

Risk-Engineering, As an Element of Financial Engineering in the Market of Innovative Financial Products

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Abstract: Article is devoted to reveal the main ideas and the field of application of risk-engineering, as process of designing of the innovative financial products. Risk-engineering are created for reduction of a various sort of risks, by means of financial engineering.

Key words: Risk engineering • Innovation • Innovative risk • Financial engineering

INTRODUCTION

The traditional approach to reduce various types of risks in theory and practice is to gain a penalty, guarantee, bank guarantee, mortgage, bills of exchange and other means to ensure, under the existing legislation (Figure 1, section 1). All the ways to ensure commitments are additional to the main obligation that they provide and are more related to basic civil legal relations between the different actors.

Matrix Directions of the Innovative Features of Risk Engineering: However, most of them are absolutely not applicable to innovative financial products, by their nature. Since the nature of a last underlies financial engineering, then the methods and ways to reduce the risks involved in the market of innovative financial products need to look at themselves instruments of financial engineering (Figure 1, section 2). If the existing instruments do not meet the requirements set by the new task to reduce the risk, you need to create a new product based on the new conditions and the available tools (Figure 1, section 3), or solve the problem by getting a fundamentally new financial product, as a result of achieve through financial engineering instruments synergistic innovation effect (Fig. 1, segment 4). The process of designing innovative financial products created to reduce the various risks through financial engineering instruments and call risk-engineering [1].

Thus, in its most general definition, a risk-engineering refers to a set of methods of financial engineering aimed at eliminating or optimizing financial

risks. Or, using the definition of financial engineering, cited in the book "Financial Engineering: A Complete Guide to Financial Innovation" - Risk engineering, in our opinion, is a package of measures including the design, development and implementation of innovative financial products and processes, as well as creative research new approaches to solving problems associated with the reduction or elimination of risks arising from financial market subjects [3].

In order to characterize the scope of this category to consider in detail the kinds of possible risks inherent in financial markets and in the terminology of financial engineering to provide approaches to solving the problem.

In general, any risk is the probability of occurrence of adverse events or adverse to the subject. Financial risk is the possibility of loss of liquidity and (or) financial loss (losses) related to internal and external factors affecting the activity of the subject.

Types of Risks Arising in the Financial Markets: In various sources, the following types of risks arising in the financial markets: credit risk, interest rate risk, liquidity risk, market risk, operational risk, other types of special risks.

Credit risk - the risk of non-payment by the borrower (issuer) of principal and interest owed to the lender (investor) to set the terms of the loan agreement (or the terms of issue of the securities) term. Credit risks are associated not only with credit, decorated in the form of a treaty, but also to loans through the issuance of securities. Credit risks come from debt securities

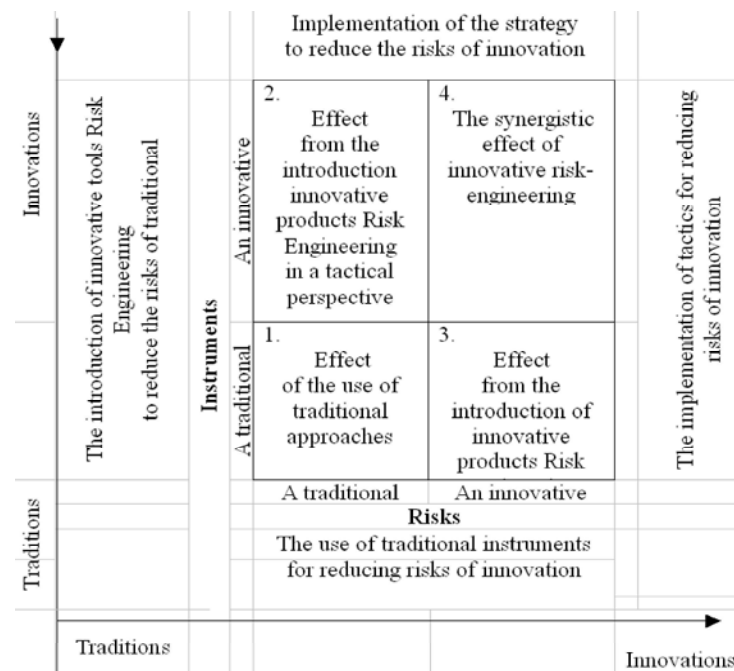


Fig. 1: Matrix directions of the innovative features of risk-engineering

(bonds, deposits and savings certificates, bills, government bonds, etc.), in addition, for preferred shares in the fixed part of the issuer's obligations to pay dividends [6]. The structure of credit risk also includes the risk of loss arising from counterparty failure on credit derivatives, swaps, options and in the period of settlement of securities settlement.

Credit risk investment activities by a number of factors:

- The characteristics of the borrower - the financial position (solvency, liquidity), integrity and the use of funds raised on the basis of the loan, the type of borrower in the form of property, credit history and expectations of future financial performance - in other words, the totality of the factors associated with the term "credit "borrower";
- The characteristic of secondary sources of repayment of the loan - the presence and types of guarantees on liabilities, reliable guarantors;
- Non-profit factors, that is the investment attractiveness of the region (political, macroeconomic stability).

Classically, the financial market credit risk is measured by rating assigned to the borrower known, reputable rating agency. The most well-known

international rating agencies are Standart & Poor's, Moody's, Canadian Bond Rating Service, Japan Credit Rating Agency, Duff and Phelps. As a rule, credit ratings are used by ordinary investors, not active in the field of financial engineering in the financial market.

In this regard, it should be noted the existing positive example of one of the most effective innovations of financial engineering in the financial market in the area of credit risk mitigation - the emergence of credit derivatives.

Credit derivatives is a logical continuation of the development of fictitious capital markets and securitization trends and represent an agreement under which one party to the transaction (the insured risk, the buyer, the initiator) shifts the credit risk associated with certain assets to one or more other parties to the transaction (seller). Credit derivative is a way of securitization of bank assets, the transfer of the portfolio risk and the associated secondary income investors. This creates a certain debt obligations of the borrower with non-standard features, such as non-standard maturities.

This innovative financial product allows to diversify the portfolio of bank loans, excluding the actual diversification of assets. Another motivation for the use of credit derivative - Support for links with traditional major borrowers when there is super-concentration of risk on one borrower, which is prohibited by the banking legislation. The way out of this situation is to buy a bank credit derivative.

For credit derivatives include swaps contract total income (total return swap), which involves the transfer of the buyer of all income from the credit of the asset seller and the latter, in turn, pays the buyer a fixed income. In this case, the seller actually accepts not only credit, but also other types of risks, such as market. Thus, this type of swap is not «pure» credit derivatives, though it touches, including the transfer of credit risk.

Variations on the total income of the swap are synthetic derivatives. The main difference is that the underlying asset of the derivative goes to the bank balance to the balance of the trust or a specially organized entity - SPV (special purpose vehicle). Such a derivative is created specifically for customers interested in purchasing non-standard or not in free circulation of the loan, or interested in the «leverage». The transfer of assets to the other balances reduces the regulatory requirements for the bank releases the available cash resources and, in addition, the bank receives fee income for the structuring and maintenance of such loans.

Credit derivatives are considered relatively new financial instruments, at the same time the volume of their use of banking institutions have a positive growth trend. For example, in 1995 the nominal value of off-exchange derivatives was around 41 trillion dollars at the end of 2000 - about 94 trillion dollars, in 2003 - about 197 trillion dollars and in 2005 reached 284.8 trillion dollars. Credit derivatives market is developed mainly by off-exchange derivatives and one of the dominant factors of this development in the creation of infrastructure off-exchange credit derivatives market was the use of telecommunication links and Internet trading.

Market risk - the risk of loss due to changes in the market value of the trading portfolio of securities or other assets. In this case, it is clear that the market risk on the «long» positions comes in the case of reduction in asset prices, to "short" - in the case of their increase. For market risk and partly has to do with the currency risk, that is, the probability of loss of assets or an increase in the company's debt due to adverse movements in foreign exchange rates. Foreign exchange risk arises when a company borrows in one currency, but receives income from their use in the other. As a result of unfavorable fluctuations in foreign currency exchange rates the company may incur losses or be unable to service its debt.

In addition, market risk can occur when trying to implement a relatively large compared with the volume of the market portfolio, as in this case, the probability of falling prices.

Among the innovations designed to protect investments from market risk more acceptable today are classical derivatives - futures and options. Other tools to reduce market risks have been associated with attempts to create long-term securities, the value of which was not changed to the same extent as the cost of traditional bonds with a fixed interest rate. Examples of the new tools of this kind can serve as bonds with floating rate mortgages with a corrective rate preferred stock with corrective rate securities that are sensitive to the rates of bonds with the correction rate and others [8].

To the greatest degree of market risk associated with the activities of the financial and credit institutions - investment companies, banks, insurance companies, etc. - so the development of risk - engineering on the market of innovative financial products are mainly carried out these institutions.

Interest rate risk - the risk of deterioration in the financial situation of the company as a result of adverse changes in market interest rates. Interest rate risk include:

- The risk of loss due to an imbalance between the fixed and floating interest rates. This risk occurs when:
- Assets with fixed-rate obligations are covered with floating interest rates, with an increase in the latter company makes a loss ;
- Assets with floating rate liabilities are covered with a fixed interest rate, with a decrease in the interest rate interest rate risk occurs.
- The risk associated with incorrect or forecast changes in the yield curve (its slope and shape), if long-term assets of the company that pays a higher floating interest rate borne by the short-and medium-term obligations with a lower interest rate. Interest rate risk occurs when changes in the yield curve, when interest rates on short-and medium-term assets are growing and long-term assets are falling.
- The risk associated with imperfect correlation of interest on assets and ensuring their obligations. The risk occurs when assets and liabilities confronting them with the same characteristics have a different mechanism for setting interest rates, a change in interest rates of assets due to the lack of correlation is not adequate to changes in interest rates on the obligations of opposing them and vice versa.

To protect against interest rate risk have been introduced such instruments of financial engineering, such as multi-period options (caps and Flora) swaps.

Liquidity risk is usually considered in two ways. First, the lack of liquidity of the company - is the failure or weakening of the ability to fund the position taken by the transaction on time, financial resources to cover the requirements of contractors and the requirements of software. Secondly, the liquidity of the asset - is its ability to be quickly sold, that is with minimal time spent, with low costs for implementation and negligible, that is adequate market fluctuations conditions, deviations of price parameters. It should be noted that these interpretations of liquidity are closely related, namely, that the company has sufficient liquid assets to enhance the liquidity of the company. But the problem is that liquid assets have a relatively lower yield and, therefore, of a trade-off between liquidity and profitability. Ideally, the assets and liabilities of the company must be balanced on the timing and amounts.

If the assets turn out for a shorter period than the one that is due to liability, there is a loss of yield. If the term of the asset turnover more, there are problems with the implementation of obligations to creditors.

Thus, Liquidity Risk Arises:

- non-compliance with maturities of assets of the entity (the cycle of "money -commodity - money ") and the terms of repayment of the securities;
- In the case of reducing the expected return on active operations.

While in the first case, the liquidity risk is dependent on both the characteristics of assets and liabilities, in the second - depends entirely on the quality of assets and therefore remains outside of the management of liabilities.

To solve the liquidity problem in the last twenty years of financial engineering has been developed significant amount of financial innovation. Some of these innovative financial products have been designed for easy access to cash, while others - to invest temporarily idle funds. In Examples include money market funds, money market accounts, electronic payments and transfer of funds, development and rapid expansion of the market for commercial paper and certificates of deposit market, the development of the REPO market.

In addition, a number of innovative financial products linked to an increase in the liquidity of the market, that is, increasing the ability to realize the financial

instrument quickly and without significant financial losses. This standardization of the earlier non-standard tools and structuring of the instrument so that it can be easier to buy and sell on a well-developed secondary market and measures to enhance credit worthiness, so that high-risk instrument interested investors with low risk tolerance. Examples of innovative financial products of that kind are the introduction of bonds secured by a pool of mortgages, «repackaging» and excessive provision of high -risk assets, such as seasonal loans to the automotive industry under the cash receipts and «junk " bonds.

Operational risks - these are the risks of technical violations of human error, fraud. This risk is not an object of protection with the use of financial innovation in general and the derivatives market in particular. Since the operational risk, the subjective nature of a weak relationship with the financial markets.

In the category of other specific types of risks include country risk, legal, risk of loss of reputation, systemic risk («domino effect» and the crisis of confidence among the general investors), international risks, the risk of natural disasters, the counterparty risk and others.

These risks are rarely the objects of insurance with the help of innovative financial instruments. However, the known, for example, the so -called " disaster loans ", the terms of which are set that debt payments may be reduced or completely abolished in the case of a major disaster. Another example - «weather derivatives " that are in use on the Chicago Mercantile Exchange.

CONCLUSION

Thus, our study of the use of risk- engineering reveals the following characteristics:

- The main objective of risk that affects the development of financial innovations includes credit, interest rate risk, market risk and liquidity risk;
- The need for the application of risk - engineering, as a set of techniques for insurance risk lies with both the demand side and the supply side of innovation of financial products;
- The basis of transactions between such counterparties are differences in predicting the behavior of the market, the different investment horizons, different tolerance to risk and subjective.

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