Pigou, Arthur Cecil (1877–1959)

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Abstract

Arthur Cecil Pigou founded welfare economics by synthesizing Marshall's theoretical framework and Sidgwick's categories of market failure and imperfections. His view of welfare economics was expansive, including resource allocation, income redistribution, business cycles, and unemployment. Pigou made important contributions to other areas of economics as well: the theory of value, public finance, index numbers, and evaluation of real national income. The most neglected aspect of Pigou's work is his investigation of a remarkable range of labour-market phenomena explored by subsequent economists – implicit contracts, internal labour markets, wage rigidity, labour market segmentation, human capital theory, and collective bargaining.

Keywords

bandwagon effect; business cycles; Cambridge School; Coase, R. H.; collective bargaining; cost–benefit analysis; double taxation; externalities; factor prices; fixed factors; happiness; Harris–Todaro model; ideal output; increasing returns; inheritance tax; interdependent utility; interpersonal utility comparisons; involuntary unemployment; Kahn, R.; Keynesian Revolution; Marshall, A.; mathematical economics; money; money illusion; monopoly; natural monopoly; natural rate of unemployment; Pigou, A. C.; Pigou effect; positive economics; price discrimination; principal and agent; public goods; public works; real balances; real wages; redistribution of income; relative income; Robbins, L. C.; Robertson, D.; Robinson, A.; Robinson. J. V.; Sidgwick, H.; snob effect; social cost; Sraffa, P.; stationary state; sticky wages; technical change; trade unions; utilitarianism; welfare economics; Young, A. A.

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Article

Arthur Cecil Pigou was founder of welfare economics, long-time occupant of the Chair of Political Economy at Cambridge University (1908–43), and author of hundreds of articles, pamphlets and books.

As Alfred Marshall's successor, he embraced, refined and extended the analytical framework that his master had painstakingly constructed. He also lived long enough to witness its disintegration at the hands of a generation of economists who had lost their tolerance for its limitations.

Life and career

A.C. Pigou was born on 18 November 1877 at Ryde, Isle of Wight, England, and died in Cambridge on 7 March 1959. He attended Harrow (1891–96), emerging as a brilliant scholar and athlete who harboured a shyness of women that bordered on panic. Contrary to common belief, Pigou was no misogynist. He advocated paid maternity leaves for factory workers, voted for women's degrees at Cambridge University, and played a decisive role in creating a lectureship for the young Joan Robinson.

Pigou entered King's College, Cambridge on a Minor Scholarship in History and Modern Languages (1896). However, his interests spanned poetry, moral philosophy, politics and economics. His achievements were stunning: a First in the undivided History Tripos (1899) and another in Part II of the Moral Sciences Tripos with special distinction in political economy (1899), the Chancellor's Medal for English Verse (1899), the Burney Prize (1901), the Cobden Prize (1901) for an essay that secured him a fellowship at King's (1902), the Adam Smith Prize (1903) for work that formed the basis of his Jevons Memorial Lectures at University College, London (1903–4), and a Girdlers' lectureship (1904) that he held until his election to the Chair of Political Economy (30 May 1908).

Although significantly influenced by Henry Sidgwick, Pigou was the foremost disciple of Alfred Marshall, who was impressed by his protégé on several grounds. Pigou's 'exceptional genius', evident in his masterful thesis, foretold a future as 'one of the leading economists of the world'. He knew the proper role of economic theory: an instrument for social betterment, not intellectual gymnastics. Pigou fought for Marshall's brainchild, the independent Economics Tripos (established in 1903), and personally funded lectureships, prizes and book acquisitions. He shared Marshall's commitment to free trade, using his publications (Pigou, 1904; 1906) and superb oratory skills – honed at the Cambridge Union Society of which he was President (1900) – to promote it. Together with Marshall, he signed the notorious Economists' Manifesto that rejected the Tariff Reform Proposal (1903) of Joseph Chamberlain. It is not surprising that Marshall's face beamed with delight when Pigou was chosen as his successor. He had manipulated the election in favour of the 30 year-old Pigou, embittering his old friend H.S. Foxwell, a serious contender.

Pigou's *Wealth and Welfare* (1912) – a synthesis of Marshall's engine of analysis and Sidgwick's categories of market failure and imperfections – laid the foundation for *Economics of Welfare* (1920), *Industrial Fluctuations* (1927a), and *A Study in Public Finance* (1928b). Taken together, these books covered most of the territory of general economics. *Industrial Fluctuations* was later complemented by *The Theory of Unemployment* (1933), which received a harsh and sophistical critique at the hands of J.M. Keynes in *The General Theory of Employment, Interest, and Money* (1936). Although faithful to the classical doctrine, *Employment and Equilibrium* (1941) – arguably the first textbook in macroeconomics – employed an IS–LM version of *The General Theory* and offered a careful analysis of the differences between Keynesian and classical economics. Pigou's other works included *Unemployment* (1913), *The Political Economy of War* (1921), *The Economics of Stationary States* (1935), many collections of essays, as well as books and pamphlets that he characterized as 'low-brow', among them the highly successful *Socialism versus Capitalism* (1937b), *Lapses from Full Employment* (1945) and *Income: An Introduction to Economics* (1946). The rise of a Cambridge

School of economics was in large measure due to Pigou's articulation of Marshall's organon (see, for example, Pigou's classic exposition of Cambridge monetary theory, 1917). Generations of economists – among them Dennis Robertson, Joan and Austin Robinson, and Richard Kahn – learned Marshall in Pigou's lectures, which were legendary for their clarity and logical rigour.

Pigou was not a public man. His aversion to discussions of economics outside 'the home' extended to a distaste for conferences. Acting on his sense of public obligation, he served on several government committees – among them the Chamberlain Committee on the Currency and Bank of England Note Issues (1924–5), which recommended a return of sterling to its pre-war level, imposing immense costs on British labour. Disillusioned by British economic policies in the 1930s, he withdrew from public life, making only occasional ritually obligatory appearances before commissions.

Pigou's personal life also became increasingly hermetic. By the 1940s, the high-spirited, companionable young man of the Edwardian era was regarded as a recluse. As a conscientious objector, he never recovered from the experience of the carnage of the Great War, which he observed first-hand as a driver in the Friends' Ambulance Unit, commanded by his student and friend Philip Noel-Baker. Beginning in the mid-1920s, severe cardiac fibrillation (irregular heartbeat) curtailed his mountaineering – he was a deft climber introduced to the sport by the economic historian J.H. Clapham. This condition left him permanently anxious over his health. Finally, Pigou watched with dismay as the Keynesian Revolution destroyed the Edwardian intellectual culture of high civility in Cambridge economics. In time, he rose above his own angry response to Keynes's gratuitous depiction of classical economists as 'a gang of incompetent bunglers' (Pigou, 1936, p. 115). But as relations between Keynes's disciples and Dennis Robertson became increasingly hostile, he grew more remote and diffident. In his judgement, Joan Robinson's dogmatic instruction of Keynesian economics turned undergraduates into 'identical sausages', and under Keynes's stewardship in the 1930s the *Economic Journal* violated its mission of representing different schools of thought 'with equal impartiality'.

Theoretical contributions

Pigouvian economics is grounded in utilitarian moral philosophy: creating the greatest good – Pigou's cognate of welfare – for the greatest number of people. Its analysis is limited to economic welfare: satisfactions that, directly or indirectly, can be related to the measuring rod of money. Up to a point, money, which measures the intensity of desires, performs well as a proxy for satisfaction. However, the human 'telescopic faculty' irrationally discounts future satisfactions, resulting in inadequate savings, insufficient investment in tunnels or forests, depletion of natural resources, and extinction of animal species. Pigou assumes that, as a rule, economic and total welfare are positively related. Anticipating contemporary research on happiness, he also recognizes the importance of factors that contribute to non-economic welfare such as relative status, social capital, political freedom, and moral quality of life.

Economic welfare may improve if its objective counterpart, the national product, is increased in size, distributed more evenly, and made more stable.

Optimal resource allocation

Integrating Marshall's marginal analysis and Sidgwick's distinction between private and public interests, Pigou produces some of the most important concepts (1912) and diagrams (1910) of welfare economics: marginal private and social net products (benefits and costs in contemporary parlance). In the absence of 'costs of movement' – associated with geographic and occupational reallocation of resources – the allocation of resources by competitive markets achieves universally equal marginal private net products. However, the production of ideal output requires equality of marginal social net products. Where private and social net products diverge, there is a prima facie case for reallocation of resources (1932, p. 136).

In Pigou's competitive economy, social and private benefits diverge in three different respects. First, a principal–agent problem arises when owners of land contract out its use to tenants. Since some benefits of the agent's investment accrue to the principal on termination of the contract, investment levels are not socially optimal. Pigou's remedies are limited to modifying contractual specifications between the two parties, presumably because low transactions costs render government action unnecessary.

Second, economic transactions between two agents may render incidental services or disservices to third parties, who cannot be forced to pay for the benefits or compensated for the costs. Unlike contemporary economists, Pigou does not distinguish public goods and externalities. Positive spillovers are a combination of public goods and beneficial externalities: lighthouses that benefit free-riding ships; private parks and forests that improve air quality; roads and tramways that improve the value of neighbouring land; privately owned lamps that shed light on streets; items of smoke-prevention equipment that benefit buildings, vegetables, clothes, and air quality; and 'most important of all' scientific research that leads to inventions, innovations and 'discoveries of high practical utility' (1932, p. 185). Negative spillovers are harmful externalities: a landlord raises rabbits that overrun a neighbour's property; a firm builds a factory in a densely populated area, destroying its amenities and injuring family health and productivity; automobile operators drive cars that wear out the surface of roads; and producers sell alcoholic beverages that increase crime. The 'crowning illustration' of negative externalities is women's factory work, especially immediately before and after childbirth, which damages the health of the fetus and increases infant mortality (1932, pp. 185–7).

Since it is difficult to internalize positive or negative externalities through contractual modifications, the state may offer 'extraordinary encouragements' or 'extraordinary restraints' as remedies, most obviously taxes and 'bounties'. In Pigou's era, a variety of taxes had already been imposed on alcoholic beverages, roads, gasoline and car licences. Bounties ranged from complete government provision (police protection and cleaning slums) to grants for scientific research. Pigouvian solutions went beyond taxes and subsidies to include patent enforcement, provision of information and training, and paid maternity leaves. In cases such as urban planning, where 'the inter-relations of the various private persons affected [are] highly complex', the state may have to exercise 'authoritative control' because the invisible hand fails to 'tackle the collective problems of beauty, of air and of light' (1932, pp. 193–6; also see 1947, pp. 94–100).

Careful readers of Pigou will note that much of Ronald Coase's critique of his analysis (Coase, 1960) is misplaced. Pigou stressed that on issues of policy he always spoke with an ‘uncertain voice’ (Pigou, 1932, p. 10), carefully considering the costs and benefits of proposed solutions. Government action entails allocative, administrative and political costs. Redeployment of labour, land and capital is also costly. It follows that the goal of achieving ideal output should be subjected to a cost–benefit analysis that shows ‘at which point the advantage of getting closer is outweighed by the complications, inconvenience and expense involved in doing so’ (Pigou, 1932, p. 315).

Third, in his early work (1912), Pigou argued that private and social benefits diverge if industries exhibit increasing or decreasing costs. Under decreasing returns, a small increase in the output of one firm creates external diseconomies for the industry by increasing the price of fixed factors. Under increasing returns, a small rise in the output of one firm creates external economies for the industry. A prima facie case could therefore be made for taxing increasing-cost and subsidizing decreasing-cost industries. Pigou’s critics – Allyn Young and Dennis Robertson – pointed out that the two types of returns are essentially different phenomena: external economies – technological change and managerial breakthroughs – are irreversible social gains. External diseconomies – increased factor prices – are not social costs since they merely transfer purchasing power from producers to factor owners. The second edition of *The Economics of Welfare* (1924) conceded this point, with the proviso that foreign owners do not capture the increased rents.

In 1926, Piero Sraffa argued that increasing and decreasing returns are incompatible with Marshall’s competitive, partial-equilibrium assumptions. Under increasing costs, for instance, a marginal increase in the output of a firm in a given industry increases the price of fixed factors for all industries that use them. Relative prices may change as a result, rendering Marshallian assumptions logically incoherent since industry supply and demand become interdependent. Although economies and diseconomies that are external to the firm but internal to the industry do not generate the same logical problem, they are rare empirically. Pigou (1927b) concluded that, although increasing costs were incompatible with his framework, he could not logically rule out external economies. In 1928, he published the standard textbook analysis of stable equilibrium in a competitive firm (1928b). The costs of the equilibrium firm (a theoretical entity based on Marshall’s representative firm) are a function of its own output and that of the industry. Although the industry may experience increasing or constant returns, the equilibrium firm is always at equilibrium when industry price is equal to its marginal and (the minimum of) average costs. U-shaped average and marginal cost curves for the equilibrium firm complemented the mathematical treatment, perhaps the first time that such diagrams were published in English. External economies shift the equilibrium firm’s cost curves.

As a rule, monopolistic conditions create discrepancies between private and social benefits. Pigou argues that their implications for welfare must be evaluated on a case-by-case basis. The incidence of discrepancies depends on whether a monopoly practices price discrimination of the first, second or third degree. State control and state operation of natural monopolies have different ramifications for welfare. Oligopolistic market structures, however, create unequivocal social costs irrespective of output: wasteful advertising, exploitation of workers – defined as payment below the value of marginal product – customer deception, reduction of upward mobility by forcing small entrepreneurs out of the market, constraints on inventions and innovations, and Tayloristic practices that dull worker initiative. Pigouvian remedies range from taxes and prohibitions to encouragement of small business.

Income redistribution

Redistribution schemes that favour the poor but leave the national product intact are likely to improve economic welfare. However, both the expectation and the fact of such transfers may produce disincentives that reduce the national product. The implication is not inaction. Rather, the state should design redistributive measures based on a comprehensive knowledge of legal, psychological and institutional factors. If capital is subject to double taxation, its flight is less probable. If economic actors target a specific level of savings, inheritance taxes may not affect investment activity. If redistributed income is used to train workers with uncommon abilities, its rate of return may surpass the return on investment in physical capital. Finally, taxation may not discourage the rich if it leaves their relative income intact. Pigou's theoretical analysis of interdependent utility (welfare) – based on reference groups, relative income, snob and bandwagon effects – anticipates Duesenberry's and Leibenstein's by some 45 years (Pigou, 1903).

Transferring one dollar from the rich to the poor increases economic welfare because 'it enables more intense wants to be satisfied at the expense of less intense wants' (Pigou, 1932, p. 89). This proposition assumes that representative members of different income groups have equal capacities for satisfaction. In 1932, Lionel Robbins claimed that such interpersonal comparisons are normative judgments and have no place in science. The ensuing attempts to establish a positivist welfare economics engaged such luminaries as Hicks, Kaldor, Scitovsky, Little, Bergson and Arrow. The results produced a sophisticated theoretical apparatus but confirmed Pigou's belated response to Robbins that without such comparisons every 'apparatus of practical thought' will collapse (Pigou, 1951, p. 292). In recent decades, the recognition that all sciences make normative claims has become received wisdom in the philosophy of science. With the demise of doctrinaire positivism, economists seem more willing to venture into the territory of interpersonal comparisons, as contemporary happiness research suggests. This research provides new grounds for reconsidering the unexploited resources of Pigouvian welfare economics.

Industrial fluctuations and unemployment

Long spells of unemployment have serious deleterious effects – malnutrition, permanent damage to the capabilities of youth, loss of skills and work ethic, alcoholism, a 'haunting' sense of insecurity and uncertainty, and the destruction of self-respect and self-confidence – that cannot be reversed in good times. Thus a prima facie case for macroeconomic stability is evident.

Pigou's theory of unemployment can be elucidated by using the language of supply and demand. Aggregate labour supply is vertical, even though individual labour supply curves may be upward sloping or backward bending. Aggregate labour demand – difficult to construct due to sectoral interdependence – is downward sloping and dependent on marginal product. Since unemployment is always positive, it can be explained only by movements in wages and the demand for labour.

Pigou distinguishes two types of unemployment. Short-run involuntary unemployment – a term he may have coined in 1913 – occurs because of frequent changes in labour demand and real wages. Although prices vary, real wages fluctuate because nominal wages remain sticky. (*a*) A perpetually flexible nominal wage is impracticable due to high administrative costs, which become more significant if ‘elaborate and formal arbitration proceedings’ are instituted to resolve capital–labour conflicts (Pigou, 1913, pp. 92–3). (*b*) Some wage rigidity is preferred: while workers want stable living standards, employers are obliged to deliver products at prices previously negotiated. (*c*) The duration of recessions and recoveries is unpredictable; it is not worthwhile to alter wages if the state of the economy is ephemeral. (*d*) Due to mutual mistrust, workers and firms alike resist wage changes, fearing that they may be irreversible. (*e*) Employees and employers suffer from money illusion, the latter resisting wage increases and the former refusing wage cuts.

Contrary to Keynes’s straw-man depiction, Pigouvian labour demand fluctuates due to general and wave-like swings in expectations of profits. Three sets of factors affect expectations: real causes such as crop size or technological breakthroughs; monetary variables, which are restricted to exogenous shifts in credit under the gold standard; and psychological factors, which occur spontaneously or as a consequence of the other two variables. Undue pessimism or optimism may be magnified because psychology, output, and debt–credit linkages create sectoral interdependence.

The amplitude of business cycles depends on the institutional structure of the economy: monetary policy, the pricing strategy of firms, income maintenance programmes, wage policy and unions. Although limited by the quality and quantity of data at his disposal, Pigou tries to quantify factors that cause business cycles or affect their amplitude. Removing monetary or psychological factors would each reduce the amplitude by one-half, crop variation by one-quarter, wage rigidity by one-eighth and price rigidity by one-sixteenth. It is clear that Pigou does not regard high real wages as the single or even the most important cause of short-run unemployment. In many cases, high wages and unemployment are both effects of factors such as ‘bursting of a gigantic bubble of unwarranted optimism, with a heavy fall in price’ (Pigou, 1929, pp. 200–1). Short-run unemployment can be reduced proactively through distribution of information, price stability, or interest-rate manipulation. Reactive policies that dampen the impact of unemployment range from (public work projects to guarantees of interest or subsidies for employers. Although Pigou favours wage flexibility at the theoretical level, he does not consider it a viable political option.

Pigou analyses long-run unemployment on stationary-state assumptions, ruling out changes in expectations, tastes, net investment, productivity, and technology. The only conceivable unemployment under these conditions is an ‘intractable minimum’ that resembles the natural rate of unemployment. It is caused by frictions, immobility, public opinion, the practical impossibility of setting wages according to marginal productivity, and unions. Collective bargaining introduces indeterminacy, which he analyses in a quasi-game-theoretic framework (Pigou, 1905). Employers and employees negotiate money wages within a ‘range of indeterminateness’. The upper limit depends on unions’ reluctance to demand a wage so high that it would result in layoffs. The lower limit is determined by employers’ recognition that a wage that reduces the available supply of labour is too low. Peaceful wage bargains are conducted within a narrower range determined by the ‘sticking point’ of each party: a certain minimum below which workers would rather strike and a maximum above which employers would prefer shutdowns.

Firms often have bargaining power to exploit workers but may choose not to, recognizing that low wages affect the productivity of workers they want to retain for the long period. This results in unemployment in a casual labour market. The magnitude of joblessness is determined by a Harris–Todaro comparison of the expected wage – ‘the wage-rate multiplied by the chance of employment’ (Pigou, 1913, p. 55) – with wages elsewhere. Unemployment is not an inevitable outcome if outsiders (low-wage workers) know that insiders (high-wage workers) are irreplaceable.

To reduce long-run unemployment, the state may attempt to educate the unskilled and try to improve wage flexibility. The effective demand ramification of wage flexibility was a major point of contention between Keynes and Pigou (see Pigou, 1937a; Keynes, 1937). Although Pigou was finally persuaded by Kaldor (1937) to take such effects into account (Pigou, 1938; 1941), he discounted them based on the well-known Pigou effect: lower money incomes and prices would increase the value of real balances, reducing and ultimately eliminating the individual's desires to save out of any assigned real income (Pigou, 1943, p. 349). In Pigou's opinion, Keynes's true contribution was not substantive but analytical: no one before him had constructed a model of the aggregate economy that incorporated both real and monetary factors. But Pigou (1950) also maintained that Keynes's analytical framework was too limited to be suitable for direct practical application.

Legacy

Economists have generally judged Pigou's work on Robbinsian, Keynesian or Coasean premises, ignoring his important contributions to the theories of value, distribution, business cycles, public finance, index numbers, and evaluation of real national income. Pigou's neglected contributions to labour economics, which anticipate Hicks's work by a quarter of a century, are especially noteworthy. *Wealth and Welfare*, hailed by Schumpeter as 'the greatest venture in labor economics ever undertaken by a man who was primarily a theorist' (1954, p. 948), and his numerous other works on labour and unemployment demonstrate an acute understanding of the importance of a remarkable range of phenomena explored by subsequent economists – implicit contracts, internal labour markets, labour market segmentation, wage rigidity, human capital theory, and collective bargaining. Alfred North Whitehead famously held that 'a science which hesitates to forget its founder is lost'. Economists have not found it difficult to forget the founder of welfare economics, with regrettable consequences that Whitehead did not envision.

See Also

- financial intermediation
- interpersonal utility comparisons
- Keynesian revolution
- labour economics
- unemployment
- welfare economics

Selected works

1903. Some remarks on utility. *Economic Journal* 13, 58–68.

1904. *The Riddle of the Tariff*. London: R. Brimley Johnson.

1905. *Principles and Methods of Industrial Peace*. London: Macmillan.

1906. *Protective and Preferential Import Duties*. London: Macmillan.

1910. Producers' and consumers' surplus. *Economic Journal* 20, 358–70.

1912. *Wealth and Welfare*. London: Macmillan.

1913. *Unemployment*. London: William and Norgate.

1917. The value of money. *Quarterly Journal of Economics* 32, 38–65.

1920. *The Economics of Welfare*. London: Macmillan.

1921. *The Political Economy of War*. London: Macmillan.

1927a. *Industrial Fluctuations*. London: Macmillan.

1927b. The laws of diminishing and increasing costs. *Economic Journal* 37, 188–97.

1928a. An analysis of supply. *Economic Journal* 38, 238–57.

1928b. *A Study in Public Finance*. London: Macmillan.

1929. *Industrial Fluctuations*, 2nd edn. London: Macmillan.

1932. *The Economics of Welfare*, 4th edn. London: Macmillan.

1933. *The Theory of Unemployment*. London: Macmillan.

1935. *The Economics of Stationary States*. London: Macmillan.

1936. Mr. J.M. Keynes'*General Theory of Employment, Interest and Money Economica* 3, 115–32.

1937a. Real wages and money wage rates in relation to unemployment. *Economic Journal* 47, 405–22.

1937b. *Socialism versus Capitalism*. London: Macmillan.

1938. Money wages in relation to unemployment. *Economic Journal* 48, 134–8.

1941. *Employment and Equilibrium*. London: Macmillan.

1943. The classical stationary state. *Economic Journal* 53, 343–51.

1945. *Lapses from Full Employment*. London: Macmillan.

1946. *Income: An Introduction to Economics*. London: Macmillan.

1947. *A Study in Public Finance*, 3rd edn. London: Macmillan.

1950. *Keynes's General Theory: A Retrospective View*. London: Macmillan.

1951. Some aspects of welfare economics. *American Economic Review* 41, 287–302.

Bibliography

Aslanbeigui, N. 1990. On the demise of Pigouvian economics. *Southern Economic Journal* 56, 616–27.

Aslanbeigui, N. 1992. Pigou's inconsistencies or Keynes's misconceptions?*History of Political Economy* 24, 413–33.

Aslanbeigui, N. 1996. The cost controversy: Pigouvian economics in disequilibrium. *European Journal of the History of Economic Thought* 3, 275–95.

Aslanbeigui, N. 1998. Unemployment through the eyes of a classic. In *Keynes and the Classics Reconsidered*, ed. J.C.W. Ahiakpor. Boston: Kluwer.

Aslanbeigui, N. and Medema, S.G. 1998. Beyond the dark clouds: Pigou and Coase on social cost. *History of Political Economy* 30, 601–25.

Aslanbeigui, N. and Oakes, G. 2007. The editor as scientific revolutionary: Keynes, *The Economic Journal*, and the Pigou affair, 1936–1938. *Journal of the History of Economic Thought* 29, 1–34.

Coase, R.H. 1960. The problem of social cost. *Journal of Law and Economics* 3, 1–44.

Collard, D. 1981. A.C. Pigou, 1877–1959. In *Pioneers of Modern Economics in Britain*, ed. D.P. O'Brien and J.R. Presely. Totowa, NJ: Barnes and Noble Books.

Collard, D. 1996. Pigou and modern business cycle theory. *Economic Journal* 106, 912–24.

Cooter, R. and Rappoport, P. 1984. Were the ordinalists wrong about welfare economics?*Journal of Economic Literature* 22, 507–30.

Kaldor, N. 1937. Prof. Pigou on money wages in relation to unemployment. *Economic Journal* 47, 745–53.

Keynes, J.M. 1936. *The General Theory of Employment, Interest and Money.* London: Macmillan.

Keynes, J.M. 1937. Prof. Pigou on money wages in relation to unemployment. *Economic Journal* 47, 743–5.

O'Donnell, M.G. 1979. Pigou: an extension of Sidgwickian thought. *History of Political Economy* 11, 588–605.

Robbins, L. 1932. *An Essay on the Nature and Significance of Economic Science*. London: Macmillan.

Robertson, D.H. 1924. Those empty economic boxes: a rejoinder. *Economic Journal* 34, 16–30.

Saltmarsh, J. and Wilkinson, P. 1960. *Arthur Cecil Pigou, 1877–1959*. Cambridge: Cambridge University Press.

Schumpeter, J.A. 1954. *History of Economic Analysis*. New York: Oxford University Press.

Shiller, R.J.Ultimate sources of aggregate variability. *American Economic Review* 77, 87–92.

Solow, R.M. 1980. On theories of unemployment. *American Economic Review* 70, 1–11.

Sraffa, P. 1926. The laws of returns under competitive conditions. *Economic Journal* 36, 535–50.

Young, A. 1913. Pigou's Wealth and Welfare. *Quarterly Journal of Economics* 27, 672–86.