

## Information Efficiency of Financial Market: Theoretical Concept and Institutional Structure

Financial system is, in addition, a kind of “information brain” of economy. It is just financiers who decide whereto the investments will be allocated (or will not be allocated), what branches and sectors will be developed and which will not be developed. Failure to choose the right priorities may cost one dear. Thus, for example, in the XIX century the Government of France decided to develop sailing fleet. They made serious efforts and spent a lot of funds. As a result, France actually has developed the most powerful sailing fleet while the other countries have already built steamships. Thus it is not by chance that Holland came to the front line in the XVII century which took place to a great extent due to the most developed financial system. It also played significant role in industrial revolution in England in the XVIII century.

J.Schumpeter whose ideas had greatly contributed to development of the economic theory of the XX century considered credit as the integral part of innovative entrepreneurship without which it is impossible. He wrote, “The banker is not so much a mediator in the commodity trade “purchasing power” as the producer of this commodity...He is between those who wish to exercise the new combinations and the owner of means of production”<sup>2</sup>

The above-mentioned aspects testify that to overcome uncertainty is the most urgent problem for financial sphere both in the inner and outer aspects. In the former case it means that each subject of the financial sphere (professional or unprofessional )is facing the same problem; in the latter case it means that its efficiency influences in many respects the way of solving information problems in the economy in whole. In this aspect one should take into consideration the problem of theoretical development of the concept of information.

J.Stiglitz and J.Akelrof have proved that economic information is endogenous, it is being generated only in the course of communication and interaction between economic entities<sup>3</sup>. Hence, valid information is not being disseminated “automatically”, and this is connected not only with weakness of organization of infrastructure of market relations but also with the fact that entities can interpret signals in a wrong way and/or inadequately transmit signals outside ( deliberately or indeliberately). At that some individuals act so as to hand over certain information (if they are concerned to act like this), the rest strive for keeping it in secret or for disclosing it partially or presenting it in a certain way so that to improve or at least not to worsen their state of affairs.<sup>4</sup>

This results in change of market functioning pattern. As J.Stiglitz accentuated, “actions (including choice) hand over information, market participants know about this, and this affects their beha-

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<sup>2</sup> J.Schumpeter, *Theory of Economic Development*. –M.: Progress, 1983 – p.167

<sup>3</sup> Probably such interpretation does not suit for physical or chemical information but it reflects the specific character of economic information which **directly affects the interests** of the entities.

<sup>4</sup> Let us note that reasoning of that kind fully comply with the spirit of “economic imperialism” (see, for example, A.Nesterenko “ What has William Baumol failed to tell”: Contribution of the 20<sup>th</sup> century to the philosophy of economic activity – *Economic Matters* – 2001.-No.7).

viour.”<sup>1</sup> **Therefore asymmetry of information is being caused by the actions of the participants of market relations.**

If this is the case, a number of theoretic and applied problems arise: if information is imperfect, its asymmetry is being caused by the market participants themselves which means informational transparency of the financial system; what should be understood as “reliable information”; what should be an institutional organization of a successfully functioning market as a whole and financial market in particular?

## Effects of Information Asymmetry

Effects of information asymmetry (EIA) are divided into two groups<sup>2</sup>:

- 1) the effects which take place *ex ante*<sup>3</sup> which are usually called risk of “adverse choice” or “adverse selection” and they are caused by mistakes in evaluation of the quality of goods or services;
- 2) the effects which take place *ex post* which are usually called “moral hazard”, and they are caused by the situation that the mere fact of transaction may result in change of behaviour of one of the parties (for example, insurance companies have long ago noticed that once the car has been insured, its owner may take less care to prevent hi-jacking).

The most famous paper in which EIA have been described for the first time belongs to J.Akerlof.<sup>4</sup> The paper describes the market of used cars (“the market of lemons”<sup>5</sup>). In general, the following process takes place in such market. It is difficult to establish the quality of the cars being sold. Therefore most part of high quality cars are being sold at understated prices whereas low quality cars are being overcharged. Theoretically this results in the situation when high quality cars either completely disappear from the market or there will be very few of them (as compared with the normal “information-neutral” state). This kinds of markets are very common, especially in the developing countries. They are noted for dull economic activities, relatively low quality of the goods being sold. They report about the cases when “uncontrolled” effects of information asymmetry resulted in almost entire collapse of the market<sup>6</sup>. It should be noted that EIAs act not only in the commodity markets but in other markets as well: in labour-market they show themselves as follows: since each firm strives to recruit the most skilled and honest workers, the actual wages being offered by employers are above market wages (the reverse side of such overestimation is certain level of unemployment); in the credit market they show themselves as follows: the creditors understand that high bank rates can scare away mainly the conservative and honest borrowers rather than swindlers, that is why interest rates being offered by bankers are below balance rates (hence there is a certain deficit of borrowed funds)<sup>7</sup>. And EIA are most strong in the financial market.

Since any market transaction assumes *ex ante* exchange of information, the statement of its attributive imperfection seems to undermine the basis of balance paradigm. **Alternatively, we consid-**

<sup>1</sup> Stiglitz J.E. Information and the Change in the Paradigm in Economics, Les Prix Nobel 2001.

<sup>2</sup> Refer to: Mishkin F. The Economic Theory of Money, Banking and Financial Markets: Manual for Higher Educational Institutions/ Translated from English by D.V.Vinogradova, edited by M.E.Doroshenko. –M.: Aspect Press, 1999, pp 46-47.

<sup>3</sup> *ex ante* (Lat.) means that the effect appears before transaction, *ex post* – after transaction.

<sup>4</sup> G.A.Akerlof. The Market for “Lemons”: Qualitative Uncertainty and the Market mechanism/ Quarterly Journal of Economics. August 1970, p.488-500.

<sup>5</sup> ‘To swallow a lemon’ means to buy the inferior goods.

<sup>6</sup> This took place in the export market of Brazilian melons. The more detailed information of this follows.

<sup>7</sup> Refer to: Stiglitz J.E., Weiss A. Credit Ration in Markets with Imperfect Information. – American Economic Review.- Vo. 71/3. –p.393-410; Akerlof G.A., Yellen J.L. Efficiency Wages Model of the Labor Market. – New York: Cambridge University Press, 1986, and other.

er that information should be included in the model of market balance but not as exogenous factor (which is typical for points of view of G.Stigler and R.Kaose) but as endogenous factor. Moreover, this can be achieved on the basis of the concept of information efficiency of the market which reflects its institutional structure which determines the direction of market balance shift due to natural asymmetry of economic information.

## Information Consistency of the Market

Information (at least economic information) depends on the behaviour i.e. the actions (which are at the same time the signals) and purposes of economic agents. They in many respects are being determined by the institutions which assign possible schemes and stereotypes of implementation of the interests of entities. Hence, the state of the market depends not only on expenses and practicality of benefits and other economic factors which are the basis of any equilibrium (and non-equilibrium) models but on the institutional structure of the economy which determines the stereotypes of behaviour of the entities and the nature of their information/communication interaction.

The modern theory assumes that the effects of information asymmetry in the commodity market result in negative tendencies. The sellers of high quality goods either bear losses or leave the market. Hence, the government policy shall be aimed at ensuring (directly or indirectly) formation of an institutional structure which enables to overcome information asymmetry. According to the common point of view, action of the said effects in the labour and credit markets is being manifested in the fact that an actual level of wages and interest rates correspondingly is beyond and below of the equilibrium ones.

These conclusions can not be considered illogical, but nevertheless they fail to describe fully the results of the effects of information asymmetry in different markets .

The thing is that information asymmetry is being displayed in the actions of market participants in two ways. First of all, this means a deliberate price shift (interest rate or wages) from equilibrium level. Secondly, this means an understatement (or rationing) of supply (of high-quality cars in the commodity market, loan funds or work places in the credit market and labour market respectively). These phenomena have been fully described by the classical authors of information behavioural paradigm. However, the problem which of the following effects are stronger is still uninvestigated: deliberate price deviation from their equilibrium level (so as to neutralize the effects of adverse choice) or rationing of supply. We believe that depending on the level of information sufficiency of the market<sup>1</sup> there may be relatively more significant the trends connected with rationing (of credit, work places etc.) or stipulated by deviation of the efficient prices (interest rates, wages level) from the equilibrium ones.

**We determine the concept of information consistency (IC) of the market as such state when institutional organization hinders collecting rent from asymmetry of information since the losses from the actions aimed at derivation of this rent exceed the latter greatly.** This is being achieved both at the cost of direct actions of a counterpart (penalties, alienation of security etc.) as well as without them when the agent gains bad reputation, loses customers or the source of income. The indispensable condition of information efficiency of the market is not only comparability of the consequences of responses with the probable benefits obtained due to deliberate generation and/or use of information asymmetry, but also awareness of the agent of the possibility and reality of such actions. In the main, this is the most principal condition. Even

<sup>1</sup> This concept has been initially introduced in the paper by Yasinsky Yu., Tikhonov A. Information-behavioural paradigm: The End of Equilibrium Theory or its Second Breath?/ Economic Matters – 2007.- No.7, p.35-58.

if the response mechanisms do not function in reality, but the agents believe in the opposite, this is sufficient for them to act correspondingly. Although such situation is fairly dangerous. "Belief" should be confirmed from time to time, otherwise it can disappear, and if this takes place quickly enough, the crisis may take place.

High information consistency of the market is also being manifested in the fact that agents are well aware about the actual costs of all alternative possibilities, the behaviour of the sellers (goods, manpower or financial obligations) is directed to disclosure of information. There is institutionally protected system of valid signals in the market. This results in increase of the quantity of transactions in the market, coincidence of the maxima of private and public benefits. To the contrary, with the information inconsistency of the market, transactions are few, the functions of private and public return do not coincide. Under conditions of high information consistency of the market the most skilled and honest agents of market relations will enjoy the advantages. Therefore public benefits from the effects of information asymmetry exceed the expenses associated with them. Otherwise the expenses of the effects of information asymmetry are very significant for the society.

The institutional structure which provides for information consistency includes: 1) The system of objectivization and verification of information of the quality of products and the reputation of manufacturers (these are the standards, the regulations specifying the requirements to specific types of products, ratings, certificates of quality, such as ISO-9000); 2) protection and distinct personification of proprietary authorities (including industrial and intellectual property) and the system of ensuring of contract obligations execution; 3) The rules of financial reporting and information disclosure; 4) The State banks and non-governmental banks and data bases (including the National Credit History Agency, for example).

If the above-mentioned elements of infrastructure are not developed, the market is informationally inconsistent, and favorable conditions appear for receipt of a rent from information asymmetry. The effects of asymmetry are reflected in destructive trends.

## Types of Biased Markets

Each actual market transaction is characterized by the fact that the certain party bears the increased risk connected with information imperfection. This is rather contradictory to the traditional theory of contracts which distinguishes between the contract for employment (where the principal bears increased risk as compared with the agent) and the sales contract (where both parties bear equal risk). Therefore, we will distinguish between a quasi-principal (even if it is the case of relationships between the creditor and the borrower where the former is a pure principal) and a quasi-agent (analogue to the classical agent). The examples of such pairs are presented in Table 1.

*Table 1: Quasi- Principal and Quasi- Agent*

Type of Market	Quasi-principal	Quasi-agent
Commodity	Buyer	Seller
Loan	Lender	Borrower
Job	Employer	Employee

Under conditions of information inconsistency of the market the Seller of the Goods (manpower, an applicant for loan) voluntarily or not strives to use asymmetry of information in such a way as to receive a rent. The Buyer (employer or creditor) should naturally stand on the defensive by decreasing demand (by excessive caution in the course of hiring or by credit rationing). In any case

under conditions of information inconsistency the burden of effects of asymmetry is being borne by the Buyer and the society as a whole, since except for the rent which is being received by the Seller the volumes of consumption, crediting and employment are being decreased.

If the market is informationally inconsistent, a quasi-agent (QA) can not give the valid signal (which is the problem for honest and skilled QAs), and the quasi-principal (QP) is obliged to defend himself. Under conditions of information inconsistency QAs can send signals. This requires certain expenses. However, if the benefit from quality or reliability for QP exceeds the said expenses, QA is ready to pay them as the “efficient interest rate” which is lower than the market rate, or as the “efficient wages” which exceeds the equilibrium market wages (credit market and labour-market correspondingly), higher prices of the brand products (including bonus for quality).

Under conditions of informationally consistent market the Seller is obliged to overcome information uncertainty by sending signals. As M.Spence<sup>1</sup> has demonstrated, the major condition for the signal to be valid is that it is difficult to falsify. This means that the signal should be such that its simple imitation should be too expensive for imitator. It is unlikely that anyone can ensure a signal to be valid and hard to falsify<sup>2</sup>, and thus Buyer of the Goods (employer, creditor) pays a kind of bonus to the Seller who succeeds in this respect.

It should be noted that the state of informationally consistent markets is far more preferred not only over as compared with the informationally inconsistent markets but relative to the market assumed by the traditional theory of equilibrium of the market as a reference one with evident or implicit assumption on its informational neutrality. Thus we can distinguish between two alternative types of biased markets (or biased equilibria): the favorable which corresponds to informationally consistent market, and unfavorable which is characteristic of informationally inconsistent market.

## **Dynamics of Loan Market Depending on the Level of its Information Consistency**

If the loan market is informationally inconsistent, the scope of “credit rationing” is very important<sup>3</sup>. It is difficult for the creditors to estimate the actual solvency of the customers as well as to estimate reliability and efficiency of the projects being offered for financing. Therefore the curve of loan offers is shifted to the left (Figure 1b). The greater portion of bank assets is allocated to short-term speculative trading. At that if private commercial banks dominate in capacity of creditors, for which difference between profit and losses has not only accounting significance, the gap between potential and actual volume of credits widens with decrease of the level of information consistency of the market. The said gap influences the market interest rates by increasing them. Thus, in spite of the fact that efficient rates are lower than the market rates (which is presented with red line in the Figure), they are still higher as compared with the initial equilibrium level (point **a** in Figure 1), i.e. the rates associated with the classic market equilibrium ( $i^*$  is higher than  $i_e$ , Figure 1b). This is a kind of “divarication” of tendencies. Loan funds are being reduced in view of the fact that banks strive to lower the average credit risk, but as soon as the credit is in “deficit”, the rates are being overstated which thus increases the risk on the projects to be financed. Thus tendency of each individual bank to reduce risks on the projects being accepted for financing has the opposite effect for the economy and banking system as a whole. In the unorganized, shadow and half-legal markets

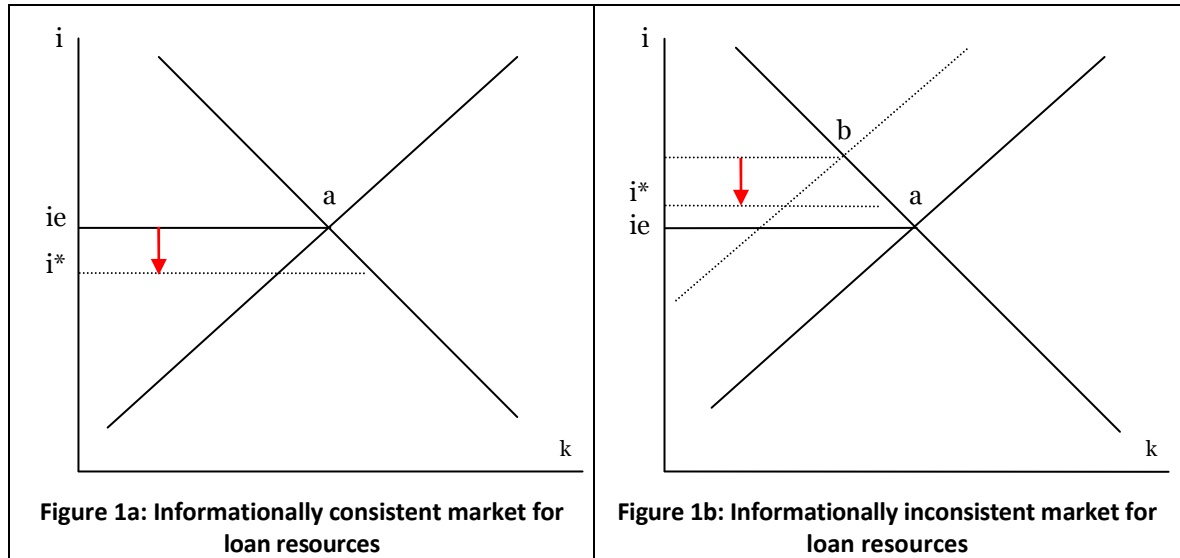
<sup>1</sup> E.g. see: Spence M. Market Signaling Information Transfer in Hiring and Related Processes. Cambridge, Harvard University Press, 1974.

<sup>2</sup> Among such signals are, for example, a fairly long-term guarantee period for durable goods, granting of liquid security on credits, higher education diploma during employment etc.

<sup>3</sup> Credit rationing also takes place in the informationally consistent financial market. In this case, however, it is weaker and is then natural consequence of underestimation of efficient rates as compared with their market level (Figure 1a).

efficient rates are much higher than equilibrium rates since they are obviously characterized by high risk, the necessity of payment of specific services.

However, it is possible that in this case the informal system of guaranteeing of credits will be created (rather rigid and in its way “efficient”). But such system will make the public mechanism nontransparent, and the information field will be “sticky” and nontransparent. Information problems will not be solved but will be rather hidden. In view of increased risk of transactions in shadow market the value of the loan funds can be increased many times but not by several percentage points<sup>1</sup>.



Under conditions of information consistency action of the effects of information asymmetry will lead to absolutely different results. In this case interest rates will be established at the level below the market level, the negative aspect of which is their certain deficit (see Figure 1a). But the latter is not persistent however since the borrower has an opportunity to signal of high quality of his project (if any). The same deficit enables the lender to carry out selection (otherwise the borrower reluctant to pass through the process of selection could appeal to other bank and receive credit). Thus the market promotes the economy and innovations. Speculative trading bears subordinate character and contributes to stability of the market at the cost of arbitrage and wide opportunities for risk hedging. The existing moderate deficit of credit resources is the factor which enables the lenders to carry out more thorough examination of the projects, and actually performs a constructive function. As a result honest borrowers generally receive credits at the rates lower than equilibrium rates.

## Attainment of Information Consistency of the Market

It is impossible to provide for high information consistency of the financial market ignoring the economy at large. The appropriate measures should cover all branches and sectors. The basic components of the institutional infrastructure which ensures information efficiency of the economy are as follows:

<sup>1</sup> In Chamber, one of the most prosperous trade areas of Pakistan, the borrowers without “credit histories” and liquid securities are forced to borrow from moneylenders. Interest rates on such loans amount in average to about 80 per cent per annum (and vary between 18 and 200 per cent per annum), and commercial banks lend money at interest rate of 12% per annum on the average. What is most surprising, however, is that if one excludes from the interest yields of moneylenders their expenses on collection of information about borrowers, “monitoring” and “supervision over purpose-oriented use” of the granted resources their interest rate will be **approximately equal to the bank rates**. This means that the lender should use more than 80% of his yields for solution of the information problems. This is in this case the price of information inconsistency of the market (See: Knowledge for Development. World Development Report. 1998/1999. — M.: Publishing House «Ves Mir», World Bank. — p. 99).

1. **Institutions which provide for actual possibility of objectivation of information of the quality of the goods and services of consumer and industrial markets.** The thing is that information on the quality of the products and services can not be always reduced to a set of well-defined invariant data. In some cases in order to ensure validity of information of the value and the market prices of the Goods, it is sufficient that free and liquid market operate. But often this condition turn to be insufficient. There is need of standards, specifications, systems of certification of the products and quality, rating estimation etc. It is necessary to emphasize in this connection that it is better to have non-high rating of the reputable agency than to have no rating. Moreover, efforts should be taken for introducing the international standards of financial accounting not only in the bank sphere but in the economy as a whole.

2. **Protection of Intellectual and Industrial Property.** The Government should create an institutional and legal environment, including protection of trade marks and brands which could contribute to establishment of the standards by the market participants themselves. Manufacturers of many products which quality can not be fully estimated at the time of purchase (from the new brands of soft drinks to cars or computer programs) can use brands for creation of reputation of high quality. This will allow them to collect an extra charge for quality thus creating interest in selling of exactly high-quality goods and wide opportunities for dynamic development.

3. The most important elements of the institutional structure of information consistency is **the system of protection and distinct identification of proprietary warrants as well as control over proper execution of contractual obligations.** From the point of view of modern economic theory property rights are the most important institutes which enable to overcome information uncertainty arising in the course of interaction between economic entities. For ensuring high level of execution of contractual obligation a well-developed system of legislation and economic courts is required.

4. Achievement of information consistency presumes **a high level of competitiveness and metacompetitiveness of the market.** The former concept is well-known in the economic theory. As for the latter concept, we define it as the state of the market when nobody is protected against liquidation (even in case of monopolistic market).

The monopolist may be situated in the sphere of metacompetitiveness unless he is protected against bankruptcy. On the other hand, there can be entities on the competitive market who are not afraid of their future, who enjoy the governmental support and are well aware of the fact that their losses will be written down in any case. If they are few, there is nothing to be afraid of, otherwise no penalties for receipt of rent from information asymmetry will be efficient, and the market will be practically doomed to information inconsistency.

5. The following component of institutional infrastructure of informationally consistent economy is the **network of the state and non-governmental databases of technical and commercial information as well as the centres of generation and distribution of information.**

The problem consists in the fact that for formation of the databases of commercial information of the borrowers, clients of insurance companies etc. It is necessary to provide for efficient functioning of the institute of protection of trade secret and private information. The scandal connected with leakage of information from the bank of credit histories which took place in Russia in 2007 suits only for the persons who are not concerned in creation of credit bureaus.

In conclusion we shall note that the problem of achieving of high information consistency is rather urgent not only for Belarus and many countries of the former USSR and Eastern Europe. The crisis in Argentine which took place in 2002 is the most prominent evidence of this.