticity of demand ... was almost necessarily implicit in many economic writings ... before Adam Smith", such as the King-Davenant Price Quantity Table. But the "stage of strict formulation" came with Whewell in 1850 (since $m = 1 + e$) and then the "concept ... only waited to be named ... in the book entitled Economy of Consumption, by R.S. Moffatt in 1878" (MacGregor 1942, pp. 315-6). This panoramic view glosses over the points that the formulation of the Marshallian elasticity concept required that the relation between quantity demanded and price be expressed in a "well-behaved" continuous functional form and that the analysis was couched in the terms of the calculus (cf. Bharadwaj 1983, p. 34). It should also be noted that Moffatt's discussion of "the elasticity of demand" seems quite different from the latter marginalist analysis. Apparently unaware of Jevons' Theory, Moffatt criticised economists for failing to pay close attention to the analysis of consumer demand. His notion of "elasticity", used with reference to his underconsumptionist analysis, referred to the ways in which production could bring about changes in demand through changes in income and wants. Hence he wrote that "As long ... as the elasticity of demand permits production to expand without loss, it can expand freely" (Moffatt 1878, p. 122). The words "elasticity of demand" did not, therefore, refer to the marginalist concept.
14. Rutherford (1987) has argued that Leibenstein's (1950) discussion of the "Veblen Effect" is inconsistent with Veblen's account of conspicuous consumption. Veblen's analysis entailed a dynamic interaction between snob and bandwagon effects, based on lower income receivers emulating the consumption patterns of the wealthy. Veblen apparently knew of Rae's work, but did not cite it (Spengler 1959, p. 394, n.6).
15. See Bharadwaj (1978) for discussion of Mill and Marshall. Jevons' account can be found in Chs 4-5 of his Theory. Chapter 4 assumes that supply is fixed for each trading period while it is allowed to vary in the following chapter.

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