

Lemon Markets and Rating - the 2001 Nobel Prize for Economics

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Why do you turn to a certified dealer rather than to a private individual when you want to buy a good second hand car? Why are insurance companies interested to propose an entire spectrum of contracts to their customers offering lower insurance premia against increased deductibles? When a customer applies for credit with a bank and is willing to pay interest rates far above the market rate, why would banks tend to reject the credit application instead of taking the high interest payments? Why do states set up entire authorities only to supervise insider trading?

The 2001 Nobel Prize in Economics

These apparently unrelated questions in fact are based on a common underlying structure: They relate to markets with asymmetric information, i.e. where the knowledge about a product of both parties involved in a trade, is different. On December 10, 2001, the Nobel Prize in Economics will be awarded to George Akerlof (University of California, Berkeley), Michael Spence (Stanford University), and Joseph Stiglitz (Columbia University, New York). They recognized the fundamental role played by information in economics, and built a variety of theoretical models to that purpose. Akerlof analyzed markets where the seller possesses more information on a product than a prospective buyer, and showed that in such markets, both the quality of the products traded and the trading volume decrease. Spence investigated how a well-informed market participant can credibly transmit her information to the uninformed party in order to escape the consequences of Akerlof's analysis. Stiglitz finally inverted this question and inquired by what incentives an uninformed agent can induce her better informed counterparty to disclose some of her information.

Lemon Markets

Why is it so difficult to sell a very good used car at a high price? Every series of cars is subject to fluctuations in quality. From several years of use, the owner of a used car can reasonably well gauge the actual quality of his car. When he offers his car for sale, his information is much superior to that of a potential buyer. The uninformed buyer necessarily must assume an average quality and will only pay a price appropriate to that average quality. The seller of a very good, and consequently rather expensive, car will find that price too low and most likely not conclude the trade. The sellers of low-quality cars ("lemons" is an American colloquialism for old, defective cars), on the other hand, will sell their cars at a profit. Ultimately, they will dominate the market.

Adverse selection, the mechanism operating in this example, implies two consequences: The trading volume decreases because sellers of high-quality products stay out of the market, and bad-quality products increasingly dominate the marketplace. According to classical microeconomic theory, a price will be fixed by the equilibrium of demand and offer. In our example - and in many instances of everyday life - this theory fails. It is based on the implicit assumption that both parties possess the same

information, e.g. on product quality, and that consequently they can reach an agreement on prices. This assumption often is not satisfied.

Signalling Quality

In such a situation, the well-informed agent, i.e. the seller of the above-average quality car in our example, must signal his superior level of information on the quality of his product, to the less well informed agent, often at considerable cost and effort. For many goods, guarantees signal such information. Guarantees can be assimilated to an additional insurance. The higher market price they justify can be considered as an insurance premium. The investments necessary to establish brand names can be understood in the same perspective. Empirically, clear correlations of prices and guarantees offered (as a proxy for quality) have been found in second-hand car markets. However, price-quality correlations in other market sectors are significantly weaker, and often ambiguous.

Information by Self-Selection

On the other hand, the less informed agent can set up incentives for her counterparty to disclose at least part of her information. This process of screening by self-selection can be implemented by offering a spectrum of contracts from which the well-informed customer can choose. When applying for an insurance, say a medical coverage, the client will have a much more accurate estimation of her health than the insurance company which, therefore, will have to assume average values. It is then advantageous for the insurance company to propose several contracts with different levels of retention where higher retention is rewarded with a lower premium. There is thus an incentive for the client to disclose her subjective risk estimate, i.e. her superior level of information. The acceptance of extremely high premia would then signal to the insurance that the customer considers her individual health risk being above average. Eventually, such an application may be rejected.

Offering reduced premia for increased deductibles targets high-frequency/low-severity risks. In many cases, it is just an incentive for reasonable behavior. On the other hand, for low-frequency/high-impact risks, such as life insurance, insurance companies require detailed information from the client about his health, diseases of parents, etc. If this is not provided, a client is rejected. If, on examination, it turns out that the information was not truthful, the insurance would refuse payment in case of an event. In this case, there is a lack of information of the customers if the insurance will actually pay.

Credit Markets and Rating

The parallels to credit markets are obvious. A bank granting a credit has less information than the borrower, on his actual default risk.

When there is an excess of capital supply for credits, a bank cannot be interested in attracting the clients of its competitors by offering them lower interest rates. Their current bank knows their creditworthiness pretty well. Only when the bank views their clients' solvency with a skeptical eye, will it not adjust its conditions to match the new rival's offer. The aggressive bank will become the prey of adverse selection. In such a situation, quantitative models for credit pricing and risk are extremely useful to set limits to the law of supply and demand, i.e. to determine up to what point a competing offer may be matched. Such models have been developed successfully, e.g., by Deutscher Sparkassen- und Giroverband. Any incentive used in attracting new customers must

increase their transparency for the new bank. In this perspective, one clearly should prefer to offer a client reduced prices for her rating rather than reduced spreads for her credit.

On the same token, banks expanding into new, unknown markets are at a particular risk. On the one hand, due to their imperfect market knowledge, they must rely on the equilibrium between supply and demand to a large extent. On the other hand, under asymmetric information, it is very easy for clients to hide risks and to give too optimistic profit estimates, possibly approaching fraud in extreme cases. Adverse selection then implies a markedly increased default risk for such banks.

The American credit market often is characterized by an excess demand for credit. According to the classical microeconomic theory of supply and demand, a bank will raise its interest rates to the point where supply matches demand. In practice, however, banks often prefer to refuse credit instead of raising their spread. In fact, the interest rate itself can influence the riskiness of a credit portfolio. Firstly, by adverse selection, borrowers of bad solvency will dominate the portfolio (the entire portfolio when clients have not been rated, otherwise within each given rating class). Secondly, the interest rate itself can influence the choice of projects financed with a credit. E.g., the threshold return of a project in order to be profitable increases with increasing interest rates. There is then a clear incentive for the borrower to finance more rewarding but also more risky projects. For a fixed credit portfolio, the profit of a bank as a function of interest rate will increase up to a maximum, and decrease beyond it. Although there is still demand for credit, it is suboptimal for the bank to grant credit above the interest rate giving maximal return.

Banks therefore can use interest rates and additional security as instruments for screening the creditworthiness of clients when they estimate that their information is insufficient. Credit risk and pricing models, of course, are complementary tools. Based on information provided by the client, they produce risk-adjusted credit spreads and thus may set limits to the principle of supply and demand. On the other hand, borrowers with a credit rating may use this rating to signal the otherwise private information on their solvency, to the bank. In exchange, they expect to receive better credit conditions than they would if the bank could only use information on sample averages.

There are many more applications of the work honored by the 2001 Nobel Prize. Examples include dividend payments of companies issuing common stock, speculative bubbles in the stock market (or any other market), contract termination and promotion of workers, and many more. A prototypical example for signaling high quality on the labor market is education. In his fundamental paper, Akerlof wrote: "The high school diploma, the baccalaureate degree, the Ph.D., even the Nobel Prize, to some degree, serve this function of certification". Should he have expected his distinction already way back in 1970?