

# The Mechanism of Creating Financial Innovations in the Context of the Presence of the Phenomena of Information Asymmetry and Lack of Market Participants' Knowledge

Adam Oleksiuk<sup>1</sup>

<sup>1</sup> University of Warmia and Mazury,  
Olsztyn, Poland

## Abstract

The aim of this text is to identify the mechanism behind the creation of financial innovations in the context of occurrence of asymmetry of information and lack of knowledge of market participants. The first part presents the definitions of financial innovations and discusses the systematic of their sources of appearance. Then I go on to discuss the importance of information in economy, including the negative consequences of asymmetry of information for market participants. The article features a thesis saying, that the market of financial innovations introduces a set information order in the economic system on one side, and on the other the phenomenon of information asymmetry as the permanent characteristic of modern investment environment within the market of financial innovations.

**Keywords:** *financial innovations, information asymmetry, transaction costs, agency costs, Gordon's model, CAPM model, Ross model.*

## 1. Introduction

The author of this paper understands the information asymmetry in the context of financial innovations as a situation in which one group (or groups) of interest holds better information about financial innovations than other groups. Most often in focus is the asymmetry of information between the owners/managers and the investors, frequently referring to those groups as the insiders and outsiders, respectively. The investors in such approach, are understood broadly, i.e. as group that includes both creditors and owners (current and potential). The reason for information asymmetry is obvious in this case: owners/managers have full knowledge about the past of the company and also much broader knowledge of its future. This advantage is more distinctive, as it is the management board that, to large extent, creates that future. Investors on the other hand are largely dependent on the information from the management. It is also evident that the asymmetry of information is not limited to the case of management boards and investors. Thorough analysis

of relations that constitute the so called corporate governance results in observation saying, that information asymmetry also exists between the owners and creditors, and within those very groups, e.g. between minority and majority shareholders. The existence of information asymmetry has far reaching consequences both on macro and micro scale. The problem of information asymmetry on macro scale is connected with the question of market efficiency. The capital market can be said to be efficient if all available information about financial innovation is instantly reflected in its prices – both among creditors and lenders of capital. These assumption means that the asymmetry of information will not occur both in case of relations between the board and investors nor in case of different groups of interest. As the strong market efficiency is rare in practice, we may assume that the information asymmetry influences the efficiency of resource allocation. On micro scale we may say about the marked effect of information asymmetry on the decisions made in the company. This is particularly manifested in case of company's financial decisions regarding the investments in financial innovations, that is the decisions that shape the structure of capital.

## 2. Financial innovations – definition approach

The background for interpreting financial innovations is usually the trend analysis of the contemporary financial markets, that emerged in the mid 1970s, with their exacerbation after 1982. Most of the definitions include the narrow approach to innovations, exposing their product character [1]. But this is only the result of the fact, that the derivatives are deemed the best innovations. The mode for defining financial innovations shows large differences in interpretations [4, pp. 1076-1107]. The author of this paper adopts the premise, that a financial innovation is a combination of a larger number of instruments (including traditional ones) that allows the exploit the benefits of comparative nature. Thus for the purpose of this paper it is adopted that a financial innovation is an instrument that

is designed to protect against the changeability of the basic parameters of financial market – such as interest or exchange rates – in form or standardized (e.g. forwards) or non-standardized (e.g. OTC<sup>1</sup> options) securitizing contracts.

Long term transformations of the market of financial innovations occur basically in two phases: broadening and deepening.

The “broadening” development, typical for the initial stadia of market development concerns the gradual increase of the volume of the market of financial innovations, with still scarce differentiation of product offer and relatively slow turnover – the changes thus have a quantitative character.

The “deepening” development has all the signs of qualitative change of the financial innovations market, which is manifested in creation of its new segments. New financial innovation instruments are offered, colloquially called the re-modeled and derivative products, the subsets of new market transactions are “opened” [9]. Derivatives, because that is what we talk about, now become independent financial instruments that are separated from their underlying products and markets. Their inventors use a simple recipe, in that they assume that elements of the underlying instrument, e.g. normal bond (interest rate, term, currency) are not constant and pursuant to the method of brick building they can be recombined anew, with ever new combinations formed. But the vehicle for innovation are not the new construction features of the product, but rather its new functions. The innovation shall thus be defined rather in the terms of demand and not supply, that is as the change of value and satisfaction of customer’s needs [7, pp.717-737]. In this context only the creation of derivatives marked the qualitative change, as through new uses (functions) the financial strategies of marketing entities, and most of all enterprises and banks, were changed.

The systematic of sources of appearance of financial innovations is not easy, due to the “crossing” of single causes and the presence of numerous feedbacks in the whole mechanism. The starting point for the early transitions of the financial markets were some macroeconomic trends that started in the mid 1970s – globalization of economy, instability of interest and exchange rates, persisting inflation or the international debt crisis. Under the pressure of internationalization of financial transactions and in conditions of growing competition between the world’s financial hubs many

national financial systems adopted deregulation processes. What was required from the majority of market participants was their greater flexibility, both in the aspect of greater protection from the changeability of the basic market parameters, and also quicker reaction to the appearing trends. The measure and the symbol of the process of deep structural changes of the financial markets were the lasting tendencies:

- a) for securitization, as the process of change of character of some assets of managing entities and giving them the form of tradable financial instruments (securities),
- b) the increased role of investment banks connected with the aforesaid,
- c) common growth of the mutually “overgrown” money, capital and currency markets,
- d) the limitation of the role of commercial bank as the classic intermediary between the capital providers and lenders; the companies started to satisfy their demand for capital through emission of securities to a larger extent.

The strategic location of the universal banks, subjected to increased pressure of achieving profits did change significantly. The banks replied, among others, with broadened scope of services through introduction of financial innovations and perfection of financial technology, supported by modern telecommunication and data processing solutions. The Anglo-Saxon origin of derivatives indicates the fact that in vast majority they were formed on stock exchanges and not by banks. The financial innovations were most frequently the ideas of brokers. The securities market is a favorable environment for forming of innovations, but only their part can be directly connected with the stock exchange. The non-stock circulation of securities (OTC; Over-the-counter) systematically increases its significance in the USA, not only when it comes to winning the conventionally understood financial market, but also due to its responsiveness to innovations. OTC, as the “free” market is, in its assumptions, envisaged for trading shares that do not fulfill the criteria for stock exchange trading, attracting the investors with its elasticity of procedures. It allows the direct trade between brokers and investors through a network of computer and telephonic devices. The speed of today’s communication and the possibility of price negotiations make many of the traders see no sense in contacts with traditional stock exchange. The above is well illustrated by forward financial transactions, with their origins in commodities exchanges. The fluctuation of market prices of raw materials, e.g. agricultural have made the manufacturers and recipients secure against future detrimental changes of prices (fall in the case of the first ones, increase in case of the latter),

---

<sup>1</sup> Over-the-counter (OTC) trading is to trade financial instruments such as stocks, bonds, commodities or derivatives directly between two parties. It is contrasted with exchange trading, which occurs via corporate-owned facilities constructed for the purpose of trading (i.e., exchanges), such as futures exchanges or stock exchanges.

exactly through future transaction [1]. The central economic function of derivatives lies in that they enable the businesses flexible risk management – beneficial when it comes both to cost and the high flexibility. Creation of protective procedures for price changes (*hedging*) was the first motive for participation in forward transactions in commodities markets and the aim behind their transfer to the currency and stock exchange markets was also identical. At the same time for some of the participants of the futures market the main motivation is speculation (*trading*). Thus if one of the parts to transaction protects its financial position – “locks” the profit in fear of falling stock prices, the other part anticipates their increase. In this light we may form the thesis that the process of creation of new financial instruments had two main driving forces, connected with the will to achieve two aims: the more effective spreading of risk between the parties to the financial contracts and even broader application of financial leverage, that is the control over the widest possible cash flow with relatively low level of involvement of own capital.

As American specialists say the current markets currently feature over 1200 different types of derivatives, that allow banks, companies and investors to control risk, and the benefits stemming from them largely surpass the risks. The economic practice proved, that entrepreneurship requires inclination towards risk. The market of financial innovations, through innovations of products and operations, becomes ever growing support of business activities – not only protecting from excessive risk, but also increasing the financial “maneuverability” of the company [5, pp. 1875-1891].

### 3. Financial innovations and research concerning the asymmetry of innovation

It is well worth to select a distinctive thread in the analysis of mechanism for creation of financial innovation. There is a phenomena, that could be described as a circulatory movement “regulation-market innovation” [3]. The “staggering play” observed by some economics, that involves regulation – innovation – new regulation may form the basis for the search of other factors that determine the market of derivatives. We may assume, that the birth of some innovations at least can be explained as “circumvention” of the regulations that are detrimental for companies and banks. The regulatory bodies may justify their movements with information complexity of the modern environment of activity of financial institutions and the limited ability to efficiently control their actions in such conditions. The amount of information contained in prices, as well as the speed and intensity of its processing

are still growing. And the derivatives may play a beneficial role in making the financial markets more “transparent” [3]. Through their support of arbitration strategies and influence on the distribution of prices in the forward markets the derivatives can connect the “fragmented” partial markets. Generally speaking- modern markets ever more frequently become the stage for game of information access.

In order to stress the significance of the phenomena of information asymmetry in the functioning of the market of financial innovations we should indicate, that this market is close to the market of perfect competition. Let us remind you, what criteria does the market of perfect competition fulfill:

- a) there are numerous parties both on supply and demand side of the market,
- b) neither of the participants may influence the price of the good that is subject to trade,
- c) there is no information asymmetry in the market,
- d) the product on offer is homogenous, there are no entry/leaving criteria for the market.

The c) condition is not met in case of the market of financial innovations. How important a problem it creates may be proven by the number of Nobel Prizes awarded to economists who work in this field. In 1972 Kenneth Joseph Arrow was awarded, i.e. for demonstrating that there are general tendencies for non-optimal allocation of resources between the real capital investments and research and development. In 1982 the award of George Stigler for describing the economy of information, that explains the creation of rigid prices and “forms the reference point for researchers of sources of unemployment and inflation”. In 1996 James Alexander Mirrlees and William Spencer Vickrey for the presentation of influence of incomplete information on the socially ineffective distribution of resources, caused by strategic use of information asymmetry by one of the parties to the transaction. Then in 2001 George Akerlof, together with Michael Spence and Joseph Stiglitz for expanding the former theory: the market may even not be created at all, as the information asymmetry can completely prevent the occurrence of mutually beneficial transactions. There is still the possibility of spontaneous mechanisms solving this problem, but they are too costly, which in turn confirms, that the market allocation of resources is in some way inefficient. The theory of information asymmetry destroys the neoliberal Utopia of perfect markets and free competition. It shatters the dream saying that without interference of the state we would face the equilibrium of demand and supply, full employment and full use of the production potential. This pipe dream landscape may only be supported if you believe – slightly simplifying – that the economy is an auction house, where all players hold full

information, that the information is free or almost free of charge and the advertisement informs and not creates needs, bemuses and compels. It is not by accident that the formulation of the theory of information asymmetry coincided with the creation of the transaction cost theory. Both theories bring the liberal Utopia back to the ground, showing that free market economy is in fact preoccupied with irrelevant matters.

Modern economical sciences are full of instrumentalist snobbery. Important observations are necessarily dressed in mathematized models to such a degree, that Thomas Mayer starts to wonder if economics has not become part of mathematics. As early as in 1960s many professors of economics wondered if they should not cease to read the most influential economic magazines of the world, as they can't understand half of what they publish. The first texts on information asymmetry were barely noticed, due to the hermetic language they utilized.

Joseph Stiglitz shows information asymmetry on the example of seller and buyer of a car – the seller knows the car better than the buyer. Thus we can't speak about normal free competition, just because there is an immense gap in the amount of information held by seller and buyer. The buyer is usually compelled to trust the seller, with only rare possibility of checking or confirming the information of the seller.

The "life itself" stressed the current importance of information in economy and business activity. It can be fully appreciated on the example of "creative accountancy" of Enron, Andersen and others. With the reservation, that asymmetry is a very inadequate term for manufacturing false information on a huge scale. The problem is not that the small shareholders and employers were devoid of information. The bull years of American economy of the second part of 1990s were based on accumulation of false information, which was manifested through the economic crisis of the early 2000s, which was inevitable in the light of the above findings.

In 2007 Leonid Hurwicz, Eric Stark Maskin and Roger Bruce Myerson were awarded for their input in designing institutions that were to prevent the direct failure of transaction or "possible side effects affecting others and the natural environment" wider known as the "mechanism design" theory. According to the Committee the transaction cost theory – for which Ronald Coese was awarded in 1991 – also confirms that administrative management of resources, in some conditions, is more efficient than the allocation based on the mechanism of market prices. The 2010 Nobel Prize, awarded to Peter Diamond, Dale Mortensen and Christopher Pissardies distinguishes the paradigm concentrating on "markets with frictions" that is the markets where maladjustment prevents the occurrence of mutually beneficial transactions.

In the above works the parties to the transactions not only compete for possessing larger volumes of information, but also stress the its quality and cost of acquisition. Whereas the world of the 21<sup>st</sup> century economy is characterized by its unequal distribution between the parties of market contracts. Let us assume, abstractly, that in result of some operation the roles of the parties were switched; the party representing the demand suddenly holds the information of the supplying party, and vice versa. In conditions of information symmetry such a transformation would bear no consequences nor economic effects, and thus neutral to the financial situation of the parties to the exchange. As there is no possibility of discounting the information advantage no one can improve its contractual position – this remains unchanged [13, pp. 130-148].

The hypothesis of the efficient financial market, rooted in the theory of economics, is unanimously imbedded in the context of information efficiency. Eugene Fama [14], creator of this hypothesis, names the conditions of efficiency of economic marked, assuming<sup>1</sup>:

- a) lack of transaction cost,
- b) free access to information for all interested parties,
- c) homogenous character of investor expectations regarding the implication of information on current and future prices of derivatives.

In such a case the balance prices of products will be close to their values, close to economic equilibrium. The market of financial innovation is thus efficient in such a context, if the prices of derivatives are immediately adjusted to the information reaching investors. But the assumption of obstacle-free and fully efficient capital marked, with perfectly informed "actors" is an Utopia [13, pp. 130-148]. It is not just the result of market mechanism failure. The information asymmetry is also the result of economic game for information advantage, result of confrontation of exchange participants with different economic interests. We thus come to a surprising conclusion, that the unequal holding of information by "actors" is one of the more important rationales for transactions. Obviously each of the parties subjectively judges its own advantage in conditions of unequal distribution of information, that is to concretize in the increase of profits – and this stimulates the market. The basic catalyst for the process of creation of community (e.g. of exchange investors) is the situation of lack of equilibrium. This creates competition and the striving of many participants aiming at its change. This in turn is connected with the constant process of informing and analysis of information.

---

<sup>1</sup> In the 1970s Eugene Fama defined an efficient financial market as "one in which prices always fully reflect available information" [14].



#### 4. Consequences of asymmetry in the context of financial innovations

Information asymmetry makes the decisions of companies on the market of financial innovations more difficult and their consequences less straightforward. The losses resulting from information asymmetry affect both the company, and – or even most of all the investors (creditors and owners). The direct consequences of information asymmetry include deviations from the optimal financial innovation investment plans. The indirect consequences of information asymmetry are connected with attempts of counteracting the direct consequences, both by management boards of companies, and the investors.

If the asymmetry is manifested in that the investors, due to holding less than full information, underestimate the market value of the capital of their businesses, it may significantly influence the decision making processes regarding investments in financial innovations. Underestimating the value of own capital increases the price of capital, and thus the risk of loss from investment with use of financial innovations. We may use the Gordon's model to illustrate the causes behind the increase of cost of own capital [11, p. 188]:

$$k = \frac{D}{P_0}$$

where:

k – cost of own capital,

D – constant dividend,

$P_0$  – market price of shares.

In conditions of information asymmetry we may end with situations in which the  $P_0$  price will be lower than that, which would be present if investors had the full information. It is thus evident, that it will increase the cost of own capital. In case of CAPM model the way the information asymmetry influences the cost of own capital was presented by Merton [8, pp. 483-510]. In his approach the cost of incomplete information appears in the CAPM model:

$$r = r_i + \beta_i (r_m - r_f - \lambda) + \lambda,$$

where:

$r_i$  – expected return from investment in the shares of  $i$ ,

$r_f$  – return from risk-free investment,

$r_m$  – return from market portfolio,

$\beta_i$  – coefficient described by the following

$$\text{equation } \beta_i = \frac{COV_{im}}{\sigma_m^2},$$

$\lambda$  – cost of incomplete information.

Thus a situation may be formed in which the undervaluing of own capital will be significant enough for the cost of capital to exceed the return from the planned investment to be made with use of financial innovation. In such a case it would be advisable to abort the investment, as it would form a transfer of value from “old” to “new” shareholders.

The problem of overinvestment is usually the result of conflict of interest between managers and owners [6, pp. 305-339]. The profit of the owner is identified with the value of the company. The basic aim of the management process should thus be to maximize the market value of the company, which may be accomplished through investments with positive NPV. It also seems that using criteria other than the net present value for evaluation of investment plans, including those based on innovative instruments, is a common practice among managers. Frequently the completion of investment results not just in an increase or decrease of value of company, but is also connected with additional benefits for the manager. These may be the very tangible signs of prestige (e.g. office buildings or cars) or the intangible benefits connected with managing a more differentiated company. The increased prestige of the manager may translate onto how he or she is perceived outside the company, which in turn influences their job market position. The problem with investment decision making in conditions of presence of agency costs may be illustrated as follows [2, p. 11]: The manager of the company may complete one of the two projects – X or Y. We will mark the value of project X as  $V_x$  and of Y as  $V_y$ . The value of project is understood as the sum of discounted cash flows that will be left at the disposal of all owners – marked as  $S_x$  and  $S_y$ , respectively. The completion of the projects is connected with possibilities of particular benefits of the manager (this may include expenses that the manager uses to reach goals that are not concurrent with the interest of the owners) – marked  $B_x$  and  $B_y$ , respectively. Let us assume that  $B_x > B_y$ . Theoretically we may assume, that if the manager holds no shares in the company managed, he or she will choose the project solely on the basis of the B value, that is the project X in this case. But if the manager is the holder of the  $\alpha$  number of shares, the X project will be completed if the following inequality is true:

$$\alpha (V_x - B_x) + B_x > \alpha (V_y - B_y) + B_y.$$

The above formula suggests that the project of lower value for owners may be completed. This depends not only from the differences between  $V_x$  and  $V_y$ ,  $B_x$  and  $B_y$  and also from  $\alpha$  that is the manager's share in the company's own capital. The X project, although of

lesser value than the Y project, will be completed if following formula is true:

$$V_{x-y} = \left(\frac{1-\alpha}{\alpha}\right) \Delta B$$

where:  $AB = Bx - By > 0$ . If we assume, that  $B$  is a function of the scale of company, the managers will have the inclination towards completion of enterprises that make the company and not the market value grow. According to Murphy's research [8], in conditions of US economy the correlation between the size of company measured by the level of its sales, and the remuneration of its highest rank management is stronger than the correlation between remuneration and efficiency of action.

The problem of information asymmetry may be reduced, if we apply some mechanism for conveying information between the management and the outside investors. This mechanism is described as signal. Functions of signals that convey financial information may be played by: dividends, buyout of own shares, sales of assets, debt to time structure. The choice of set structure of financing may also be a signal.

In order to play its role the signal must be costly for the company. Furthermore it has to be credible, that is the company in bad condition may not "mimic" a good company. If we judge the change of structure of the capital as a signal, the increase of debt should be treated as passing on the information that the company is in sound condition. The change of structure of capital through increase of debt is costly for the company, as it increases the costs of bankruptcy. We may also assume that it is hard, in stable capital market conditions, for a company in bad shape to "play" a good company, as the increase of debt is connected with the need to pass the verification procedures and increased control. Furthermore, if managers decide to make debts it means, that they are convinced that they are able to pay the obligations in the future, thus they believe in future development of the company. Obviously not every case of increase of debt may be perceived as a positive signal. If this debt is a result of uncontrolled increase of payables for the suppliers or state budget, or is a result of capitalization of unpaid interest, the interpretation of the growing liabilities is opposite – that is it will be perceived as a negative signal.

The formal model taking the information asymmetry and the role of debt into account was created by Ross [12, pp. 675-692]. This model makes the x rate of owner return on the investment dependent on t type (the type of company in this case is the indicator of its quality and not the type of business) – and x thus belongs to the range of [0, t]. The manager of course knows the type of managed company, choosing the structure

of capital with D as the value of debt. The structure is to be chosen in such a way, as to maximize the market value of the company, taking the L (bankruptcy cost of debt) into account. We will then mark the market value of the company with the D level of debt as  $V_0(D)$ . The function of management goal thus reads:

$$(1 - w) V_0(D) + w (t/2 - LD/t),$$

where w is weight function that is a number from the range of [0,1].

The probability of bankruptcy is D/t. If the investors conclude that t is some function of the debt  $\alpha(D)$ , then  $t - \alpha(D)$  and thus:

$$V_0(D) = \alpha(D)/2$$

After substitution of function of goal, calculation of the D derivative and taking the fact that D(t) is the optimal debt level of the t type companies into account, we end up with the following formula:

$$D(t) = ct^2 / L + b$$

where c and b are constants.

Signaling seems to be a quite effective way for reducing the information asymmetry. It is still worth observing, that it is frequently expensive. Furthermore the risk of conveying the so called false signal can't be completely eliminated.

## 5. Conclusions

The analysis of the information asymmetry problem shows, that its negative consequences affect all market participants. In some cases the use of information asymmetry for increasing profits of one group, at the expense of others, may be observed. Summarizing we must ascertain, that the market of financial innovations introduces some form of information order to the economic system (functioning of forward markets may form the basis for forecasts of e.g. interest or exchange rates). On the other hand the phenomena of information asymmetry is the permanent characteristic of the modern investment environment of the financial innovation market. In conclusion I would like to point the attention to the fact, that even symmetric information does not guarantee the protection from financial and psychical costs of lack of knowledge, that in particular the inexperienced investors face. That is why it is advisable to initiate actions that will determine the creation of the need of broadening the scope of knowledge of investors, so that the level of their skills of judging the market situation, quality of instruments, risk and verification of the information from different sources

would allow for automatic, endogenic “reinforcement” of stability of the financial innovations market.

## References

- [1] Ph. Aghion, and P. Howitt, *The Economics of Growth*. Cambridge, MA: MIT Press, 2009.
- [2] L. Bebchuk, R. Kraakman, and G. Trintis, *Stock pyramids, cross-ownership, and dual class equity: the creation and agency costs of separating control from cash flow rights*, NBER Working Paper Series, 1999.
- [3] Th. Beck, T. Chen, Ch. Lin, and F. Song, "Financial Innovation: The Bright and the Dark Sides." Tilburg University, 2012 mimeo.
- [4] J. Greenwood, and B. Jovanovic, "Financial Development, Growth, and the Distribution of Income." *Journal of Political Economy* 98, 1990.
- [5] J. Greenwood, J. Sanchez, and Ch. Wang, "Financial Development: The Role of Information Costs." *American Economic Review* 100, 2010.
- [6] M. C. Jensen, and W. H. Meckling, *The theory of the firm: managerial behavior agency costs and ownership structure*, „*Journal of Financial Economics*” 1976.
- [7] R. King, and R. Levine, "Finance and Growth: Schumpeter Might be Right." *Quarterly Journal of Economics* 103, 2013.
- [8] R. C. Merton, *A simple model of capital market equilibrium with incomplete information*, „*Journal of Finance*” 1987, 42.
- [9] F. Modigliani, and M. Miller, *The cost of capital, corporation finance and the theory of investment*, „*American Economic Review*” 48, 1958, 3.
- [10] K. J. Murphy, *Corporate performance and managerial remuneration: an empirical analysis*, „*Journal of Accounting and Economics*” 1985.
- [11] S. C. Myers, and M. Majluf, *Corporate financing and investment decisions when firms have information that investors do not have*, „*Journal of Financial Economics*” 1984, 13.
- [12] S. A. Ross, *The determination of financial structure: the incentive signaling approach*, „*Bell Journal of Economics*” 1977, 8.
- [13] A. Thakor, "Incentives to Innovate and Finance Crises." *Journal of Financial Economics* 103(1), 2012.
- [14] L. Vaughan – Williams (eds.), *Information efficiency in financial and betting markets*, Cambridge University Press 2005.