THE NEW
PALGRAVE
A DICTIONARY OF ECONOMICS

EDITED BY
JOHN EATWELL
MURRAY MILGATE
PETER NEWMAN

Volume 2
E to J
of papers in 1908–9 that we can now recognize as containing the germ of a proof of the asymptotic efficiency of maximum likelihood estimates. In a contentious 1935 meeting of the Royal Statistical Society this work was pointed out to R.A. Fisher by Bowley as an unacknowledged predecessor, although it seems doubtful that it had any influence on Fisher (see Pratt, 1976). Of more importance was Edgeworth’s work on index numbers and on the theory of banking. While his work on index numbers is more properly treated with his economic work, it is worth noting here that he was a pioneer in the application of probability to the analysis and choice of index numbers. In regard to banking, based upon statistical considerations, he promulgated in 1888 the rule that the reserves of a bank need only be proportional to the square root of its liabilities (Edgeworth, 1888).

In all Edgeworth’s work one is constantly coming upon minor, often paradoxical observations (see for example, Stigler, 1980) that reveal the depth of his understanding, the subtlety of his thoughts, and a grasp of mathematics that seems quite at odds with his lack of formal training in the subject. Edgeworth was an independent thinker upon statistical matters, though he was perhaps the earliest to appreciate and follow up Galton’s innovative concepts of regression and correlation. Edgeworth’s most important influence was upon Karl Pearson, though Pearson was chary in his recognition of this influence. Taken together, Galton, Edgeworth and Pearson shaped modern statistics to a greater degree than any other individual or group before R.A. Fisher.

Edgeworth’s works on statistics is rare to find one that is self-contained. Bowley (1928) and all of Edgeworth’s statistical works (Edgeworth, 1878, 1886) gives a more recent assessment and comments upon different aspects of Edgeworth’s work. The work can be found in papers by Kendall (1968, 1969) and Pratt (1976).

**Stephen M. Stigler**

**BIBLIOGRAPHY**


Edgeworth, F.Y. 1892a. Correlation and related averages. Philosophical Magazine (Fifth Series) 34, 190–204.

Edgeworth, F.Y. 1892b. The philosophical Magazine (Fifth Series) 34, 499–512.


**Edgeworth, Maria (1767–1849).** Born in England of an Irish land-owning family, Maria Edgeworth began her career as an author and co-author to her father Richard Lovell Edgeworth, the educator and amateur inventor. Her first publications were a series of moral tales for children (The Parent’s Assistant, 1796; and Early Lessons, 1802) which aimed to instill the virtues she saw as essential to a ‘good’ individual and so a ‘good’ society: honesty, frugality, and hard work. These characteristics match rather precisely those of Adam Smith’s ‘prudent man’ in the Wealth of Nations. Her tales teach the value of a work ethic, sharply contrasting the evils of sloth and idleness with the pleasures of diligence and achievement. Indeed, her attitude towards this aspect of labour did not exclude her own privileged class of landowners, who, as she witnessed in her own country, frequently abused the landlord-tenant contract.

In 1808 she published the work which is, perhaps, of most interest to economists, Castle Rackrent. Through the character of Thady Quirk, an ancient retainer of the Rackrent family, she recounts the history of three generations of absentee landlords, of their tenants and of the depths to which the Rackrent fortunes had fallen through successive generations of dissolute lifestyle. The book not only influenced prominent literary figures of the time (for example, Turgenev and Walter Scott) but also established a literary precedent for the development of fictional characters within the context of a realistic historical, social and economic setting – an approach which, in England, could be said to reach its peak with George Eliot’s Middlemarch. In the 19th century the name Rackrent came to stand for the embodiment of the vices of the landed aristocracy and was freely used as such by writers like Carlyle and, later, her nephew F.Y. Edgeworth.

Maria Edgeworth continued her critical examination of the landlord-tenant relationship in novels like The Absentee (1812) and Ennui (1825) where she addressed issues such as leases, population and economic progress and the impact of manufacture on a traditional agricultural economy. Her letters to David Ricardo confirm her interest in the poverty and distress among the Irish agricultural peasantry. She initiated and engaged in a vigorous correspondence with Ricardo over the potato question and the effects of famines in the 1820s. On this subject she differed with both Ricardo and Malthus arguing that the essential cause of the difficulty lay in mismanagement. She rather amusingly suggested that instead of theorizing from afar, Ricardo should travel to Ireland and see for himself.

**J.P. Croshaw**

**education, economics of. See human capital.**

effective demand. This is the term used by Keynes in his General Theory (1936) to represent the forces determining changes in the scale of output and employment as a whole.
Keynes attributed the first discussions of the determinants of the supply and demand for output as a whole to the classical economists, in particular the debate between Ricardo and Malthus, concerning the possibility of 'general gluts' of commodities, or what has come to be known as Say's Law of Markets. Indeed, Keynes's theory was intended to replace Say's Law, although the emergence of effective demand from his Treatise on Money (1930) critique of the quantity theory of money, and his insistence on its application in what he originally called a 'monetary production economy', suggests that it should also be seen in anathesis to classical monetary theory. For Adam Smith (1776, p. 235), 'a man must be perfectly crazy who ... does not employ all the stock which he commands, whether it be his own or other people's on consumption or investment. As long as there was what Smith called 'tolerable security', economic rationality implied that it was impossible for demand for output as a whole to diverge from aggregate supply. Although Smith (p. 73) did call the demand 'sufficient to effectuate the bringing of the commodity to the market', the 'effectual demand' of those who are willing to pay the natural price of the commodity, the idea referred to divergence of market from natural price of particular commodities and the process of gravitation of prices to their natural values. J.B. Say's discussion of the problem of the 'disposal of commodities' adopted Smith's position. Against those who held that 'products would always be abundant, if there were but a ready demand, or market for them', Say's 'law of markets' argued 'that it is production which opens a demand for products' (1855, pp. 132-3); if production determined ability to buy, then demand could not be deficient. While excesses in particular markets were admitted, they would always be offset by deficiencies in others. Ricardo used similar arguments against Malthus, who responded by suggesting that:

from the want of a proper distribution of the actual produce, adequate motives are not furnished to continued production.... the grand question is whether it [actual produce] is distributed in such a manner between the different parties concerned as to occasion the most effective demand for future produce ... (Malthus, 1821).

Malthus argues that the composition of output affects its quantity by producing doubts in the minds of Smith's rational entrepreneurs concerning the 'security' of their future profit. The final word in the classical debate was J.S. Mill's 'On the Influence of Consumption on Production', which sought exceptions to the proposition that 'All of which is produced is already consumed, either for the purpose of reproduction or enjoyment' so that 'There will never, therefore, be a greater quantity produced, of commodities in general, than there are customers for' (1874, pp. 48-9). Mill accused those who argued that demand limits output of a fallacy of composition, for the individual shopkeeper's failure to sell is due to a disproportion of demand which cancels out for the nation as a whole. Mill also notes that the argument that every purchaser must be a seller presumes better, for money enables exchange 'to be divided into two separate acts' so one 'need not buy at the same moment when he sells' (p. 70). To avoid this problem 'money must itself be considered as a commodity', for 'there cannot be an excess of all other commodities, and an excess of money at the same time' (p. 71). Mill admits that if money were 'collected in masses', there might be an excess of all commodities, but this would mean only a temporary fall in the value of all commodities relative to money. Similarly to Smith's 'tolerable security', Mill explains an excess of commodities in general by 'a want of commercial confidence', which he denies may be caused by an overproduction of commodities (p. 74).

Mill's defence of Say's Law highlights the importance of the classical quantity theory, which was originally formulated to oppose the undue emphasis given to precious metals as components of national wealth by the mercantilists. Hume noted that labour, not gold, produced the commodities which composed national wealth; that gold was only as good as the labour it commanded to produce output. Thus the classical position that the velocity of circulation of money was independent of its quantity was built on the view that money could only be held to be spent. Money could at best cause temporary general gluts; in the long term, 'rational' men would not choose to hold money rather than spend it.

On the eve of the marginal revolution, classical theory thus admitted the temporary occurrence of general gluts explained by cyclical disproportions in demand for money and commodities due to crises of confidence. It is paradoxical that while the marginal revolution was motivated by the failure of classical theory to give sufficient attention to the role of demand in value theory, it failed to extend its analysis of demand to output as a whole in either the long or the short period. Indeed, the emphasis on individual equilibrium produced by the subjective theory of value which replaced the classical theory, made separate discussion of aggregate supply and demand redundant. Thus Keynes's reference to the disappearance of the theory of demand and supply for output as a whole, that is the theory of employment after it has been for a quarter of a century the most discussed thing in economics' (Keynes, 1936c).

But it was discussion, not Say's Law, which disappeared from neoclassical economics. Thus Keynes classed economists from Smith and Ricardo to Marshall and Pigou as 'Classical', for despite antagonistic theories of value and distribution, they all held a similar theory of supply and demand for output as a whole.

Keynes suggests that this was due more to the failure of neoclassical economists to heed Mill's warning concerning the extension of the conditions faced by the individual to the economy as a whole, than to their positive analysis. If consumers (resource) subject to an income (cost) constraint, reaching the maximum by substituting in consumption (production) goods (inputs) which were cheaper per unit of utility (output), then excess supply of any good (resource) is due to its price exceeding its marginal utility (productivity). Market competition would lead to relative price adjustments which eliminate excess supply. Since it was impossible for any single good (resource) to be unsold (unemployed), it was natural to extend this analysis to the aggregate level to deny the possibility of general gluts without further analysis.

Any divergence from this position was explained, not by reference to hoarding money due to crises of confidence, but by temporary impediments to the automatic adjustment of relative prices in competitive markets. Thus, despite their new marginal theory of value, Keynes's contemporaries reached a similar result that divergence of employment from its full employment level would be determined by temporary non-persistent causes eliminated in the long run.

From 1921 to 1939 the unemployment rate in the United Kingdom never fell below 10 per cent, peaking in 1932 at 22.3 per cent (over 2.7 million). This exceeded the limits that most economists attributed to short-period friction. The self-adjusting nature of the neoclassical version of Say's Law that Keynes chose to criticize was thus contradictory by reference to
the general principle that any expansion of output gluts the market unless there is a pari passu increase of investment appropriate to the community's marginal propensity to consume; and any contraction leads to windfall profits to producers unless there is an appropriate pari passu contraction of investment.

The level of O at which OP = OW will be determined by the level of investment and the propensity to consume. Changes in the rate of investment, based on entrepreneurs' expectations of their future profits, will determine O.'

In an early draft of the General Theory Keynes put it this way:

Effective demand is made up of the sum of two factors based respectively on the expectation of what is going to be consumed and on the expectation of what is going to be invested (1973a, p. 439).

Thus the theory of effective demand required, in addition to explanation of consumption based on the propensity to consume, an explanation of variations in the level of investment. Since neoclassical theory resolved this problem by presuming that investment was brought into balance with full employment saving by means of the rate of interest, Keynes located the 'law being largely due to the failure of the Classical doctrine to develop a satisfactory theory of the rate of interest' (1934c, p. 489).

Keynes concentrated his efforts to produce a theory of interest compatible within this theory of effective demand within what he called a monetary production economy. The Treatise on Money (1930) had explained changes in prices in terms of households' consumption decisions relative to entrepreneurs' production decisions. If these decisions were incompatible, investment diverged from saving and prices of consumption goods adjusted producing windfall profits or losses. The prices of investment goods were determined separately from this process, by means of the interaction of the bearishness of the public reflecting their decisions to hold bank deposits or securities on the one hand, and the monetary policy of the banking system on the other.

Investment goods are held because their present costs or supply prices are lower than the present value of their anticipated future earnings or demand prices; the larger this difference, the higher the expected rate of return. Since any change in the price of a durable capital asset will influence its rate of return, a theory that explains the price of capital assets also explains rates of return (which Keynes called marginal efficiency). With the demand price of an asset based on the value of expected future earnings discounted by the rate of interest, it is clear why a satisfactory theory of interest is crucial to the explanation of effective demand.

But money was a durable asset like any other, and as such it has a spot or demand price and a supply price or forward price, which determine the money rate of interest. Keynes thus transformed his concept of bearishness into liquidity preference which, together with banking policy, would determine the rate of interest. For Keynes, 'the money rate of interest is nothing more than the percentage excess of a sum of money contracted for forward delivery ... over what we may call the "spot" or cash price of the sum thus contracted for forward delivery' (1936a, p. 222), it is:

the premium obtainable on current cash over deferred cash. ... No one would pay this premium unless the possession of cash served some purpose, that is had some efficiency. Thus we may conveniently say that interest on money measures the marginal efficiency of money measured in terms of itself as a unit (1973a, p. 101).
Since both money and capital assets had marginal efficiencies representing their rates of return, profit-maximizing individuals in a monetary economy would demand money and capital assets in proportions which equated their respective returns. The equilibrium level of output chosen by entrepreneurs would then be represented by equality of the marginal efficiency of capital and the rate of interest (the marginal efficiency of money). The question of the effect of an increase in output on profit raised by a propensity to consume less than unity can now be seen as the effect of an increase in investment on the marginal efficiency of money relative to the marginal efficiencies of capital assets. Since these marginal efficiencies reflect pairs of spot and forward asset prices, the question can also be put as the effect of an increase in investment on relative money prices. Thus Keynes's independent variables, the propensity to consume, the efficiency of capital and liquidity preference, given expectations and monetary policy, interact to determine effective demand.

Since this equilibrium could be described by $S - I$, or equality between the rate of interest and the marginal efficiency of capital, the level of output which equates aggregate demand and supply also equates marginal efficiency with the rate of interest. To complete his theory of effective demand, Keynes faced the question first raised by Wickesel of the causal relation between the natural and the money rate of interest. Just as Keynes rejected the determinism of the level of $O$ at which $OP = OW$ by the equality of the marginal productivities and disutility of labour, he rejected marginal productivity as the determinant of marginal efficiency and the real rate of interest determining the money rate because it was based on "circular reasoning" (1937b, p. 212).

Keynes argues instead that it is the marginal efficiency of capital assets which adapts to the money rate of interest rather than vice versa. These two points of departure are discussed in chapters 16 and 17 of the *General Theory*, where Keynes points out that the money rate of return to be expected from a capital asset depends on the relation of anticipated money receipts relative to expected money costs, and that there is no reason to believe that these will be related in any predictable way to the asset's physical productivity. Wickesel's natural rate, derived from physical relations of production and exchange, has no application in a monetary economy; Keynes thus substitutes the concept of marginal efficiency.

Keynes also notes that increased investment in particular capital assets increases supply prices and reduces demand prices, causing a decline in marginal efficiencies; an increase in output thus leads to investment in assets with lower rates of return. At some point the marginal efficiency of money will make investment in money as profitable as the purchase of capital assets. At this point the rate of interest equals the marginal efficiency of capital, and any further increase in output would confirm Keynes's "general principle" that any further expansion in output glut the market, for increased income is not spent but held in the form of money which becomes a "genuinely sink for purchasing power".

The question that distinguishes Keynes's theory is thus why money's liquidity premium does not fall as output expands, for this is what prevents investment from rising by just the amount to fill the gap created by the propensity to consume being less than one. To describe these "essential properties of interest and money", Keynes departs from Mill's position that money is just another commodity, when money is the debt of the banking system its price and quantity behaviour will differ from physical commodities, for it has no real costs of production nor real substitutes. Thus an asset which has a negligible elasticity of production and substitution with respect to a change in effective demand, will have a rate of return which responds less rapidly to an expansion in demand. As long as the rate of interest falls less rapidly than the marginal efficiencies of capital assets, its rate will be the one which sets the point at which further expansion causes losses.

Thus the propensity to consume shows that investment will have to increase by the amount of the gap between incomes and expenditures as incomes rise if entrepreneurs are not to make losses, while the marginal efficiency of capital and liquidity preference in a monetary production economy explain why the behaviour of the rate of interest relative to the marginal efficiency of capital makes it unlikely that the rate of investment should adjust by just that amount. Since entrepreneurs maximize monetary returns, not employment or physical output, there is no reason why their investment decisions should lead to an equilibrium at full employment. Keynes's explanation of the limit to the level of employment permits any level as a stable equilibrium, including full employment; it is thus more general than the classical Say's Law position, in which the only stable equilibrium was the limit set by full employment as given in the labour market.

J. A. KAESER

See also Say's Law.

BIBLIOGRAPHY


