

## The Importance of Information Problem in Financial Markets

**Nedret DEMİRÇİ**

Asst. Prof. Dr., Kırıkkale University, Department of Economics,  
Kırıkkale, Turkey  
[nedretdemirci@kku.edu.tr](mailto:nedretdemirci@kku.edu.tr)

**Ercan SANCAK**

Asst. Prof.Dr., Fatih University, Department of Management  
Ankara, Turkey  
[esancak@fatih.edu.tr](mailto:esancak@fatih.edu.tr)

**Abstract:** Information can be considered just as an economic good, because it has a price in the market like every economic product and to produce and disperse it is costly. Also it allows individuals to make choices that yield higher expected payoffs or expected utility than they would obtain from choices made in the absence of information. Information has some other special characteristics than other economic values. It is easy to create but hard to trust. It is easy to spread but hard to control. It influences many decisions. These special characteristics (as compared with other types of goods) complicate many standard economic theories and make sense on the financial markets. The goal of this paper is to emphasize on what information means generally in economics and especially in financial markets and to evaluate the economic problems in a detailed manner when “imperfect information” is available in the financial markets.

**Key words:** financial markets, asymmetric information, adverse selection, moral hazard, credit rationing.

### The Role of Information in Market Economy

Information economics is a branch of microeconomic theory that studies how information affects an economy and economic decisions. In economic literature, nearly everything in the world can be treated a commodity, including information. However, it is not all treated the same. Information in economics as a commodity apart from other goods has special characteristics. It is easy to create but costly, because creating information has a transaction cost. It influences many decisions. These special characteristics (as compared with other types of goods) complicate many standard economic theories. Some of these characteristics can be put in line as follows.

First, in the normal economy, the buying and selling of goods means those goods are no longer able to be used by others, at least not in the same condition. That simply does not exist in information economics. One person consuming information does not prevent another person from consuming that information.

Second, in normal economic theory, items for trade are usually valued based on their scarcity, as well as their demand. If products become scarcer or demand is increased while supply stays the same, the price increases. However, that is not true in information economics. Information is not scarce and is becoming even less scarce all the time. Technological progress makes information more ample and easy to reach it.

The first thing we have to emphasis on is that information has economic value because it allows individuals to make choices that yield higher expected payoffs or expected utility than they would obtain from choices made in the absence of information. This special characteristic of information leads the economy some important problems. Because of the transaction cost of having the complete information on contracts parties are not likely to have the same information. We call this incompleteness “asymmetric information problem” or “imperfect information problem”.

## Asymmetric Versus Complete Information; a Close Look at the Problem

Markets allow economic agents to separate the consumption and production of goods and services through trade. Thus, theoretically markets produce Pareto-optimal allocation of resources that is a situation in which no individual can be made better off without making someone else worse off. According to the Arrow and Debreu (1954) model when:

1. there is full information,
2. agents are atomistic (too small to influence market and prices)
3. there are no externalities (unpriced side effects like pollution)

there are market clearing prices and that makes individual plans consistent (Spencer, 2000). When we consider above explanation, it is obviously assumed that there is an efficient market that allocates resources in a Pareto-optimal manner; once the market opens, equilibrium prices are found and exchanges are made without any problem.

According to the Classical Economists, perfect competition is prevalent in the market hence information for every market type is perfect and reachable. That means for especially financial markets there is no friction, so the economy is a well- functioning device like a clock. Actually this argument of Classical School arises from Adam Smith's "Laissez-Faire Laissez-Passer" philosophy. As it is well-known, A. Smith and other Classics argue against the state intervention because of their prominent assumption arguing that there is a "mysterious chef" bringing the market always into equilibrium. That "mysterious chef" is sometimes called "invisible hand". In Smithian thought, this "invisible hand" commands the whole economy without any undesired results. As it is well known by economists, "invisible hand" is none other than "prices". Thus, according to this idea there is perfect competition in the market and information is perfectly attainable by every participant of this market without any barrier.

The asymmetric information literature which looks at the impact of financial structure on economic activity focuses on the differences in information available to different parties in a financial contract (Mishkin, 1990:4). **Asymmetric information** is a situation in which one party in a transaction has more or superior information compared to another. This often happens in transactions where the seller knows more than the buyer, although the reverse can happen as well. For example agents on one side of the market have much better information than those on the other side. Borrowers know more than the lender about their repayment prospects; the seller knows more than buyers about the quality of his car.

Disputes on asymmetric information theory go back to Hayek, in his path breaking work "The Use of Knowledge in Society" he says "*The peculiar character of the problem of a rational economic order is determined precisely by the fact that the knowledge of the circumstances of which we must make use never exists in concentrated or integrated form, but solely as the dispersed bits of incomplete and frequently contradictory knowledge which all the separate individuals possess*" (Hayek, 1945:519). Hayek implicitly accept that in a contract having more information of one party than another leads to asymmetric information problem.

## Imperfect Information and Its Mechanism

As we can remember from classical economics, prices convey all the relevant information (especially about the scarcity value of resources). We now realize that there are a variety of other ways in which economically relevant information is conveyed, and that prices convey information other than that about scarcity. Producers and consumers realize that their actions—both individually and "collectively," e.g., through aggregate movements in prices and quantities convey information, and this affects actions, so that the simple theory of consumer and producer behavior does not describe the behavior of consumers or producers in several central aspects (Stiglitz, 2000:1449).

Because information possesses many of the properties of a public good, non-rivalrous consumption (which means that consuming information does not exclude someone else from also consuming it even if it is potentially possible, it is socially inefficient to do this ) and non-excludability (it is difficult to exclude others from its use), there is a presumption that information will be "underproduced" in competitive market economies. There are also externalities associated with the acquisition of information since it is not easy (or is sometimes not possible) to appropriate the returns to collecting information (Islam, 2007:2). Correspondingly, the asymmetric information theory focuses on the differences in information that different parties have with different degree in a financial contract. For example in a lending transaction borrowers have an informational advantage over lenders because borrowers have more information about the quality of the investment projects they want to undertake than lenders have.

Informational difference and its arising drawbacks in the financial markets like classic "lemons" problem first described by Akerlof (1970) in his pioneering article. Akerlof gives a simple and quite apparent example from

used car market. In his essay, he says the example of used cars captures the essence of the problem. This kind of used car's sellers are better informed in comparison with the buyers about the quality of cars. Defective cars in the market are called "Lemons".

We can explain Akerlof's idea with a simple example. Individuals want to buy used cars in the market but they don't know which car have high quality and which one have poor quality (e.g. lemon). On the other hand, they can make an estimation with  $q$  probability that car will be high quality and with  $(1-q)$  will be lemon. We are making an assumption here that  $q$  is the proportion of good car and  $(1-q)$  is the proportion of lemons in second hand market. Information asymmetry arises here and sellers have more knowledge about their cars than buyers. However, good cars and bad cars sell at the same price due to buyers can not differ easily the good one from the bad (to be able to do that they have to get extra knowledge by paying its charge, e.g. that requires a transaction cost). Clearly their prices have to be at different values because of the quality difference. If this situation continue in this manner, the seller of bad cars is going to sell "lemons" at the price of good car and buy a new one that may be good with the probability of  $q$ . Obviously this will be a good trade for the bad car sellers.

In Akerlof's example, sellers and buyers make different valuations about the cars for both high quality and poor quality. By using Let's say buyers evaluate high quality cars with a price  $W^h$  and poor quality  $W^p$  and, sellers evaluate high quality with a price  $V^h$  and poor quality  $V^p$ . In buyer's mind  $W^h > W^p$  and according to the sellers'  $V^p < W^p$  and  $V^h < W^h$ . In practice, the markets would merge into a single market with one and the same price for all units (Lofgren, Persson and Weibull, 2002:197-198). Suppose that this occurs and that the sellers' valuation of high quality exceeds the consumers' average valuation. In accordance with the former explanation, we make a new assumption that buyers evaluate all cars in the market with an average price  $W_a$ . We may represent this case with the following inequality:  $V^h > W_a$ , where the average valuation  $W_a$  is given by  $W_a = qW^p + (1-q)W^h$ . In the market, consumers want to pay for the car at most  $W_a$ . But this price is under  $V^h$ , what sellers want. Hence, high-quality sellers leave the market to low-quality goods, the lemons, due to demand for their good quality cars doesn't meet the price that they expect. Therefore the only machines remain in the market are bad quality. As a result, while good cars can not find their worth, bad cars are sold at a higher value that they don't deserve. Apparently bad cars drive out the good from the market<sup>30</sup>.

## Asymmetric Information and Deriving Problems

Information asymmetry can lead to three main problems:

1. *Adverse selection*: immoral behavior that takes advantage of asymmetric information *before* a transaction. For example, a person who is not in optimal health may be more inclined to purchase life insurance than someone who feels fine.
2. *Moral Hazard*: immoral behavior that takes advantage of asymmetric information *after* a transaction. For example, if someone has fire insurance they may be more likely to commit arson to reap the benefits of the insurance.
3. *Principal-Agent Problem*: if information is asymmetrically distributed between those who make decisions (agents) and the theoretical beneficiaries of those decisions (principals), then the reward functions which govern firm decision-making may not have the form of simple valuation maximization assumed in the neoclassical theory (Greenwald and Stiglitz, 1990).

## Adverse Selection

In accordance with the explanations in the previous topic, we can better identify "adverse selection" mechanism with following illustration:

Buyer Knows		Seller Knows
Doesn't know every car's quality and Make decision according to average price	Excellent Car	\$1500
	Good Car	\$600
	Fair Car	\$300
	Lemon Car	\$200
	\$600 Average Value	\$600

<sup>30</sup> This situation is known as Gresham's Law and is defined "bad money drives out good".

**Table 1: The Mechanism of Adverse Selection**

Buyers know that the sellers of excellent cars won't sell for the average value, so they recalculate the average value without excellent car:

$$(\$600 + \$300 + \$200) / 3 = \$366.$$

With this new average price, only fair car owner will be wishful to sell car, and buyer will revise the average price once again excluding good car:

$$(\$300 + \$200) / 2 = 250.$$

At this time the only lemons will sell at this price, and last time buyer will revise average price. Last evaluation:

$$\$200 \text{ (that is lemon).}$$

According to the above explanation, at the end, only lemons will be sold in the second hand market and high quality cars will leave the market. This situation is called "*adverse selection*". This result is completely dissimilar what A. Smith argues in the classical theory.

A firm or fund users have an incentive to present lenders with an evaluation of positive financial condition and have an incentive to persuade them about the positive return of the investment. If lenders knew perfectly the risks associated with each borrower, this would matter little; each borrower would be charged an appropriate risk premium. It is because lenders do not know the risk properties perfectly that this process of adverse selection has important consequences

Because of lack of sufficient information, or having this information is costly about the riskiness of the projects, in the similar way that we developed in used car example, lenders will make a classification among the projects according to the their level of risk and define only one average interest rate to apply for all borrowers. But healthy projects with high level of returns will find this rate of interest is quite high and not affordable, on the other hand, poor quality projects with a high probability of negative result (that is lemon) will be demanding the loan at this high rates. As a result, poor investment projects will drive out the healthy projects from the market. This situation is called "*adverse selection*" in financial markets.

## **Moral Hazard**

The lack of appropriate information about the quality of borrowers may result in another problem called "*moral hazard*" which effects the well-functioning of financial marke~~st~~. Because the insufficient information that lenders have about the riskiness of the barrower, barrower has incentives to engage in activities that most probably will result in with a high loss (Mishkin, 1990:7). Because that low probability of positive return of the project there is a default risk at the end and this situation harm the lender.

Moral hazard occurs when a barrower's behavior is hard to monitor and control and thus payment to that barrower is based on incomplete information. Thus, moral hazard takes place after having the credit from the lender. In financial markets, due to less information and low degree of control and monitoring about the barrowers' actions, barrowers have a tendency to deal with risky projects. In particular, if there is a deposit insurance the state provide to the financial institutions like banks, that encourages the lenders to monitor their barrower appropriately because they will not have to carry the full burden of losses. If the majority of the barrowers consist of risky projects, the total amount of default risk will be higher at that much. Hence, the abundance of the losses may reduce the total amount of credits in the financial markets. This circumstance is called "*credit crunch*" that is the real crises. So, better information on the economy helps borrowers and lenders make better decisions and may be expected to rise lending.

## **Principal-Agent Problem**

Principal-agent problem occurs when one party, called an agent, acts on behalf of another party, called the principal. The agent usually has more information about his or her actions or intentions than the principal does, because the principal usually cannot completely monitor the agent. The agent may have an incentive to act inappropriately (from the viewpoint of the principal) if the interests of the agent and the principal are not aligned. For example the CEO of a firm knows more than shareholders about the profitability of the firm and may engage in some risky actions without the knowledge of the firm owner (shareholder). Consequently the firm faces a loss. Incentive problems may intensify when a firm is equity financed. Managers, who receive only a small fraction of any additional profit, are likely to put forth less than optimal amounts of effort (Stiglitz, Greenwald and Weiss, 1984:4).

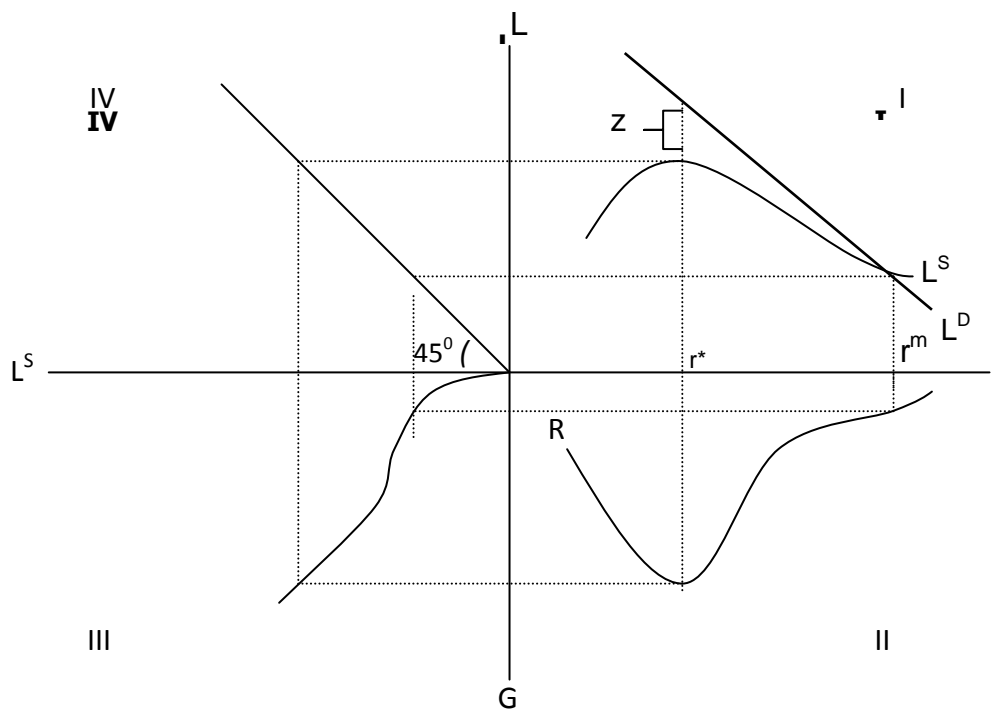
### Credit Rationing

One result deriving from the asymmetric information is credit rationing. Why credit is rationed? When there is an excess demand for credit, in order to meet this increase in financial market, lenders apply credit rationing mechanism instead of increasing the interest rates due to falling short of this demand.

The adverse selection aspect of interest rates is a consequence of different borrowers having different probabilities of repaying their loan. The expected return to the bank obviously depends on the probability of repayment, so the bank would like to be able to identify borrowers who are more likely to repay. It is difficult to identify good borrowers, and to do so require the bank to use a variety of screening devices (Stiglitz and Weiss, 1981:393). As the interest rate rises, the average riskiness of those who borrow increases, possibly lowering the bank's profits because of the default risk. So, that increases the pool of the risky project and discards the high quality projects from market.

In the figure, the space I shows the interest rate  $r^*$  that maximize the expected returns of the banks. Both credit demand ( $L^D$ ) and credit supply ( $L^S$ ) are the function of the interest rate and at the rate of  $r^*$ , credit demand exceeds credit supply. Excess demand is shown with Z. In the conventional analysis, the investors who are not eligible to get the credit will offer higher interest rates to the banks and in this way they will induce to increase the amount of funds supplied in the market. However, in the credit rationing mechanism a Walrasian market equilibrium is not realized and, though the fund demand is not equal to fund supply,  $r^*$  is the equilibrium interest rate (Jaffee and Stiglitz, 1990:854).

When we look at the space II, we can find out that banks are not willing to lend credit with the rate above  $r^*$  because of the adverse selection effect. From the viewpoint of banks, borrowers offering interest above the rate  $r^*$  have a higher level of risk than the borrowers with rate  $r^*$ . Consistently, former projects will have lower return in comparison with latter. Lower rate of R than  $r^*$  shows this relationship.



**Figure 1:** Credit Rationing in Financial Markets

Source: Villanueva and Mirakhor, 516

Space III represents the relationship between supply of funds and expected rate of return. For more rate of return the amount of funds supplied have to be increased. Space IV shows the relationship between supply of funds and the quantity of funds at equilibrium. When there is a credit rationing in the financial market, the equilibrium interest rate is realized at the rate  $r^*$ . There is an excess demand at this rate  $r^*$ , on the other hand the market clearing interest rate is  $r^m$ . This rate is neither optimal nor effective for banks, because that provides the banks lower rate of return in comparison with the rate  $r^*$ . Despite  $r^*$  is not market clearing rate, it is both optimal and effective because banking sector profits are at the maximum level and the risky projects are excluded.

As a result, credit rationing mechanism may be good solution for the adverse selection problem when there is asymmetric information about the credit market.

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