

ID: A000208

Abstract

George Akerlof is forever associated with his landmark 1970 paper, “The market for ‘lemons’ ”, which transformed the way economists approach markets where there is a difference between the transacting agents in the information they possess. This concept of asymmetric information, with its major impact on many fields of economics, was singled out when, in 2001, he was awarded the Nobel Memorial Prize in Economics (along with Michael Spence and Joseph Stiglitz). A more comprehensive assessment of his contribution to economics would be as providing a better behavioural underpinning for macroeconomics as a major figure in the New Keynesian movement.

Akerlof, George A.

(1940–)

George Akerlof’s father came to the United States from Sweden to obtain a Ph.D. at the University of Pennsylvania, and remained in the country to pursue a career as a research chemist. He met George’s mother while she was a graduate student in chemistry. Hers was an academic family. George’s great grandfather was among the earliest graduates from the University of California at Berkeley (in 1873), and his grandfather also graduated from Berkeley. Other members on that side of the family also established successful academic careers. George grew up on the East Coast, where his father held a series of posts, variously at Yale University, at the Mellon Institute in Pittsburgh and at Princeton University, before running his own independent research firm in the Princeton area. Indeed, it was witnessing the uncertainty surrounding his father’s continuing employment, dependent as it was on securing government research grants, which first turned George Akerlof’s mind to macroeconomic themes such as unemployment. As an undergraduate at Yale he majored in mathematics and economics, and in the fall of 1962 he entered graduate school at MIT, where he had the good fortune to find himself one of an exceptionally

talented cohort of students. His doctoral supervisor was Robert Solow (Nobel Laureate 1987). Akerlof joined the Berkeley faculty in the fall of 1966 and, although he has spent extended periods away from Berkeley – at the Indian Statistical Institute in New Delhi, the Council of Economic Advisors, the Federal Reserve Board (where he met his wife, Janet Yellen), the LSE, and the Brookings Institution – he has remained closely identified with Berkeley ever since.

The ‘Market for “lemons”’ paper

For the generations of economics students trained since 1970, when asked to single out a favorite economics article, it is a pretty safe bet that the most popular article would be George Akerlof’s (1970) paper on asymmetric information, ‘The market for “lemons”’. Part of this paper’s appeal lies in its modelling approach. While mathematically rigorous, it is derived from close observation of the world. Care is taken to incorporate realistic economic detail, yet the results obtained provide tremendously powerful insights. The reader is left with an understanding of an important market situation that was previously obscure and, in addition, is offered policy options whereby economic well-being can be improved. This general approach characterizes all of Akerlof’s work.

The ‘lemons’ paper starts by offering an analysis of the second-hand car market in which the existence of lower-quality vehicles (the eponymous ‘lemons’) can disrupt the workings of the market – to the extent that the usual economic law of lowering the price in the face of an excess of supply (or difficulty experienced in selling into the market) simply makes matters worse. Rather than bringing about a market equilibrium through matching supply and demand, the lower price drives out the better-quality cars remaining in the market and this further depresses demand.

The problem arises from an asymmetry of information that exists between those supplying used cars into the market (they know, in considerable detail, just how good or otherwise their present car is) and those who are buying in the market (they can obviously inspect the car, but are left with substantially less knowledge than the seller). If those on the demand side use the price as an indication of the average quality of car traded, this can cause demand to decline in the face of falling prices – if, as seems reasonable, the suppliers with better-quality cars withhold them as the price falls, leaving only the poorer-quality cars to be offered at lower prices. Note that this problem does not arise in the new car market. While this market is, unfortunately, not

free from ‘lemons’, the probability of being stuck with a lemon can be ascertained from sources such as consumer reports. The fraction of new cars entering the market as lemons does not vary with the price or discount offered on new cars.

Varian (1992, p. 469) offers the following simple characterization of the model. Assume there is a quality-of-car index q , which is uniformly distributed between 0 and 1. Additionally, assume the demand for cars is a function of this quality to the extent that the price offered for cars of quality q is exactly $(3/2)q$ and that, on the other side of the market, suppliers with a car of quality q would be willing to sell for price q or better. There is clearly scope for mutually beneficial trade in this market, as any price between q and $(3/2)q$ leaves both the buyer and seller of a car with quality q better off.

On the other hand, if the buyer is unable to perceive the quality of the car but has to rely on the average quality of cars traded in the second-hand market as a measure of the expected quality of any car purchased, then the price offered is $(3/2)q^*$, where q^* is the average quality in the market.

But on the supply side, of course, sellers know the exact quality of their cars and, for any price p , only those with quality p or lower will offer cars for sale. Thus, the observed quality of cars traded at price p will be $p/2$. However, at quality $p/2$ there will be no cars demanded, as cars of this average quality fetch an offer of only $(3/2)q^* = (3/2)(p/2) = (3/4)p$. So no cars will be traded at this price. But nor will a fall in the price offer any improvement because, if price falls, then so too will the quality of car offered to the market and the average quality of cars observed. As things stand, there is no price that will allow cars to be traded. Potentially mutually advantageous trades are not made. Economic welfare is lower than it might be. The culprit is, of course, asymmetric information.

It is the inability of the supply side of the market (which possesses the hidden information about car quality) to meaningfully communicate this information to the buyers that undermines the potential for mutually advantageous trades. The existence of lemons inhibits the proper functioning of the market. Akerlof points out that the inability of older people to secure health-care insurance, the inability of minorities to secure decent employment prospects, the external costs of dishonest business practices, and the difficulty developing countries experience in establishing capital markets can all be viewed as manifestations of the same ‘lemons’ problem, i.e., asymmetric information.

In awarding the 2001 Nobel Memorial Prize in Economics to George Akerlof, Michael Spence and Joseph Stiglitz, the Royal Swedish Academy of Sciences cited ‘their analyses of markets with asymmetric information’. In reviewing the contributions of these prize winners, Rosser (2003) identifies a nascent discussion of this idea in the earlier economics literature, but there is little doubt that it was with the publication of Akerlof’s 1970 ‘Market for “lemons”’ paper that the metaphorical light bulb was switched on in the economics community and the idea of asymmetric information started to become integrated into economics. As a recent survey by Riley (2001) makes clear, this concept is now an important feature of modern approaches to development economics, financial economics, industrial organization, international economics, labour economics, and many other areas. It is now difficult to imagine the world of economics without this insight.

Other work

While for many people the ‘lemons’ paper stands as a seminal example of the power of microeconomic analysis, the underlying motivation that led Akerlof to investigate this area was actually macroeconomic. Cyclical fluctuations in the car market were seen as a major destabilizing factor in the macroeconomy: hence the original research effort. Throughout his career Akerlof has been driven by a desire to develop macroeconomics in a way that allows problems such as unemployment to be better understood. Never happy with the neoclassical synthesis and distinctly critical of the New Classical economics, Akerlof has been a major contributor to the development of New Keynesian Economics (2002). Indeed, his work can be seen as a lifetime effort to create a better behavioural micro-foundation to macroeconomics – continuing in the tradition started by Keynes’ (1936) *General Theory*.

Caste and identities. In subsequent work the ‘lemons’ paper was soon developed into an analysis of caste systems (1976; 1985), in which irrational and economically inefficient belief systems can be sustained out of a concern for individual well-being, albeit at the cost of society’s overall welfare. This work is typical of Akerlof’s approach to economic theory in that it seeks to broaden our view of economic exchange from the simplistic dyad of buyer and seller (the focus of so much economic analysis) to admit the real possibility that such exchanges are heavily conditioned by the existence of wider social forces. In this specific case, people adhere to what are

obviously dysfunctional behaviours because, in their individual calculus, the costs of being seen to break such conventions (and hence being outcaste) outweigh any individual short-term gains. Thus, individually rational action leads to a macroeconomically inefficient outcome.

More generally, people can be seen as exhibiting patterns of behaviour that are consistent with chosen identities but would be otherwise difficult to explain (Akerlof and Kranton, 2000). Such identities are chosen in an attempt to fit most comfortably into society, given people's individual circumstances. The choice of identity brings with it a set of behaviours and an exposure to the behaviour of others with whom one identifies. This stream of work represents a major step in bridging the gap between economics and sociology that is so aptly summarized by James Duesenberry (quoted in Granovetter, 1985, p. 485): 'economics is all about how people make choices; sociology is all about how they don't have any choices to make.'

This approach led Akerlof to empirical analyses of the dramatic rise in out-of-wedlock births (Akerlof, Yellen and Katz, 1996) and the marked increase in the number of men living without children (1998). These papers demonstrate that the rise of children born to unmarried mothers and the increase in men living outside of households with children can each be ascribed to changing norms (the notion of the shotgun marriage and the destigmatization of out-of-wedlock births) that have more to do with changing technology (birth control) and the social reaction to these changes than to any wealth or incentive effects arising from welfare programmes.

This enthusiasm to engage with real-world data and empirical work is another salient characteristic of Akerlof's work. Somewhat unusually, for a theorist of major reputation, he has throughout his career undertaken empirical studies of the major social and economic policy issues of the day. Thus, in addition to the analysis of family structure and poverty mentioned above, he has studied the distribution of employment and unemployment experience (Akerlof and Main, 1980, 1981), job mobility (Akerlof, Rose and Yellen, 1988), German reunification (Akerlof, Rose, Yellen, and Hesselius, 1991), financial malfeasance (Akerlof and Romer, 1993), and the inflation-unemployment trade-off (Akerlof, Dickens and Perry, 1996, 2000). Akerlof's intellectually open and outgoing approach to his work also shows in the wide range of co-authors involved in his theoretical work, including, for example, Akerlof and Miyazaki (1980), Akerlof and Milbourne (1980), Akerlof and Katz (1989), Akerlof and Yellen (1990), and Akerlof and Kranton (2005). As will be seen

below, his collaboration with Janet Yellen has been the most sustained and intellectually productive.

Near-rational economic behaviour. While the ‘lemons’ paper is undoubtedly his most famous, the stream of papers that best demonstrates Akerlof’s New Keynesian pedigree starts with Akerlof (1969). This paper investigates structural unemployment in a framework that sees firms as being in monopolistic competition and having staggered price setting, with wages emerging as bargains struck between firms and workers. With Taylor’s (1979) incorporation of rational expectations, this links directly to the overlapping contracts approach that now lies at the heart of the New Keynesian model. Akerlof also deployed this approach in the study of monetary policy (1973; 1978; 1979). Here, simple monitoring rules by agents of their bank balances are shown to make both monetary and fiscal policy effective.

Extending this approach more generally, Akerlof and Yellen (1985) demonstrate that what appear as rule-of-thumb behavioural rules deployed in economic decision-making actually bring with them substantial savings in computational costs (and deal with the bounded rationality problem) while, at the same time, imposing only second-order costs on the agent by way of lost economic efficiency. In this sense, such rules of thumb are quite sustainable and sensible modes of behaviour. The insights of this paper have far-reaching implications. Accepting the existence of such behaviour not only points to why monetary policy might be effective but also explains why there can, indeed, be significant trade-offs between inflation and unemployment, particularly at low rates of inflation (Akerlof, Dickens and Perry, 1996, 2000).

Friedman’s (1968) original attack on the notion of a long-run trade-off between inflation and unemployment was further strengthened by the incorporation of rational expectations by the New Classical economists, Lucas (1972) and Sargent (1971). Deploying the Akerlof and Yellen (1985) insight of near-rational behaviour towards inflation, Akerlof, Dickens and Perry (2000) demonstrate that at low rates of inflation, such as were typical in the 1950s and are now prevalent once again, there can be an empirically significant trade-off between inflation and unemployment. The fact is that in setting wages and prices economic agents (business people, wage negotiators and so on) do not behave exactly as economic models of rational expectations would suggest – at least not when inflation is moderate and the costs of

deviating from such rationality are modest when compared with the informational and computational costs involved.

Sociologically based efficiency wage theory. In attempts to explain the unemployment that fiscal and monetary policy is often deployed to remedy, a standard question is why in the face of unemployment wages do not simply decline, so restoring equilibrium in the market. The answer is, of course, that cheaper is not always better. In a paper evocatively titled 'Jobs as dam sites', Akerlof (1981) explains that, just as it makes poor economic sense to construct a lower-quality dam on a prime site (no matter that it may be cheaper), so it may not make economic sense to hire cheaper labour even when available. These ideas, further developed in Akerlof (1982) and most elegantly expressed in Akerlof and Yellen (1990), provide a sociologically rooted explanation for efficiency wages.

The key idea here is that the exchange between employer and employee is rich and complex, extending well beyond the narrow instrumental delivery of labour in return for wages. Workers who display 'consummate' cooperation in playing their part to achieve the objectives of the organization are much preferred to those exhibiting 'perfunctory' cooperation (see Williamson, Wachter and Harris, 1975, p. 266). Part of the key to ensuring the higher-productivity outcome is being seen to pay a fair wage. The concept of fair wage-effort is socially determined, and both equity theory from social psychology and social exchange theory from sociology offer explanations of how workers react when this balance is disturbed. From this perspective, the financial savings from lowering wages can be a poor bargain when set against the impact on the productivity of the workforce. In the face of such rigidity coming about through the individually rational decisions of employers, there is clear scope for macroeconomic policy to effect a coordinated move to a higher level of employment. This is a key insight of the efficiency wage model of the labour market (Akerlof and Yellen, 1986).

Psychologically based models. The incorporation of psychological insights into economics has proved highly successful in recent years, as indicated by the award of the Nobel Prize in 2002 to Daniel Kahneman. Akerlof and Dickens (1982) is an early contribution to this movement, drawing on the notion of cognitive dissonance whereby individuals choose their beliefs or view of a situation in such a way that

renders them the greatest comfort or happiness. In this way, it is possible to explain many common phenomena that otherwise seem to make little economic sense, such as the widespread flouting of workplace safety standards. In some ways the more recent work in Akerlof and Kranton (2005) on choice of identity can be seen as a sociological version of this same phenomenon. The common theme is that social actors are capable of choosing the frame through which they view their circumstances and, unsurprisingly, can be expected to choose an approach that, given the situation in which they find themselves, offers them the greatest comfort. To an external observer this can often result in behaviours that are perplexing.

Thus, in Akerlof (1991) a psychologically based explanation is offered for the widely documented phenomenon of people acting in ways that seem too short-sighted to be in their interest. This is seen in the widespread failure to make adequate provision for retirement or to save enough in general. Drawing on a personal experience during a year living in India during the late 1960s, Akerlof recounts how day after day he procrastinated over mailing off a promised package to Joseph Stiglitz. This is developed into a model that demonstrates why in repeatedly opting for what appears as the best short-term course of action (to procrastinate) one is often left in a situation that in retrospect one may regret. The insights offered by this model of economic behaviour are both powerful and far-reaching, and later proponents, such as David Laibson (1997), have extended the area into neurological studies of the brain under the heading 'neuroeconomics'.

Conclusion

If economists were ever to adapt the psychologist's stimulus-response technique into a game of declaring a famous economist's name as a stimulus and then noting the response, it seems clear that the overwhelming response to 'George Akerlof' would be 'lemons'. This would, at the same time, be both a sufficient response and an insufficient response. As the above discussion has shown, it is insufficient to try to capture such a major body of important studies by reference to one paper. Akerlof has not only dealt with asymmetric information but, as a major contributor to modern Keynesian economics, has also confronted the major macroeconomic issues of the day, most notably by providing the behavioural underpinnings to explain the efficacy of interventionist economic policy.

Yet the ‘lemons’ response could arguably be judged sufficient in the sense that the ‘lemons’ paper contains all of the elements that make Akerlof’s approach to economic theory so different and so potent. Mark Granovetter (1985) criticizes economic models as either totally ignoring the influence of social structures and relations or else going to the other extreme, by being oversocialized in the sense that there are really no choices left for agents to make. Akerlof is one of a small but growing set of economists who manage to position their models on the middle ground. Far from Friedman’s (1953) positive economics approach, which regards assumptions as something to be minimized and whose realism is of no consequence as long as the predictive power of the model holds up, Akerlof adheres to an approach that utilizes models based on closely observed empirical examples. The fact that the most observers believe that monopolistic competition is the norm means to Akerlof that such a feature must appear in the model. A model utilizing perfect competition might be able to do just as well, but would be rejected in the face of Akerlof’s pragmatic goal of making his models as near to the observed reality as possible while still being tractable.

‘The market for “lemons”’ will almost certainly stand as Akerlof’s best-known contribution, having provided the impetus for radical new ways of looking at events in so many areas of economics. But it is also an excellent exemplar of a different approach to economic modelling. It is this pragmatic approach to economic modelling that makes all of Akerlof’s contributions so worthwhile.

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See also bounded rationality; caste system; efficiency wages; information aggregation and prices; psychology and economics; social norms; sociology and economics

Selected works

1969. Relative wages and the rate of inflation. *Quarterly Journal of Economics* 83, 353–74.

1970. The market for ‘lemons’: Quality uncertainty and the market mechanism. *Quarterly Journal of Economics* 84, 488–500.
1973. The demand for money: A general-equilibrium inventory-theoretic approach. *Review of Economic Studies* 40, 115–30.
1976. The economics of caste and of the rat race and other woeful tales. *Quarterly Journal of Economics* 90, 599–617.
1978. The microfoundations of a flow of funds theory of the demand for money. *Journal of Economic Theory* 18, 190–215.
1979. Irving Fisher on his head: The consequences of constant target-threshold monitoring for the demand for money. *Quarterly Journal of Economics* 93, 169–87.
1980. (With B. G. M. Main.) Unemployment durations and unemployment experience. *American Economic Review* 70, 885–93.
1980. (With R. Milbourne.) Irving Fisher on his head II: The consequences of the timing of payments for the demand for money. *Quarterly Journal of Economics* 94, 145–57.
1980. (With H. Miyazaki.) The implicit contract theory of unemployment meets the wage bill argument. *Review of Economics Studies* 47, 321–38.
1981. Jobs as dam sites. *Review of Economic Studies* 48, 37–49.
1981. (With B. G. M. Main.) An experience-weighted measure of employment and unemployment durations. *American Economic Review* 71, 1003–11.
1982. Labor contracts as partial gift exchange. *Quarterly Journal of Economics* 97, 543–69.
1982. (With W. T. Dickens.) The economic consequences of cognitive dissonance. *American Economic Review* 72, 307–19.
1985. Discriminatory status-based wages among tradition-oriented stochastically-based coconut producers. *Journal of Political Economy* 93, 265–76.
1985. (With J. Yellen.) A near-rational model of the business cycle, with wage and price inertia. *Quarterly Journal of Economics*. 100, 823–38.
1986. (With J. Yellen, eds.) *Efficiency Wage Models of the Labor Market*. New York: Cambridge University Press.
1988. (With A. Rose and J. Yellen.) Job switching and job satisfaction in the U.S. labor market. *Brookings Papers on Economic Activity*, 1988: 2, 495–592.

- 1989 (With L. F. Katz.) Workers' trust funds and the logic of wage profiles. *Quarterly Journal of Economics* 103, 525–36.
1990. (With J. Yellen.) The fair-wage effort hypothesis and unemployment. *Quarterly Journal of Economics* 105, 255–283.
1991. (With A. Rose, J. Yellen and H. Hessenius.) East Germany in from the cold: The economic aftermath of currency union. *Brookings Papers on Economic Activity*, 1991: 1, 1–105.
1993. (With P. Romer.) Looting: The economic underworld of bankruptcy for profit. *Brookings Papers on Economic Activity*, 1993: 2, 1–60.
1996. (With W. T. Dickens and G. L. Perry.) The macroeconomics of low inflation. *Brookings Papers on Economic Activity* 1996: 1, 1–59.
1996. (With J. Yellen and M. L. Katz.) An analysis of out-of-wedlock childbearing in the United States. *Quarterly Journal of Economics* 111, 277–317.
1998. Men without children. *Economic Journal* 108, 287–309.
2000. (With W. T. Dickens and G. L. Perry.) Near-rational wage and price setting and the optimal rates of inflation and unemployment. *Brookings Papers on Economic Activity* 2000: 1, 1–60.
2002. Behavioral macroeconomics and macroeconomic behavior. *American Economic Review* 92, 365–94.
2000. (With R. E. Kranton.) Economics and identity. *Quarterly Journal of Economics* 115, 715–53.
2005. (With R. E. Kranton.) Identity and the economics of organizations. *Journal of Economic Perspectives* 19, 9–32.

Bibliography

- Friedman, M. 1953. The methodology of positive economics. In *Essays in Positive Economics*, ed. M. Friedman. Chicago: University of Chicago Press, 3–43.
- Friedman, M. 1968. The role of monetary policy. *American Economic Review* 58, 1–17.
- Granovetter, M. 1985. Economic action and social structure: The problem of embeddedness. *American Journal of Sociology* 91, 481–510.
- Keynes, J. M. 1936. *The General Theory of Employment, Interest and Money*. London: Macmillan.

- Laibson, D. I. 1997. Golden eggs and hyperbolic discounting. *Quarterly Journal of Economics* 112, 443–77.
- Lucas, R. E., Jr. 1972. Expectations and the neutrality of money. *Journal of Economic Theory* 4, 103–24.
- Riley, J. 2001. Silver signals, twenty-five years of screening and signaling. *Journal of Economic Literature* 39, 432–78.
- Rosser, J. B. , Jr. 2003. A Nobel Prize for Asymmetric Information: the economic contributions of George Akerlof, Michael Spence and Joseph Stiglitz. *Review of Political Economy* 15, 3–21.
- Sargent, T. J. 1971. A note on the ‘accelerationist’ controversy. *Journal of Money, Credit and Banking* 3, 721–5.
- Taylor, J. 1979. Staggered wage setting in a macro model. *American Economic Review* 69, 108–13.
- Varian, H. R. 1992. *Microeconomic Analysis* (3rd edn.) New York: W. W. Norton & Company.
- Williamson, O. E., Wachter, M. L. and Harris, J. E. 1975. Understanding the employment relationship: the analysis of idiosyncratic exchange. *Bell Journal of Economics* 6, 250–78.

Suggested index entries:

Asymmetric information
 Caste system
 Efficiency wage theory
 Friedman, Milton
 Neuroeconomics
 New Keynesian Economics
 Inflation-unemployment trade-off
 Social norms

