

'THAT GOD-FORGOTTEN THORNTON'
AND THE LAWS OF SUPPLY AND DEMAND

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"I am suffering the torments of the damned from that god-forgotten Thornton, who is boring on about supply and demand...He is not a bad fellow, but just now I hate him like poison." (Leslie Stephen at the Political Economy Club, December 1866.¹)

I

Between 1866 and 1868 The Fortnightly Review published a series of articles by William Thornton which were extracts from his forthcoming book, On Labour (Thornton 1869).² That text is chiefly remembered now for J.S. Mill's review, in which he rejected the notion of a determinate wage fund.³ Thornton's analysis has sometimes received a disparaging treatment from historians of economics,⁴ although it is recognised that Book II, Chapter 1, of On Labour was important in forcing a number of writers on political economy to clarify their arguments as to the meaning of "the laws of supply and demand". With the widespread attention On Labour received, indicated by a significant number of review articles and a second edition in 1870,⁵ it effectively set off an extensive debate over the explanation of price formation, some of the effects of which can be seen in the early work of Alfred Marshall, H.C. Fleeming Jenkin's exposition of supply and demand diagrams (1870) and W.S. Jevons' Theory of Political Economy (1871).⁶ This should not be surprising for the nub of Thornton's analysis was not the dismissal of the wage fund per se, which accounted initially for only a page-length footnote in his text.⁷ Instead, what also attracted so much attention at the time was his attack on the coherence of claims made about the laws of supply and demand and a subsequent argument that the process of price formation in labour markets was unlike that for other commodities. As Thornton noted in 1869, the "substance" of his analysis had been presented in the Fortnightly Review, "where it incurred a good deal of criticism, both public and private" (Thornton 1869, p. 57).

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This note focusses on Thornton's explanation for the price formation of commodities other than labour. The first reason for doing so follows from a discussion of P.H. Wicksteed's The Common Sense of Political Economy (1910) by Davidson and Meiners (1976). They argue that Wicksteed was a "forerunner" of the work devoted to finding new microfoundations for macroeconomics in the 1970s by economists who, while writing from a number of different analytical perspectives, were critical of a Walrasian framework. For my purposes, the key aspect of this argument is the explanation of how Wicksteed's analysis of price formation was "a far cry from a dual-decision mechanism where supply and demand are mutually determined". By not assuming instantaneous price adjustments and by using the notion of sellers' reserve prices, Wicksteed discussed a market world where sellers were price setters, making calculations by attempting to anticipate further transactions in a dynamic disequilibrium process, involving a stock adjustment mechanism.⁸ The notion of sellers' reserve prices was also important because it lay at the base of Wicksteed's argument that supply was the "reverse" of demand so that there was "no such thing" as a supply curve (Davidson and Meiners 1976, pp. 888, 892-5).⁹ An analogy is drawn between Wicksteed's analysis and recent inventory (stock) adjustment models as well as with Paul Davidson's explanation of price formation in "the real world" (Davidson 1972, p. 42).

While not wishing to question the Davidson and Meiners reading of The Common Sense, the first objective of this note is to show that the basis of much of Wicksteed's analysis was set out by Thornton, who emphasised more than Wicksteed the role of interdependent calculations under conditions of uncertainty. The second objective is to consider briefly how a number of contemporary proponents of the laws of supply and demand (L.H. Courtney, Jenkin and Jevons) either ignored the critical parts of Thornton's treatment of price formation or introduced restrictive assumptions so as to reject his conclusions.

II

Dealing with the formation of market prices where sellers' commodity stocks were given,¹⁰ Thornton followed Mill's account of supply and demand in arguing that any "merchantable" commodity's price depended on its being "at once useful and difficult of attainment" and that the price would settle at one of, or between, two "extreme" points.¹¹ The upper limit was set by the "utility, real or supposed, of

the commodity to the customer" while the lower was set by the utility to the dealer, forming the reserve price which characterised all commodity sales, with the exception of labour (Thornton 1869, pp. 45, 56, 58). While the price could vary between the limit points, dealers would aim to maximise revenue by initially setting the price as high as possible and then altering it in a sequence of adjustments, eventually clearing all their stock (ibid., p. 50).

Prices were governed by dealers' calculations as to "the actual state and future prospects of the market" so far as demand and supply conditions were concerned. Price setting was a process of trial and error, for expectations would differ and dealers would be under varying pressure to sell their stock according to their credit position. The lowest price at which any dealer was prepared to sell would then become the initial "set-up" price. No dealer was prepared to sell below this "if in his judgement customers will readily purchase at the current price all that he has to sell" (Thornton 1869, p. 61). While the initiative on pricing lay with the dealers rather than the customers (ibid., pp. 71,77), it was competition between dealers which determined the set-up price and the subsequent sequence of price adjustment, the necessity for which was indicated by unsold stocks (ibid., p. 59).

Since prices depended on the estimates dealers made of future supply and demand conditions, their credit position and their estimates of how other dealers would adjust prices (ibid., pp. 60-2), calculations could not be made in any precise, uniform and predictable fashion:

The same probabilities of supply and demand may affect competition very differently at different times. The state and prospects of the market being in other respects the same, competition will be more or less keen according as the dealers, or some of them, are more or less experienced, more or less shrewd, or more or less ready. The estimates of the future formed by individual dealers will thus depend partly on individual necessity and partly on individual discretion; and for discretion, or anything dependent on it, to be subject to law or rule, is not in the nature of things (ibid., p. 63).

Thornton's principal contention was, therefore, that given that pricing calculations had to be formed in a context of uncertainty, where conditions of credit availability were not

uniform, and where it was necessary to estimate the competitive price strategy of other dealers, the calculations "need not always be the same in all circumstances, for the same probabilities of supply and demand may be very differently estimated at different times or by different people, and the same estimates may affect different dealers differently" (ibid., p. 64). To the argument that dealers would learn to estimate accurately through experience, Thornton replied (in the second edition) that this procedure was "quite incompatible with any phenomena of commerce, either actual or possible. By no repetition of experiments could it be ascertained beforehand what in retail, and still less in wholesale transactions, would be the daily or otherwise periodical demand for any commodity" (Thornton 1870, p. 66n).

Apart from arguing that estimated supply-and-demand was only one element in dealers' calculations, Thornton noted that even if a competitive price could exist where supply equalled demand, most commodities would not be sold at that price. Since traders followed a pattern of price adjustment, most of their stock would be sold before the final "competitive" stock clearing price was reached. In the case of a sequence of price declines, this would mean that most sales would occur where supply was greater than demand, which "compelled" the subsequent changes in price:

when we speak of prices depending on certain causes, we surely refer to the prices at which all goods, or at least the great bulk of them, not that at which merely a small remnant of them, will be sold. How can we say that the equation of supply and demand determines price, if goods are almost always sold at prices at which supply and demand are unequal? (Thornton 1869, p. 54).

The sequence of disequilibrium trading was "almost typical of commercial transactions in general, most of which partake more or less of the character of sales by auction" (ibid., pp. 50, 56). Hence the notion of a static equilibrium point was a "figment of the economic brain". Mill had acknowledged that an equilibrium point was only "momentary" but the real problem was that it could never be reached (Thornton 1870, pp. 48n, 66n).¹²

Thornton acknowledged that his analysis was disatisfying in the sense that it meant no precise explanation of price formation could be produced by economists. But this conclusion was an analytical gain in that he could now

explain, in general terms why there were so many counter-examples to the supposed law of supply and demand:

Nine-tenths of the confusion and obscurity in which the doctrine of price has hitherto been involved has arisen from...straining after precision where to be precise is necessarily to be wrong. Supply and demand are commonly spoken of as if they together formed some nicely-fitting, well-balanced, self-adjusting piece of machinery, whose component parts could not alter their mutual relations without evolving, as the product of every change, a price exactly corresponding with that particular change... [Due, however, to] that ever-changing chameleon, human character or disposition, price cannot possibly be subjected to law. (Thornton 1869, p. 65).

Wicksteed's analysis differed from Thornton's in a number of respects and, with the advantage of subsequent discussion over forty years, The Common Sense certainly contains a more wide-ranging and sophisticated presentation.¹³ Nevertheless, so far as the features of Wicksteed's explanation of price formation emphasised by Davidson and Meiners are concerned--i.e. a dynamic disequilibrium process involving a stock adjustment mechanism--Wicksteed appears to have taken the kernel of his argument from Thornton. This suggestion may appear questionable because On Labour was not referred to in The Common Sense. But Wicksteed made clear that the "general absence of references or acknowledgements" throughout his book was not meant to imply that he claimed any "special property" in the arguments or illustrations (Wicksteed 1933, p. xxix). (At the same time, his suggestion (ibid.) that he made "no claim to originality or priority" for any of the analysis understated his own contribution). That the scholarly Wicksteed, who subjected Jevons' Theory to the closest scrutiny, had studied Thornton closely would not be surprising, for Jevons referred to On Labour on a number of occasions in 1871 (Jevons 1871, pp. 105-9, 123). Unlike Wicksteed, however, Jevons and a number of other commentators at the time ignored the nub of Thornton's argument about the problems with the prevailing supply and demand explanations of price formation.

III

The discussion of price formation outlined above did not exhaust Thornton's critique. He argued also that in so far as proponents of the laws of supply and demand claimed that price

increased (decreased) when demand (supply) exceeded supply (demand) and that supply and demand would be equal at the eventual competitive price (Thornton 1869, p. 461), it was possible to produce cases where those rules would not apply. The price of a commodity could remain unchanged, for instance, even though there were unsatisfied buyers willing to pay the price at which a unit of a commodity was sold. This depended on there being a limited stock and a series of buyers, all of whom were willing to pay the same maximum price. More buyers entering the market on the same conditions would increase demand but the price would remain unchanged. While it was the case that, if supply exceeded demand, the price would fall (provided there was competition and no reserve price set by dealers), it was not "always" the case that price rose if demand exceeded supply (*ibid.*, pp. 49-52). Using the same example Thornton was able to argue that this meant that at the highest possible price in the market at which the stock was sold, there would be unsatisfied customers willing to pay that price, so that supply did not equal demand. (*ibid.*, p. 53).

The point of these examples was, primarily, epistemological. For Thornton there were many exceptions to the rule of supply and demand being equilibrated at the ruling market price. But even if there was only one exception, that was enough; because "a scientific law admits of no exceptions whatever; one single exception suffices to deprive it of all legal character" (Thornton 1869, p. 50).

It should be noted in this context that Thornton used the example of a fish market to illustrate his argument that demand could increase with a given supply but the price could remain unaltered. He also used a fish market to illustrate the possibility of Dutch and English auction systems where, for the same stock and number of customers, the prices could be different (*ibid.*, pp. 47-8). But Thornton was explicit that this particular discussion of auctions with different outcomes was not designed to illustrate his general argument that supply and demand did not determine price. Rather, it was meant to illustrate the "utility" of his definitions of supply (the quantity offered for sale at a price specified by the dealer or the customer) and demand (the quantity the buyer was willing to buy at a specified price). According to Thornton, the supply and demand conditions differed in the Dutch and English auctions because the transactors were willing to sell and buy the same quantity of output at different prices (*ibid.*, pp. 45, 48-9).¹⁴ The illustration, then, simply set the scene for the following analysis by

showing how, in a simplified example, prices could differ, in part because of the way buyers and sellers made their particular offers or estimates (cf. Thornton 1870, pp. 56-8).¹⁵

In this context, what is noticeable about a number of the contemporary responses to On Labour is the way in which attention was focussed not on Thornton's general analysis of price formation, but rather on the "exceptional" cases and the discussion of Dutch and English auctions. As Negishi (1986) has shown, Mill's 1869 review misread the analytical significance of the auctions discussion as an example of indeterminacy in price formation where the "same" demand and supply conditions could produce different price outcomes.¹⁶ This might be explained by Mill's focus on wage determination; that is, he sought to link the discussion of price formation for all commodities with Thornton's argument that wage outcomes were indeterminate, so far as supply and demand were concerned, because there was no reserve price for unorganised labour (Thornton 1869, pp. 66-87).¹⁷

In the first set of supply and demand diagrams published in English, Jenkin followed Mill's reading in that he depicted the Dutch and English auctions' outcome by means of a flat segment on a demand schedule (Jenkin 1870, p. 160). He also acknowledged that determinate supply and demand schedules required that the 'conditions of [buyers' and sellers'] minds should not vary' during the market period and that 'actual' prices could only approximate the theoretical equilibrium price because market prices "do not remain constant for five minutes together" (ibid., pp. 154-5). Nevertheless, by arguing that the initiative for price changes was made on both sides of the market (ibid., p. 153), and by depicting all price formation in terms of determinate supply and demand schedules, including Thornton's "exceptional" cases (ibid., p. 160), Jenkin effectively ignored On Labour's general analysis of price formation. In a long review article in The Times, Leonard Courtney, who was to hold the University College (London) Political Economy Chair between J.E. Cairnes and Jevons, also ignored Thornton's key argument, while claiming that all prices were determined by the laws of supply and demand (Courtney 1868, p. 4).¹⁸

In retrospect, perhaps the most interesting defence of the laws of supply and demand came from Jevons in The Theory of Political Economy. Concentrating on Thornton's "exceptional" cases and dismissing them as "besides the

question' (Jevons 1871, p. 107), while acknowledging that the operation of the laws of supply and demand required conditions of perfect competition (*ibid.*, pp. 85-7), Jevons used three devices to derail Thornton's analysis. The first was to claim that all market conditions approximated to those in the 'public exchanges' of London and Manchester where, although prices were changing continually, brokers' activities ensured a uniform price 'at any moment' (*ibid.*, pp. 86-7). The second was to assert that while a given commodity stock was sold in successive lots at different prices, all transactions took place at equilibrium positions (*ibid.*, pp. 92-3). The third was to insist that, on average, all 'actual' market behaviour could be explained in a determinate fashion under competitive conditions, so that problems such as 'defective credit' and 'imperfect knowledge of the market' were brushed aside as 'extraneous circumstances' (*ibid.*, p. 92). Thornton's general analysis of competitive pricing calculations was thus reduced to the special case of an indeterminate outcome which was outside the analytical boundary of 'scientific' political economy (*ibid.*, pp. 123-4). The manner in which Jevons attempted to deride Thornton's argument by counter-assumption and assertion, rather than by careful argument, can be illustrated by the following quotation where Jevons referred to Thornton's general analysis of price formation: 'Mr. Thornton seems to allow that, if prospective demand and supply are taken into account, they become substantially true. But, in the actual working of any market, the influence of future events would never be neglected either by a merchant or an economist' (*ibid.*, p. 106).¹⁹ Jevons thus attempted to defuse the critical impact of Thornton's discussion of the laws of supply and demand by a series of rhetorical devices. It is, then, rather ironic that some forty years later the 'Jevonian' Wicksteed was to resurrect the arguments that Jevons had dismissed in 1871.²⁰

IV

Davidson and Meiners conclude their discussion of Wicksteed's price analysis by suggesting that:

Viewed from the perspective of theory today, Wicksteed seems to have had a much clearer view of fundamental individual and market actions than did many of his more famous contemporaries...[and] it may be that if Wicksteed had been read in conjunction with Walras, macroeconomics may have developed on a sounder footing initially (Davidson and Meiners 1976, p. 897).

In the light of the analysis above, however, a different point should be made. This is that, at the time supply and demand explanations of price formation were beginning to obtain a dominant position in England,²¹ albeit not necessarily within a "marginalist" theory,²² a number of its most prominent defenders rejected the type and source of the "disequilibrium" arguments which Wicksteed was to present some forty years later.

FOOTNOTES

1. Maitland 1906, p. 189. Seven years before this, Stephen was not quite so bored with supply and demand, since he had begun a "little treatise" on political economy, adopting "the graphic method of illustrating supply and demand by means of curves" (ibid., p. 75).
2. Beginning with "A New Theory of Supply and Demand" (Fortnightly Review, Vol. VI, October 1, 1866) which set out Thornton's explanation of price formation (discussed below), six more articles appeared until May 1868, under the general heading "Stray Chapters from a Forthcoming Book on Labour".
3. "Thornton on Labour and its Claims", Fortnightly Review, 1869. Part I appeared in Vol. 29 (May 1, pp. 505-18). Part II in Vol. 30 (June 1, pp. 680-700). Reprinted in Robson 1967.
4. Stigler (1965, p. 9) called it "absurd", Uemiyu (1981, p. 52) termed it "bizarre", while Bharadwaj (1978, p. 260) thought the arguments "rather confusing and weak". For alternative views, see Schumpeter (1954, pp. 669-70) and Negishi (1986).
5. The reviews were referred to in the Preface to the second edition of On Labour (Thornton 1870), and Thornton's replies are in Book II, Chapter 1, which consequently grew to 67 pages as compared with 44 in the first edition.
6. Bharadwaj 1978; Whitaker 1975, p. 121; for comment on Jevons and Jenkin see below.
7. Thornton 1869, pp. 84n - 85n. In the second edition, however, he moved the criticism of the wage fund to the beginning of his discussion of wage formation and widened the analysis (Thornton 1870, pp. 84-9).

8. See Wicksteed 1933, pp. 231-6, 497.
9. Wicksteed 1933, pp. 505-16, 784-8. See also note 19 below.
10. For Thornton's criticism of the concept of long period natural prices, see 1870, pp. 45-7.
11. See Mill 1909, Book III, Chapters 1-2. (Cf. Hearn 1864, Ch. 14). For Mill's debts to Bailey and De Quincey in formulating the supply and demand aspect of his value theory, see Bharadwaj 1978; De Vivo 1981; Groenewegen 1982.
12. In his review of On Labour, Mill had argued that the "point of exact equilibrium may be as momentary, but it is nevertheless as real, as the level of the sea" (Robson 1967, p. 636).
13. One example of this was Wicksteed's acknowledgement that, if disequilibrium transactions occurred, traders' endowments and hence "the equilibrating price itself" could shift (Wicksteed 1933, p. 227). As Nell (1980, pp. 105-7) has shown, however, Wicksteed then retreated into a consistency argument to downgrade the significance of the problem. See also Kregel 1975, pp. 38-40).
14. In Unto This Last (1862), Ruskin considered the possibility of fixing wage rates "irrespective of the demand" for labour. He argued that "wages are already so regulated", providing the following example: "We do not sell our prime-ministership by Dutch auction" (Ruskin 1967, p. 19).
15. Negishi argues that Thornton "emphasized...the possibility of trade carried out at disequilibrium prices", but appears to treat Thornton's "exceptional" cases as the nub of the argument and does not discuss Thornton's general analysis of price formation (Negishi 1986, pp. 573-6). Negishi does refer to that analysis, however, describing it as a "non-Walrasian, non-tatonnement process", the significance of which is that disequilibrium trades shift the equilibrium positions "eventually established" (ibid., p. 575). However, Thornton doubted whether an equilibrium point could be established (see above) and it was Wicksteed who discussed the possibility of shifts in demand (see note 13).

16. See Robson 1967, pp. 636-7. Mill countered Thornton's "exceptional" cases by arguing that scientific laws were not meant to apply in all cases and that a "supplementary law" was then required to explain any divergences (ibid., p. 637). Mill did refer to Thornton's discussion of disequilibrium trading but argued that all laws produced their effects "gradually" (ibid., p. 639).
17. A subsequent example of indeterminacy, expressed in functional schedules, was Sweezy's kinked demand curve (Sweezy 1939). This was developed to show that, in conditions of oligopoly, money wages could increase without necessarily increasing output prices or reducing employment (Hewins and Shelley 1979).
18. The article was unsigned, but De Marchi (1973, p. 184n) has identified Courtney as the author.
19. It should be noted, however, that in his Theory Jevons used a stochastic analogue for perfect knowledge to buttress this claim (see White 1988).
20. It was noted above that Wicksteed argued that there "is no such thing" as a supply curve because it is the "demand curve of those who possess a commodity", although he expressed some caution as to the applicability of the argument in "long" as compared with market periods (Wicksteed 1933, pp. 785, 788n). The basis of this point can be found in Jevon's Theory. In the case of two representative traders with parametric stocks of commodities, exchanging x amount of one commodity for y of another in equilibrium, Jevons argued that: "We may regard x as the quantity demanded on the one side and supplied on the other; similarly y is the quantity supplied on the one side and demanded on the other." Jevons illustrated the analysis with a diagram for one transactor, where the utility schedule for one commodity was reversed and transposed on the other schedule (Jevons 1871, pp. 97-9, 103).
21. For an indication of this, see Macdonnell 1871, pp. 253-6. Macdonnell's Survey appeared at the same time as Jevons' Theory. See the review of both texts in The Athenaeum, No. 2297, November 4, 1871, pp. 589-90.
22. Jenkin, for example, rejected Jevons' utility analysis.

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POSTSCRIPT

This article was written before the arrival of E.L. Forget and S. Manouchehri, "Keynes's neglected heritage: the classical microfoundations of The General Theory", Journal of Post Keynesian Economics, Vol. X(3), Spring 1988. While the authors do not refer directly to Thornton, they show that a similar explanation of enterprise price-setting (involving credit constraints, inventory adjustments, expectations, and a view of competition as a disequilibrium behavioural process) can be found in J.S. Mill's essay "Paper Currency and Commercial Distress" (1826). This was reprinted in his Essays on Some Unsettled Questions in Political Economy (1844), although the analysis was more 'implicit' in his Principles and in Cairnes' Leading Principles (1874). Elements of the argument can also be found in Marshall's Principles, which might in part reflect Marshall's early discussion of Thornton. For the strict Classical notion of competition, see G. Dumenil and D. Lévy, "The Dynamics of Competition: A Restoration of the Classical Analysis", Cambridge Journal of Economics, Vol. 11(2), June 1987, esp. p. 136. (M.V.W.)