

University of Bielsko-Biala

**National Security & Innovation Activities:
Methodology, Policy and Practice**

Monograph

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Monograph is devoted to the research of theoretical and practical aspects of the innovation security. Different innovative methodic approaches and economic mechanisms to provide innovation security at the regional, national and international levels are considered. Scientifically grounded recommendations to achieve economic, financial, social and ecological aims of the national security through the strengthening of innovation system are given.

Keywords: national security, innovation activities, innovation security, international economic relations, innovation policy, technology transfer, investment, policy, management, marketing, ecological security, economic mechanisms, “green” economy.

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5.3 INFORMATION ASYMMETRY REDUCTION AS A BASIS FOR THE FINANCIAL SECURITY OF THE STATE

Classical economic theory involves the rational actions of economic subjects, based on equally distributed information. But real life shows that this is only an ideal model and in practice it does not work. Its main provisions – the rational actions of the subjects and equal information distribution – are essentially abstractions and in practice are implemented only partially.

Failure to complete the rationalization of actions and behavior of economic subjects is related to human psychology and connected with the presence of different kinds of expectations, mostly with the individual, not common nature.

Equal distribution of information between economic agents is impossible – someone always knows more than the others. Some economic agents do not want others to know about their real state or do not want to harm themselves with their own information actions (e.g., sale of shares by the owner of the company can generate a negative signal about the company's prospects, so the owner will try to hide information about such actions to avoid harm to the

company). Other economic agents due to certain circumstances cannot share information with the others, because transfer of information can be associated with additional costs and requires additional time losses. Quite often obtaining of information is accompanied by significant costs that is why economic subjects limit their own knowledge. Despite the significant development of information technologies and faster access to information, growth in size of available information, this problem does not become less, and even increases in scale.

The situation where part of economic subjects is more informed in contrast with other participants of economic relations is called information asymmetry. Information asymmetry leads to market failure, which in turn can lead to crisis in the economy. With growing globalization and internationalization of economic and especially financial processes, the problem of information asymmetry from a secondary becomes one of the key economic issues.

Financial security of the state can be harmed by the information asymmetry in a variety of ways. For example, in banking using a credit card customer borrows money without any collateral. Obviously, the debtors better than a bank know whether they would return the debt or not. In addition, debtor can stop acting to return the debt. For example, if the customer does not care about the return of debt, he can safely accept the loss of job. This, of course, eliminates his ability to repay debt to the bank. In case of financial markets information asymmetry leads to the appearance and to collapse of price bubbles and, as the result, can cause economic crisis. Similar examples can be provided from other spheres and aspects of economic activity (labor and health market, investing and insurance, consumer sector, etc.). As can be seen, financial security of the state can be harmed significantly with the information asymmetry and its consequences.

At the same time effective mechanism of information asymmetry counteraction still does not exist. Thus, it is very important to research the nature, causes and consequences of information asymmetry and to search methods of its minimization.

Basic theory of information asymmetry in the economy was developed by Arrow (1963) and Akerlof (1970) [1; 2]. Latter Akerlof constructed mathematical model of the market with imperfect information (for this he had received the Nobel Prize in 2001. By the way in 1996, Nobel Prize was awarded to William Vickrey and James Mirrlees "for their fundamental contributions to the economic theory of incentives under asymmetric information" – it underscores the importance and urgency of this problem) [10**Błąd! Nie można odnaleźć źródła odwołania.**]. Akerlof (1970) showed that due to imperfect information dishonest retailers may offer less quality products. The result is fall in demand for goods and low prices for them. As a result sellers of better goods disappear from the market or try to separate themselves from the average producer which leads to additional costs [1].

The problem of information asymmetry is one of the most important in modern economy because it is typical for all levels and all areas of economic activity: at the macro level and micro level, at the national and international levels in all areas of industry and services.

Relationships between elements at the macro level are always accompanied by some level of information asymmetry. For example, existence of shadow economy is one of the results of information asymmetry (economic subjects have information about the actual amounts of their financial and economic activity while the state is able to monitor only a part of them – as the result part of economy is not controlled by the government).

The problem of information asymmetry does not apply to a particular type of industry or sector of the economy – it is a general defect of economic system and, as the result, it is quite important for the financial security of the state, because it leads not only to additional losses of economic activity, but also acts as a basic factor in failure of market mechanism in general.

The main reasons for the existence of information asymmetry are:

- 1) limited access to information;
- 2) variability and the rapid aging of information;
- 3) partial assimilation of information;
- 4) confidentiality;
- 5) costs on obtaining information;
- 6) opportunistic behavior of the parties.

The main consequences of information asymmetry are:

- it prevents the adoption of optimal economic decisions;
- it contributes to distortion of markets and their failure;
- it causes additional transaction costs;
- economic agents find themselves in rough conditions while making decisions that can lead to opportunistic behavior and loss for one of the parties;
- it stimulates the cooperative behavior of firms.

As information asymmetry consequences are important in modern economy, it is necessary to know how to counter it.

According to Akerlof (1970), there are only 2 ways to solve the problem of information asymmetry: guarantees and reputation [1]. Guarantees can only be realized in court, and appropriate reputation realization is possible only in an open society (in this society every citizen has free access to information on all companies and sellers).

The main methods and approaches to reduce the information asymmetry are presented in Fig. 5.4.

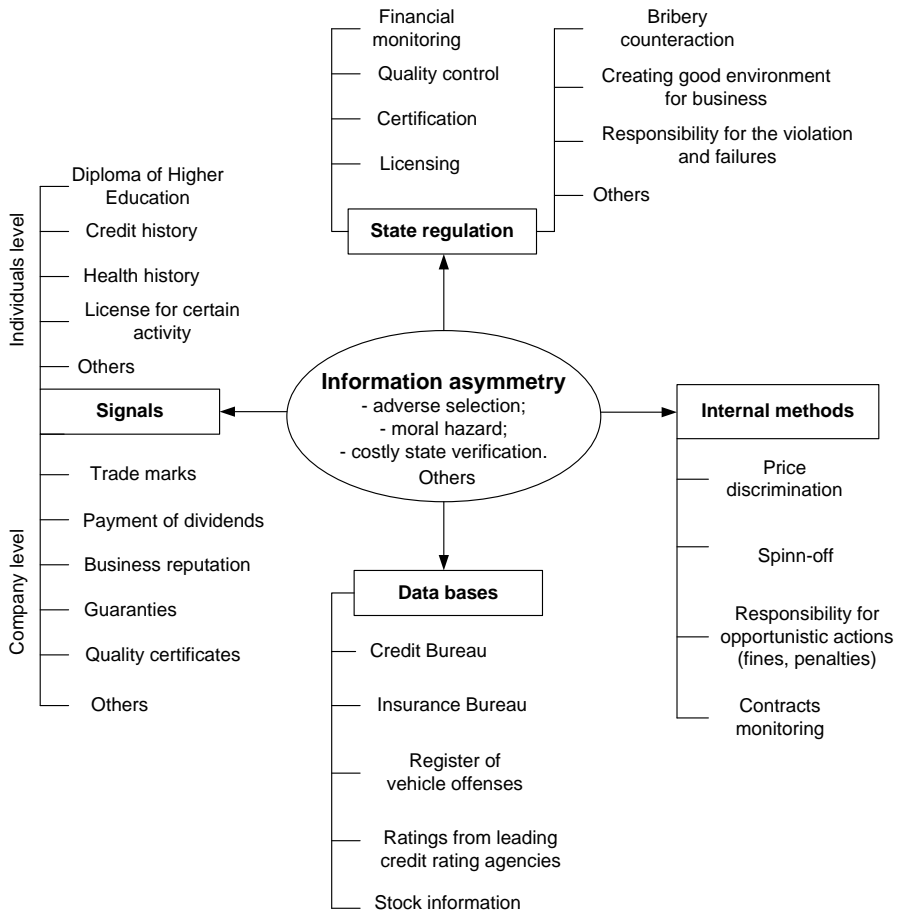


Figure 5.4. Methods of information asymmetry reduction [author's research]

We offer a group of four methods that help to reduce information asymmetry in the economy which can act as a basis for the financial security of the state.

The basis of information asymmetry reduction was developed by Spence (1974) with his "theory of market signals". According to this theory sellers have to provide additional information about the quality of their products. This will counteract against adverse selection and save market efficiency. Logos, trademarks, guarantees, reputation of company, quality certificates, diplomas from various competitions and prestigious nominations, recommendations, qualifications and payment of dividends as a signal of prosperity and good prospects may act as additional information about the company [11].

In general, all signals from the company can be divided into three groups:

1. Signals about quality – designed to show the quality of the products and to form the positive image of the company (expensive advertising, very attractive guarantees from the manufacturer etc.);

2. Strong competitive position signals – designed to show the benefits of the company over its competitors and its self-confidence and abilities (aggressive price cuts, sales);

3. Signals of financial success – aimed at forming an opinion of stable financial state of the company and its ability to generate significant amount of income and profit (financing the company not by issuing shares, but by issuing bonds, which are more costly, dividends payout).

Spence (1974) mentioned signals not only at the company level, but also at the level of individuals (e.g., employees) and the state. For example, when government is trying to show its commitment to deal with high inflation, the central bank held its restrictive monetary policy [11].

One more example of the generation of signals at the state level is the existence of special institutions that perform guarantee and insurance functions. For example, the presence of the Guarantee Fund for the deposits signals to investors about the reliability of the banking system, thereby reducing the level of information asymmetry between economic subjects and banking system.

During the global financial crisis level of confidence of the banking system has dropped significantly. One of the reasons was sharp increase in information asymmetry.

For individuals the graduate degree and license for certain activities may act as signals. As for the financial activities of individuals, credit history can act as the element of information asymmetry reduction. So maintenance of credit bureaus by banks and credit unions or at least presence of clients' databases can prevent the emergence and implementation of moral hazard.

Stiglitz and Rothschild (1973) developed the mechanism of "reverse market adaptation". Uninformed market participants receive information from more informed. For example, insurance company (uninformed participant) should encourage their customers (well-informed participant) in order to "force" them to discover information about their real insurance risk [12].

Also there is a group of methods which can be called "internal". They are used by companies to reduce the information asymmetry. For example, price discrimination. Price discrimination in various forms can be very effective counteraction to the information asymmetry and its effects. Setting different prices for different consumers allows reducing moral hazard and adverse selection. For example, a healthy person, for which the probability of the insured event (for health insurance) will be quite low, should have lower premiums than the person with a health problems, who respectively, will be paid higher premiums, because the probability of occurrence of insured accident is much higher.

Creation of subsidiaries makes the activities of the company more transparent, as investors become more transparent about the strategy in whole and its activities that are presented by subsidiaries and their results. Plus spin-offs reduce the negative synergy that can exist when all activities are conducted "under one roof."

Penalties and responsibility for breach of contract can significantly reduce moral hazard and the size of opportunistic behavior.

Monitoring of partners and their economic activity despite costs can significantly reduce the possibility of financial losses from information asymmetry.

In case of information asymmetry in banking widely used method of information asymmetry counteraction is collateral. Collateral, property promised to the lender if the borrower defaults, reduces the consequences of opportunistic behavior because it reduces the lender's losses in the event of a default. If a borrower defaults on a loan, the lender can sell the collateral and use the proceeds to make up for the losses on the loan. For example, in case of fail to make mortgage payments, the lender can take title to house, auction it off, and use the receipts to pay off the loan. Lenders are thus more willing to make loans secured by collateral, and borrowers are willing to supply collateral because the reduced risk for the lender makes it more likely they will get the loan in the first place and perhaps at a better loan rate.

At the same time, the debtor, who gave his property for collateral, will not be prone to opportunistic behavior because economic benefit for him in this case is questionable. This leads to a reduction in adverse selection and moral hazard, which in turn increases the efficiency of credit activity, resulting in reduced credit risk and, consequently, in reduced rates on credit.

At the company level net worth can act as another element of the information asymmetry reduction. When borrowers have more at stake because their net worth (the difference between their assets and their liabilities) is high, the risk of moral hazard and other types of opportunistic behavior will be greatly reduced because the borrowers themselves have a lot to lose. The greater the borrower's net worth is, the greater the borrower's incentive to behave in the way that the lender expects and desires is, and the smaller the moral hazard problem in the debt contract is, and the easier it is for the firm to borrow. Vice versa, when the borrower's net worth is low, the moral hazard problem is bigger, and it is harder for the firm to borrow.

In case of investments, potential method of opportunistic behavior reduction is the use of so-called debt contracts. Debt contract is a contractual agreement by the borrower to pay the lender (investor) fixed sums of money at periodic intervals. This approach, unlike investors' participation in the profits, reduces the likelihood of moral hazard and opportunistic behavior by managers.

When the firm has high profits, investor receives the contractual payments and does not need to know the exact profits of the firm. If the managers hide profits or pursue activities that are personally beneficial, but don't increase profitability, the investor is indifferent as long as these activities do not interfere with the ability of the firm to make its debt payments on time. Only when the firm cannot meet its debt payments, thereby being in a state of default, there is a need for the lender to verify the state of the firm's profits. In case of debt contracts, when company has to pay fixed payments, it is inefficient for management to hide profits. They will prefer to operate at maximum efficiency, because the more profit the company gets, the more money will remain in their possession after payments to investor under debt contracts, the more managers will get as bonuses. Investor in this case does not care how management behaves, because he will get his money in any case.

It has to be mentioned that debt contracts are still subject to moral hazard. The borrowers have an incentive to take on investment projects that are riskier than the lenders would like, because a debt contract requires the borrowers to pay out a fixed amount and lets them keep any profits above this amount.

But not only debt contracts can reduce opportunistic behavior of the management and moral hazards arising from this. A possible alternative is so-called “restrictive covenants” – clearly stated in the contract permissible actions and responsibilities of the management. Hubbard (2002) mentions four types of restrictive covenants:

1. Covenants designed to keep the borrower from engaging in the undesirable behavior of undertaking risky investment projects.
2. Restrictive covenants that encourage the borrower to engage in desirable activities that make it more likely that the loan will be paid off.
3. Restrictive covenants that encourage the borrower to keep the collateral in good condition and make sure that it stays in the possession of the borrower.
4. Restrictive covenants that require a borrowing firm to provide information about its activities [7].

An important group of methods associated with information asymmetry and the behavior of executives is their insider activity (for example, deals with shares of their company). Executives have unique information on the current and future state of the company. It gives them opportunity for speculative trading. That is only one of the examples how they could materialize information asymmetry. To prevent such behavior the next methods can be used:

- 1) disclosure by key insiders information on the number of shares they own;
- 2) restrictions on transactions with securities by insiders.

Key insiders are required to submit certain information to the state agencies that publish this information in special issues. In addition executives can be limited in personal transactions with shares of their company. Typically, these restrictions are applied to "short" operations (sells).

Thus, insider activity is state regulated. This leads to information asymmetry reduction and reduces the opportunities of its use to obtain economic benefits.

Effective information asymmetry counteraction is impossible (or at least is much more complicated) without government regulation. Thus, another element of information asymmetry counteraction is an active participation of government (state) in certain aspects of economic activity. In particular, state control over the quality of goods and services, creation of special public services, inspections, and bureaus of quality control in various areas of socio-economic activity provides conditions for information asymmetry reduction.

Akerlof (1970) notes that information asymmetry in developed countries is somewhat less than in the developing countries, due to the fact that in developed countries effective state and public control over the quality are adjusted [1]. So in Ukraine the problem of information asymmetry is much bigger than in case of developed countries.

An important element of government regulation of information asymmetry is licensing and certification. Additionally government could, for instance, produce information to help investors distinguish "good" firms from "bad" ones and provide it free of charge.

Another possibility for the government is regulation that encourages firms to reveal honest information about them so investors can determine how good or bad the firms are.

The U.S. experience in the sphere of government control of financial activity is quite important. The U.S. financial market has a large number of investors (large and small) that operate on it. At the same time, dishonest behavior of firms on the basis of information asymmetry often leads to losses. In order to reduce information asymmetry and to prevent opportunistic behavior in relation to investors, Securities and Exchange Commission (SEC) was founded. This government agency makes firms that sell their securities in the stock markets follow standards of accounting and disclosure of income, assets and size of activity. Accounting standards are designed to ensure that investors can assess the financial state of companies they invested to, thus reducing the level of information asymmetry.

Healy et al. (1999), Leuz and Verrecchia (2000) evidence in favor of inverse relationship between the level of information asymmetry and the level of disclosure which is achieved by financial reporting standards [6; 9].

In addition, laws interpret misreporting or stealing profits belonging to shareholders as an offense, which is punished by large fines or prison terms, or both.

Although government regulation lessens the adverse selection problem, it does not eliminate it. Even when firms provide information to the public about their sales, assets, or earnings, they still have more information than investors. Statistics can't provide enough information about the quality of a firm. Furthermore, bad firms have an incentive to make themselves look like good firms because this would enable them to fetch a higher price for their securities. Bad firms will slant the information they are required to transmit to the public, thus making it harder for investors to sort out the good firms from the bad.

The asymmetric information problem of adverse selection in financial markets explains why financial markets are one of the most heavily regulated sectors in the economy.

Another example of state regulation of economic activity aimed at information asymmetry counteraction is a system of measures for prevention of manipulation of stock exchange prices. For example in the U.S. imitation of market activity, dissemination of false information, sales of insider information, etc. are forbidden.

Important group of methods of information asymmetry reduction are those one which have purely informational nature. We called them databases. For example, creation of specialized databases (credit and insurance history, motor offenses registries and other data sets).

The most common approach, which reduces information asymmetry on different types of markets, is the use of intermediaries. Intermediaries can be divided into two groups depending on role in information asymmetry reduction:

- financial and economic intermediaries;
- information intermediaries.

Capital can be moved from households to companies directly (by buying shares of the companies, direct investment) or through financial intermediaries (banks, investment companies, venture capital funds). According to Healy and Palepu (2000) information flows companies may contact investors directly (financial statements, press releases) or through information intermediaries (financial analysts, credit rating agencies, audit firms, consulting companies, etc.) [5].

In financial markets, the main financial intermediaries are banks. Banks become evaluators of creditworthiness by providing loans to borrowers and have a possibility to distinguish "good" borrowers from "bad." Banks act as intermediaries between those ones who want to borrow money (take a bank loan) and those who want to get income from savings (put money on deposit at the bank). Since the interests on loans are bigger than the interests on deposits – banks obtain profit, which actually is a price to pay for information asymmetry reduction. Free-rider problem in case of banks is solved itself, because information generated by the bank is used by the bank. Private loans are not traded, so no one else can free-ride on the intermediary's monitoring.

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Audit reports reduce information asymmetry and form positive image of the firm. This helps potential investors to take right investment decisions. Kothari (2000) notes that reaction of stock prices on companies' announcements of financial reports confirms that investors generally believe that accounting information of the companies is reliable. In turn, this trust was formed largely by confirmation of financial reports by independent auditors and their reputation. It should be mentioned that auditors do not provide markets with new information about the company or its condition, they just confirm existing information [8].

Credit rating agencies play an important role among information intermediaries in the financial sphere. Credit rating agencies are companies that assign credit ratings to issuers and their securities. Credit rating agencies indirectly through ratings exposure (rating is a credit rating agency opinion about the creditworthiness of rating object and /or about its individual debt or other financial instrument, which is expressed as a score on a scale of credit ratings) signal economic subjects about the status of other economic subjects. Availability of rating can open or, conversely, close access of a company to financial resources, improve its reliability in the eyes of investors, or reduce it. In any case, the ratings significantly reduce the level of information asymmetry and today it is one of the most effective and efficient instruments of information asymmetry reduction in financial markets, especially international.

Financial analysts play important role of information intermediaries in the financial markets. They collect information from public and private sources, assess the current state of companies and make predictions about their future perspectives and give certain recommendation (for example, to buy/sell shares of the company).

Some researchers add so-called reputational intermediaries as an additional class of intermediaries. They are economic subjects whose participation in certain transaction (agreement) guarantees its transparency and honesty. This guarantee is achieved by the reputation of these economic subjects. Participation of such firms in agreement reduces the level of information asymmetry around it. As reputational intermediaries may act investment banks and their role of underwriters during the initial public offering. In this case, investors may not have sufficient information on IPO subject, however reputation of the bank, is reducing the level of information asymmetry (Black 1998) [3]. Also audit companies can act as reputational intermediaries, because their main asset is the reputation that was created by decades of their activity in the market. An illustrative example is the fate of the audit firm "Arthur Andersen" (was one of the five largest audit firms in the world) that after the scandal with "Enron" was forced to cease its existence because of reputation loss.

Stiglitz and Grossman also proved that the existence of information asymmetry leads to the use of non-market mechanisms by banks, such as credit rationing (limitation of the credit size to one borrower). Formally, if demand for loans exceeds supply banks would raise interest rates and increase profitability of operations. This is how the market mechanism works. However, when the information asymmetry is high and its consequences (adverse selection and moral hazard) are present on the market, interest rates increase could lead to the disappearance of “good” borrowers and to the appearance of “bad” lenders on the market. This will lead to the losses of the bank, when it cannot get back money from “bad” lenders. Thus, rationing serves as an instrument of bank's losses reduction by avoiding loans with high level of information asymmetry [4].

Important instrument of information asymmetry reduction is stock markets and information from them. Usually signals that economic system sends to its members have considerable big time lags. As the result, economic subjects act in conditions of uncertainty. At the same time sphere of economic activity, where information is absorbed quickly and signals are generated in real time is a stock exchange activity. Asset prices in this case are some sort of a practical result of processing the entire set of information about certain part of economic activity or economic subject.

Stock exchange is a place where information is aligned, and market prices are kind of tool for alignment, or indicator.

In an efficient capital market, the price of a company's stock provides the best signal to managers about the profitability of new investments. Stock prices increase in response to good news, suggesting that more capital should be allocated to the firm's lines of business. Similarly, a decline in stock prices reflects news about market pessimism regarding the firm's prospects.

Thus, analysis of stock markets, dynamics of prices and their reaction to certain events provides more objective and adequate picture of economic reality, i.e. helps to reduce information asymmetry. Information from stock markets is important not only because of its speed, but also because it is formed as a result of analysis by a large number of professionals – stock analysts, traders, investors and other participants. Thus, exchange information is unique both in its speed and quality.

Information asymmetry is important and even crucial element of financial security of the state, because it generates inefficiency of the various aspects of economic activity and economic system in general. That is why information asymmetry reduction can increase the financial security of the state. Proposed methods of information asymmetry reduction and their classification can act as a basis for the appropriate actions from the government to ensure the financial security of the state.

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5.4 FINANCIAL CONSUMER PROTECTION THROUGH THE DEPOSIT GUARANTEE SYSTEM: ON THE WAY TO NATIONAL ECONOMIC SECURITY

The current financial crisis has sharply aggravated the issue of protection of the depositors interests of domestic banks. This issue is particularly actualized in the context of the implementation of national economic security. The existing structure of the deposit insurance system of Ukraine, which still functions properly, is currently almost exhausted and needs serious reform. The main components of such reform should be the creation of more flexible financing system of the Deposit Guarantee Fund for individuals and strengthening of its powers for work with banks that are in the stage of liquidation.

The deposit insurance system is an important component of the financial infrastructure and national economic security of any state. It is necessary to prevent a massive "escape" of depositors from banks. For the first time such system was created by the United States in 1933, during the Great Depression. According to the International Association of Deposit Insurers (IADI) [5], as of June 2008, 119 countries had a deposit guarantee system or planned to introduce it. Such system functioned fully in 99 countries.

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