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The Principles of Exporter-Provided Trade Credit Risk Model

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The issue of trade credit risk evaluation, from an exporter's point of view is analysed in the article, i.e. sources and evaluation possibilities of the risk.

Assessing exporter-provided trade credit risk, it is essential for the exporter to identify to which obligor it is rather safe to provide trade credit (negligible or moderate default probability) and which obligor has large probability to default.

Credit risk evaluation for exporting companies is more complicated than for firms trading with local partners only, because of the following reasons: firstly, customer is located in another country and therefore it is more complicated to get information about customer's reliability. Secondly, there are more factors influencing exporter's credit risk as the credit risk is influenced by foreign country's political situation, economic stability, etc.

Exporter experiences the largest impact and, therefore, losses in the case of customer's (obligor's) default, since the creditor (exporter) has a scarce probability to get the money back. Therefore one of the main factors evaluating trade credit risk is obligor's default risk assessment.

As the obligor and creditor are from different countries, the credit risk arises both from the obligor's intentions and financial situation (internal risk factors) and from obligor's business environment in his country (external risk factors).

Internal factors of obligor default involve activity, competence, reaction to environment changes and moral attitudes towards exporter of company's management and employees. Dishonest intentions, however, cannot be expressed mathematically, therefore this aspect of the risk is not analysed in the article.

External factors of international trade credit risk involve economic and political risk.

Complex gathering and analysis of information about foreign country political and economic stability (country risk) is time and money intensive. Country risk can be evaluated by means of sovereign credit ratings provided by world-known credit rating agencies.

Obligor's individual failure probability can be evaluated by the use of various failure risk models. Statistical models based on discriminant analysis and "theoretical" failure risk models are received as classical ones. Alternative models, like expert systems, hazard and neural network models are also employed in credit risk analysis.

Trade credit risk evaluation is very important for risk-based export pricing. With risk-based pricing customers (obligors) are charged according to the default risk they present.

Keywords: *export, trade credit risk, risk assessment, export pricing.*

Introduction

Credit risk evaluation has a growing significance to exporting companies because of the most popular payment condition – on open account – in international trade. Exporters are aimed to gain competitive advantage and make a contract with importer, therefore they offer more favourable settlement conditions to their customers, i.e. provide trade credit. Under such conditions credit risk to exporter arises.

There is a lack of credit risk evaluation modelling from the point of exporter in literature there. Though there is a plenty of models they are primarily designed for banks and other financial institutions, which valuate loans, bonds and derivatives, individual risk and also the risk of their portfolios, compiled mostly in local market. When evaluating the risk of foreign obligor, banks and financial institutions respond differently than exporters to country risk because of different activity, scope and duration of investments.

Assessing trade credit risk, it is essential for the exporter to identify to which obligor it is rather safe to provide trade credit (negligible or moderate default probability) and which obligor has large probability to default. For successful classification of obligors to solvent and insolvent, principles of foreign obligor's default risk model have to be set.

The first models of credit risk for banks and financial institutions appeared in 1966 (model of Beaver), later appeared well known classical models of Altman (1968, 2000), Altman et al. ZETA model (1977), Zavgren (1985), Scott (1981), Black and Scholes (1973), Merton (1974), Kealhofer (2003), etc.

Sources of trade credit risk and their influence on exporter's bared risk were analysed by Branch (1994), Startienė (2002), Gramlich (2002), Maxwel (2003), Wilson and Summers (2002) and others.

In this paper the authors discussed factors determining international trade credit risk, based principles of external obligor's default factors valuation, analysed and based suitability of well-known obligor's failure risk models to exporter-provided trade credit risk modelling, discussed the main aspects of risk-based export pricing.

The object of the research is processes of exporter-provided trade credit risk.

The aim of the paper is on the basis of sources of exporter-provided trade credit risk analysis to set principles of such risk model.

Risk of exporter-provided trade credit: the concept and sources

Trade credit, according to Lee and Stowe (1993), involves a joint commodity-financial transaction where the exchange of goods is separated in time from the exchange of money (Pike, Cheng 2001). Similar approach uses Wilson and Summers (2002), who describe trade credit as delivery of goods with postponed payment, i.e. providing a certain period for a customer to pay. Nilsen (2002) has a simpler view to trade credit and says it is a short-term loan provided by a seller to buyer, purchasing his product.

All presented concepts of trade credit reflect the essential feature of a credit – payment for goods later, after a certain period, though the buyer gets possession rights as soon as he receives the goods. Credit risk arises for the seller until he gets back the provided trade credit to the buyer.

Exporter does not necessarily face credit risk. Credit risk appears following an agreement between exporter and importer about payment conditions (Figure 1). If exporter requires payment in advance, he will not bear any credit risk. On the contrary, if open account will be employed, exporter faces full credit risk.

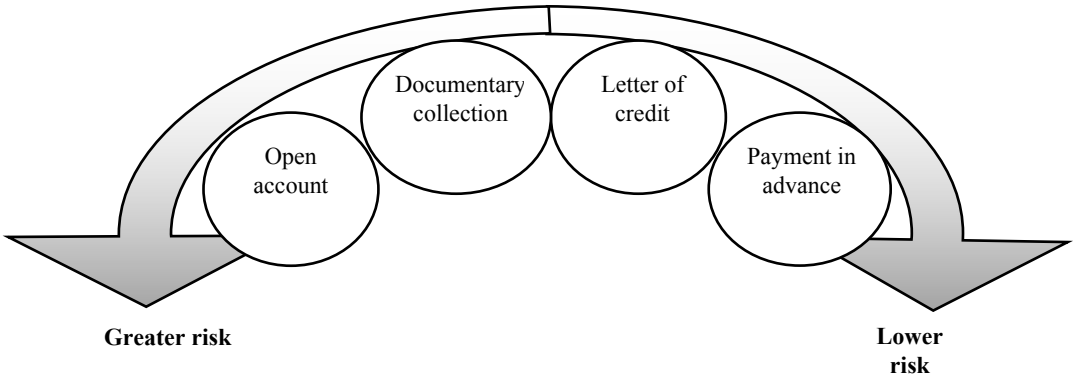

Figure 1. Payment conditions and their influence on exporter's trade credit risk (Ioma's Report on Managing Exports, 2001)

Payment conditions under documentary collection and open account creates the necessary conditions for credit risk to arise. Under these two payment conditions exporter provides a trade credit to importer for a certain period (Ioma's Report on Managing Exports, 2001; Startienė, 2002):

- In case of documentary collection – until importer accepts goods, i.e. credit term is determined by the period of goods delivery and money remittance to exporter's bank account;
- In case of open account trade credit is provided for a term agreed in the contract (the term usually lasts from 30 to 90, sometimes to 180 days). The term begins from the moment when importer accepts the goods.

Credit risk means that obligor for some reasons will not be able to meet his liabilities and creditor will not get the money back (Klein, 1995; Vaškelaitis, 2003).

Ammann (2001) views credit risk as a probability of transactions party's default, what may cause financial loss to the creditor. Amman (2001), however, agrees such a wide definition of credit risk does not explain, why obligor does not meet the liabilities – because of financial distress or of dishonest intentions.

Credit risk can be expressed as a probability of default caused by changes in obligor's credit rating quality (Barnhill, Maxwell, 2002; Giesecke, 2003). Friman (2002) extends the view and shows that change in credit quality can cause positive or negative credit risk. If credit rating goes up, the risk is positive and if it goes down, the risk is negative.

From exporter's side positive change in credit quality is also useful, since the repayment of obligor's liabilities is more likely and, therefore, exporter's financial stability increases.

On the other hand, negative change in credit quality warns the creditor of obligor's decreased reliability, and as consequence, the exporter has to review his crediting policy. After obligor's credit quality going down, repayment may be late. If repayments are huge in amount, exporter may feel lack in circulating capital and be forced to borrow it from a bank.

Exporter has the greatest loss and impact, when obligor's credit quality migrates down to default category. Obligor becomes insolvent, and creditor most likely won't get (full) repayment. Evaluating credit risk, therefore, one of the most important factors is likelihood of obligor's failure (bankruptcy) (Jain, 2001).

When obligor has temporal financial distress, repayment may be postponed. Temporal financial distress may grow to business failure. If repayment is postponed because of importer's unpunctuality or non-malicious slippage, exporter has some losses, but according to Startienė (2002), may tolerate such behaviour with intentions to retain the customer.

Internal business factors determine obligor's financial capability and behaviour. Internal factors involve activity, competence, reaction to environment changes and moral attitudes towards exporter of company's management and employees. Obligor's unwillingness to repay makes the situation, when importer bought on open account terms and has funds to pay for the goods, but is dishonest towards exporter and is intended not to pay because of unclear reasons.

Obligor's business failure or bankruptcy, what cause importer's default, means that exporter most

likely will not avoid losses. In this case exporter faces the greatest risk, as most probably he will loose all amount of the trade credit. Therefore, it is essential for exporter to observe financial situation of his customers by the use of possible channels (e.g., public financial statements), credit ratings, if the customer has one, or other information.

Notions, like bankruptcy, financial distress, business failure, are closely interconnected, outlining complication of business situation in a certain period. Whereas both obligor's failure and dishonest intentions may be the reasons for obligor will default. Dishonest intentions, however, cannot be expressed mathematically, therefore we analysed credit risk models, where probability of failure (because of financial distress) is concerned only.

External factors of international trade credit risk involve economic and political risk. Political risk is caused by political decisions and events. When external political factors appear, customer may agree and wish to pay for goods, it can be impossible, however, because of importer's government prohibitions, i.e. transfer and payment prohibition risk (Branch, 1994). Assessing political risk, one has carefully to examine foreign country's political climate, historical political events and decisions, i.e. general political situation in a foreign country.

On the other hand, external factors of credit risk may arise from any group of country risk. For exporter not only political risk of customer's country is important, but macroeconomic indicators, showing economic and financial stability and potential are relevant, as well. For example, sudden changes in customer's currency exchange may mean to importer not only financial losses or gain, but also signal about possible prohibition of currency transfers. Transfer risk may be related to economy recession. Hence, transfer risk may be caused by country economic risk, though transfer risk by itself is assigned to political risk group.

Summarizing causes of exporter-provided trade credit risk and obligor's default, we classify them as follows (Figure 2):

1. Customer's (obligor's) default risk, which is caused by:
   - Obligor's internal business factors,
   - Obligor's external business factors (country's economic risk, market conjuncture, etc.);
2. Obligor's external factors, influencing exporter directly (obligor's country's political risk).

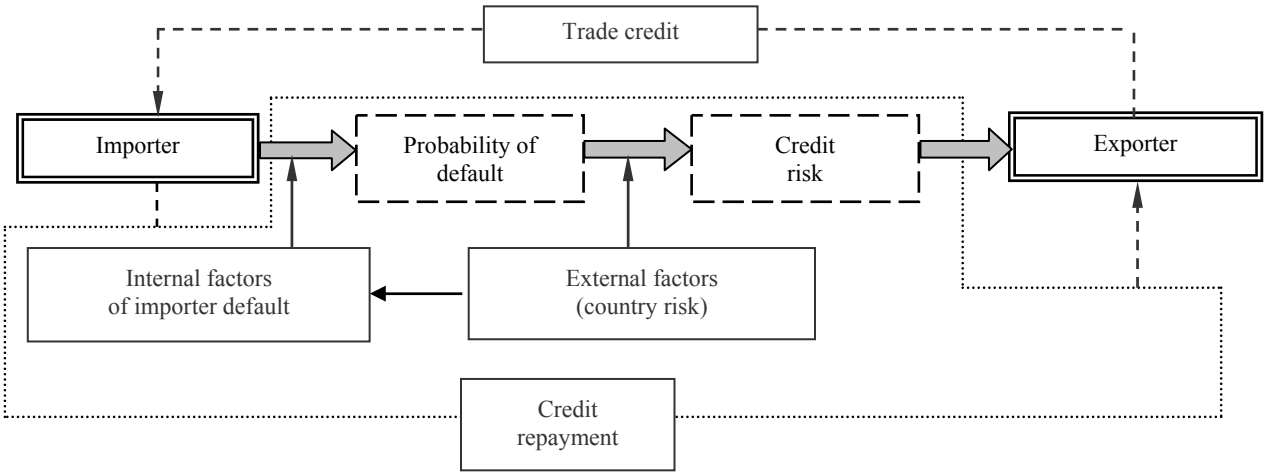

Figure 2. Factors of exporter-provided trade credit risk

External factors of obligor's default: evaluation features

If trade credit related the creditor and obligors in the same country, credit risk would arise from internal and direct external factors of obligor's default and there would be no political risk, which in the case of export, is directed towards exporter (creditor) (Figure 2). Such a separation of external factors would seem to be relevant, when analysing sources of international trade credit risk. With reference to the mentioned approach, external factors of exporter-provided trade credit risk can be analysed by two dimensions: first, analyse political climate in importer's country (factor, directed towards exporter) and second, analyse economic stability and potential in importer's country (factors, directed towards obligor).

On the other hand, complex gathering and analysis of information about foreign country political and economical stability is time and money intensive. Assessing foreign country risk by himself, exporter may face with some problems, like reliability of information gathered and lack of competence.

A more usual and reliable way of country risk evaluation is employment sovereign credit ratings provided by well-known credit agencies.

Gramlich (2002) argued that international trade credit risk is determined by three factors: country risk, obligor (failure) risk and currency risk. He ranked the factors by priority of impact to exporter. Trade credit risk is caused first by country risk and obligor risk, only then currency risk is relevant. Exporter faces all three factors, if importer is a private business unit. If importer is a government-owned unit, country and obligors risk coincides.

International credit risk impacts on the repaid amount can be expressed as follows (Gramlich, 2002):

$$VAL(REC) = (1 - r(co)) \times (1 - r(cu)) \times \left(\frac{1}{e(fx)_0 + \Delta e(fx)_1} \right) \times REC \quad (1)$$

where $VAL(REC)$ – repaid amount of the trade credit (value of receivables),
$r(co)$ – default probability because of country risk,
$r(cu)$ – obligor (customer) failure probability,
$e(fx)$ – currency exchange,
REC – trade credit amount.

According to Shapiro (1985), country and currency exchange risk should not be assessed separately, as currency exchange risk is a part of economic risk; therefore, currency risk is considered in sovereign credit rating.

In fact, country risk, which is caused by political and economic country environment, is not only relevant international trade credit risk factor, but essential in estimation of credit riskiness, as well (Maxwell, 2003; Wilson, Summers, 2002). For example, if country risk and obligor failure probabilities were converted to ratings, then sovereign credit rating would be a limiting factor to obligor credit rating: obligor credit rating cannot be higher than sovereign credit rating. There may be exceptions, however, when ratings of dominating enterprises in essential industries or ratings of large international capital companies may exceed sovereign credit rating.

After the analysis of different approaches to exporter-provided trade credit risk, we argue that obligor default must be assessed in the context of country risk, since:

- When country (political) risk evidences, repayment of trade credit does not depend only on obligor's financial strength;
- If obligor becomes insolvent, exporter has a possibility to retrieve at least a part of the given credit in the form of money or (provided) goods; whereas if obligor defaults because of country risk, (though he has financial resources to repay), compensation of losses is most unlikely;
- Changes in country economic environment (also in currency exchange) have impact on credibility of majority business units in the country, consequently deterioration of obligor financial situation is possible and multiple defaults are likely (if there are more than one obligor in the country), as well.

Governments are concerned to borrow funds in international financial markets with as low interest rate as possible, therefore, it is essential for them to have a credit rating given by a reliable and well-known credit agency. Exporter can find the ratings quite easily and make use of them when assessing country risk.

Estimation of obligor's individual failure probability

Various models of the kind can evaluate probability of obligor's individual failure.

The aim of *statistical models based on discriminant analysis* is to derive a linear combination of two or more independent variables, according to which companies in focus could be classified to two pre-described classes – failing and non-failing (Back et al., 1996; Friman, 2002).

The result of discriminant analysis is a linear equation, which can be written as:

$$Z = w_1 x_1 + w_2 x_2 + \ldots + w_n x_n, \quad (2)$$

where Z – discriminant score,
x_i $(i=1,2\ldots n)$ – independent variables (financial indicators),
w_i $(i=1,2\ldots n)$ – variable weight.

Discriminant score is set for every firm analysed and it is compared to a cut-off point – a special value of discriminant score. If the discriminant score of the company is greater than cut-off point, the firm is classified as non-failing, if the score is less – as failing. The models of the group sometimes are called traditional scoring models (Altman, Saunders, 1998).

One of the first models to predict a company failure was developed by Beaver in 1966 (Scott, 1981, Laitinen, 1990). Beaver proved his hypothesis that the larger the amount of the debt held or the fund expenditures for operations, the greater the probability of failure.

Altman (1968) in his first model Z-score derived a linear discriminant function with five variables. In ZETA model (Altman et al., 1977) the first model of Z-score was extended and quadratic instead of linear combination of variables was used. In ZETA model seven variables were used: return on assets, stability of earnings, debt service, cumulative profitability, liquidity, capitalization and size.

Deakin (1972), Edmister (1972), Tafler (1983), Zavgren (1985), Altman (2000) also used discriminant analysis in their research (Resti, Omacini, 2001; Altman, 2000).

After the analysis of statistical models based on discriminant analysis was made, we may argue that their use to evaluate the risk of obligor's failure for exporter is limited, because:

- Accounting data is used in the models, therefore, they are insensible and do not reflect obligor's current financial situation. The data used in the models is got from annual financial reports for past periods;
- The most popular and accurate classification models in statistical model group are Z-score and ZETA, but exporter may use them only if stock of his obligor circulates in the stock exchange. Both models use stock market data;
- The models may be called "subsequence-like" ones, as the causes of obligor failure are not modelled there; indicators, best signalling the possibility of failure, are estimated.

On the other hand, the models are quite accurate and also simple to use. No abundant calculations are required, since all discriminant functions are linear or quadratic (in ZETA case). Besides, the models predict company failures well.

It is worth to notice that some statistical models based on discriminant analysis (Z-score, ZETA) are used successfully in obligor failure risk evaluation in commercial area.

"Theoretical" models of failure are based on theo-

retical approach to probability of failure. Usually the models are based on gambling and probability of event theories. Balance sheet, other quantitative and qualitative data is used in the models.

In "theoretical" models probability of failure is modelled using logit or probit analysis (Wilson, Summers, Hope, 2000).

In logit analysis financial and other data is used to predict probability of failure with assumption that probability of failure is distributed by logistic function, i.e. the result of the function (probability of failure) is between 0 and 1. The assumption is used to avoid a linear interdependence among variables (Back et al., 1996).

Probability of failure in logit analysis can be written by cumulative function:

$$P(F)= \frac{1}{1+e^{-(w_0+w_1x_1+...+w_nx_n)}}, \quad (3)$$

where $P(F)$ – probability of failure,
w_i – weighting coefficients,
x_i – independent variables.

Ohlson was the first to use logit analysis in bankruptcy prediction in 1980 (Bernhardsen, 2001). Wilson *et al.* (2000) used logit analysis in their model of obligor classification and failure prediction and used not only financial data, but obligor behaviour characterizing, like late in payment, and other non-financial (company age and the like) indicators, as well.

Using probit analysis, companies can be classified to two (failing and non-failing) or more risk groups, and every company can be assigned a probability of belonging to a certain group. Assumption is used in probit analysis that the real probabilities are distributed normally.

When probability of company failure is modelled by probit analysis, it is deemed that failure is caused by underlying latent variable, which depends on external risk factors (company's systemic risk) and non-systemic risk factor. Latent variable is described by function:

$$U = wx+\varepsilon_i, \quad (4)$$

where U – latent variable,
X – factor of systemic risk,
W – coefficient,
ε_i – factor of non-systemic risk.

One group of "theoretical" models make "risk of ruin" models. In this case the simplest model of bankruptcy is based on a company that lasts for two periods. Its securities are traded in the current period and it will be liquidated next period and company goes bankrupt if its liquidation value *(V)* is less than its liabilities to creditors *(D)* (Scott, 1981; Altman, Saunders, 1998).

In this model stock data is analysed instead of balance-sheet and profitability indicators. The risk of ruin model is in many respects similar to the well-known option pricing models of Black and Scholes (1973), and of Merton (1974).

The models of Black and Scholes (1973), and Merton (1974) go with an assumption that company's liabilities are made of one bond; it has assets and no other liabilities. At the end of period there are two possible outcomes: either value of assets is large enough to meet liabilities or not. In the latter case company is failing. Therefore, a possibility for a company to go bankrupt depends on assets' market value variation (Charitou, Trigeorgis, 2000).

Similar to risk of ruin is "gambler's ruin" model of probability theory. The gambler in this theory begins the game with an arbitrary amount of money. Probability to win is *p* and to loose *1-p*. The game is over when the gambler or his opponent looses all the money. The essence of models of Wilcox (1976), Santomero and Vinso (1977), Scott (1981) is the idea that a firm fails when its assets' liquidation value is less than liabilities to external creditors (Scott, 1981; Altman, Saunders, 1998).

Gambler's ruin and option pricing models (they are very similar) are used in commercial area of credit risk evaluation. For example, Moody's|KMV and JP Morgan company's methodologies are based on Merton, Black and Scholes models (Kealhofer, 2003; Gupton, Finger, Bhatia, 1997).

We argue that these models are convenient to use for securities market participants and specialists, who have possibilities to evaluate market value of obligor's assets and liabilities. It is rather complicated to apply the models, however, as exporter dispose limited financial information about his obligor and costs of information gathering may exceed expected benefit.

"Mortality rate" and "the aging approach" models form other class of "theoretical" models, where companies are classified to certain groups according to probabilities of debt stock defaults. Asquith et al. (1989) and Altman (1989) used credit rating of debt stock in modelling the risk of company failure (Altman, Saunders, 1998). These models seek to derive actuarial-type probabilities of default from past data on bond defaults by credit grade and years to maturity.

Models where actuarial-type calculations are employed have an assumption that future default rate probability of obligors belonging to a certain pre-described group will be same as fixed default rate of corresponding risk group. The models of the kind are used by Moody's and Standard&Poor's agencies in their credit rating methodologies. CreditRisk+ methodology, which evaluates riskiness of credit portfolio, uses the model of actuarial-type, as well (Gordy, 2000).

"Theoretical" models may be called "causal" ones, as factors, having influence on obligor failure, are modeled there. Advantages of theoretical models are their dynamism, and methods used for modeling (logit, probit analysis) give possibilities to choose and model factors of obligor failure to a researcher himself.

By our opinion, it is not necessary to refer to already existing theoretical models of obligor default only. Establishing the model, it is reasonable to involve disposable quantitative data (like obligor's financial indicators) and various quantitative data (like obligor's age, management shift, regularity of transactions and payments), as well.

A newer approach towards obligor failure risk is application of so called alternative models. Most popular of them are expert systems, hazard and neural network mod-

els (Shumway, 2001; Luoma, Laitinen, 1991; Hawley et al., 1990; Coats, Fan, 1993). These models, however, are criticized for subjectivity, abundant calculations and complicated application (Balcaen, Ooghe, 2004; Bardos, 1998).

It is worth noticing that modeling trade credit risk, the model should be reliable and meet other requirements, as well: the model has to be cost-effective in the estimation and application stage, also; the model should involve historical tendencies of data variation, be flexible and easy to use.

Trade credit as a pricing tool. Risk-based export pricing

The trade credit terms offered and the attitude the exporter takes to enforcing them are part of the final export price. According to Wilson and Summers (2002), trade credit terms can be used as a tool to achieve a variety of marketing objectives. Similar approach uses Schwartz (1974), who views credit terms as 'an integral part of the firm's pricing policy' (Wilson, Summers, 2002). Furthermore, credit terms can be used to disguise price reductions from competitors and to facilitate price discrimination between customers (Petersen, Rajan, 1997; Schwartz, 1974).

Emery (1987) sees the setting of terms as a way for the creditor to cope with variable demand by offering better credit terms (i.e. lower price) when demand is low to increase sales and tightening up credit terms when demand is high.

Wilson and Summers (2002) state that creditors may use trade credit as a means of manipulating final price across the product life cycle, as a part of an introductory offer to important customers and/or as a means of tying in new customers.

Exporter-provided trade credit risk evaluation is very important for risk-based export pricing, also known as tiered pricing. This method of assigning prices and other credit terms is based on the customer's (obligor's) credit history, i.e. individual obligors who present a greater measurable risk of loss to the creditor pay higher prices that directly reflect the marginal cost of the additional risk. Therefore, the higher prices charged to risky obligors are necessary to make credits available to them. Conversely, the lower is the risk, the lower the price.

Implementing a risk-based pricing methodology can attract new customers in export markets who either may have been denied credit or charged excessively higher interest rates at alternative creditors. More importantly, using risk-based pricing allows creditors to meet the needs of their top-rated customers by giving them the best terms possible. Risk-based pricing, which is used in setting of trade credit terms and availability to a customer, is useful also in various other situations, such as business loans, equipment leasing, etc.

Summarizing, trade credit provides more options for price variation, and, therefore, for building customer loyalty and repeated sales. Trade credit approval is one of the most important processes for exporters since it supports a positive exporter-importer relationship. This process relies upon assessing risk accurately and making a sound decision based on that analysis. Striking a balance between acceptable level of risk and meeting customers' needs is the key to maximizing revenue and customer relationships.

Conclusions

1. Obligor's company management and employee activities, competence, reaction to changes in environment and moral attitudes towards exporter determine internal risk factors of exporter-provided trade credit risk. External credit risk factors may influence either obligor's financial stability or directly exporter.
2. Evaluating risk of exporter-provided trade credit, obligor's individual failure risk should be assessed in the context of country risk.
3. Exporter should use statistical models based on discriminant analysis only if the exporter has sufficient information about the obligor.
4. "Theoretical" models of obligor's failure risk ensure possibilities to choose and model factors of obligor failure.
5. When evaluating international trade credit risk it is reasonable to pay respect to country risk, probability of obligor failure, and evaluate concentration of provided trade credits in a given country, as well. If adverse business environment in the country emerges, multiple defaults are possible.
6. Exporter-provided trade credit risk evaluation is extremely important for risk-based export pricing. Implementing a risk-based pricing methodology provides not only more possibilities to attract new customers in export markets, but also to meet the needs of top-rated customers by giving them the best terms possible. Striking a balance between acceptable level of risk while also meeting customers' needs is a key to maximizing revenue and customer relationships.

References

1. Altman, E. Financial Ratios, Discriminant Analysis and the Prediction of Corporate Bankruptcy // The Journal of Finance, September 1968, p.589-609.
2. Altman, E. Predicting Financial Distress of Companies: Revisiting the Z-Score and ZETA® Models, 2000 // Accessed in Internet http://defaultrisk.com/pp_score_14.htm [2005-10-07].
3. Altman, E. ZETA Analysis / E.Altman, R. Haldeman, P. Narayanan // Journal of Banking and Finance, 1977, Vol.1, p.29-54.
4. Altman, E. Credit Risk Measurement: Developments over the Last 20 Years / E.Altman, A.Saunders // Journal of Banking and Finance, 1998, Vol. 21, p.1721-1742.
5. Ammann, A. Credit Risk Valuation: Methods, Models, and Applications. Berlin: Springer, 2001.
6. Back, B. Choosing Bankruptcy Predictors Using Discriminant Analysis, Logit Analysis, and Genetic Algorithms / B.Back, T.Laitinen, K.Sere, M.van Wezel // Technical Report No 40. Turku: Turku Centre for Computer Science, 1996.
7. Balcaen, S. Alternative Methodologies in Studies on Business Failure: Do they Produce Better Results than the Classical Statistical Methods? / S.Balcaen, H.Ooghe // Working Paper, Universiteit Gent, 2004.
8. Bardos, M. Detecting the Risk of Company Failure at the Banque de France // Journal of Banking and Finance, 1998, No 22, p.1405-1419.

9. Barnhill, T. Jr. Modeling Correlated Market and Credit Risk in Fixed Income Portfolios /T.Jr.Barnhill, W.Maxwell // Journal of Banking and Finance, 2002, Vol.26, p.347-374.
10. Bernhardsen, E. A Model of Bankruptcy Prediction // Working Paper of Norges Bank, 2001, No 10.
11. Branch, A. Export Practice and Management. London: Chapman&Hall, 1994.
12. Charitou, A. Option-Based Bankruptcy Prediction / A.Charitou, L.Trigeorgis, 2000 // Accessed in Internet http://defaultrisk.com/pp_score_13.htm [2005-06-12]
13. Coats, K. Recognizing Financial Distress Patterns Using a Neural Network Tool /K.Coats, L.Fant // Financial Management, 1993, Vol.22, Iss.3, p.142-155.
14. Emery, G.W. An Optimal Financial Approach to Variable Demand // Journal of Financial and Quantitative Analysis, 1987, Vol.22, No2, p. 209-225.
15. Ford, J. Measuring Portfolio Diversification // The Journal of Lending and Credit Risk Management, 1998, February.
16. Friman, K. A Review of Credit Ratings and Credit Risk Modeling: Some Evidence for Finnish Firms' Credit Quality Migrations. Turku: University of Turku, 2002.
17. Giesecke, K. A Simple Exponential Model for Dependent Defaults // Journal of Fixed Income, 2003, December, p.74-83.
18. Gordy, M. A Comparative Anatomy of Credit Risk Models // Journal of Banking and Finance, 2000, Vol. 24, p.119-149.
19. Gramlich, D. Cross Risks in International Finance // Journal of Financial Management and Analysis, 2002, Vol.15, Iss. 2, p.1-9.
20. Gupton, G. CreditMetrics™ – Technical Document /G.Gupton, C.Finger, M.Bhatia // J.P.Morgan & Co. Incorporated, 1997.
21. Hawley, D. Artificial Neural Systems: A New Tool for Financial Decision-making /D.Hawley, J.Johnson, D.Raina // Financial Analysts Journal, 1990, Vol.46, Iss.6, p.63-72.
22. Cost Effectiveness Drives Exporters from L/Cs to Credit Insurance // Ioma's Report on Managing Exports October, 2001, p.10-11.
23. Jain, N. Monitoring Costs and Trade Credit // The Quarterly Review of Economics and Finance, 2001, No 41, p.89-110.
24. Kealhofer, S. Quantifying Credit Risk I: Default Prediction // Financial Analysts Journal, 2003, January/February, p.30-44.
25. Klein, G. Dictionary of Banking. London: Pitman Publishing, 1995.
26. Laitinen, T. Distress Analysis and Financial Information. Vaasa: University of Vaasa, 1990.
27. Luoma, M. Survival Analysis as a Tool for Company Failure Prediction / M.Luoma, E.K.Laitinen // Omega, 1991, Vol.19, No6, p.673 678.
28. Maxwel, R. Risk Rating and International Corporate Risk Portfolio // Business Credit, 2003, April, p.56–57.
29. Nilsen, J. Trade Credit and the Bank Lending Channel // Journal of Money, Credit, and Banking, 2002, Vol.34, No.1, p.227–253.
30. Petersen, M.A., Rajan, R.G. Trade Credit: Theories and Evidence. The Review of Financial Studies, 1997, Vol.10, No3, p.661–691.
31. Pike, R. Credit Management: An Examination of Policy Choices, Practices and Late Payment in UK Companies /R.Pike, N.Cheng // Journal of Business Finance & Accounting, 2001, No28 (7&8), p.1013–1042.
32. Scott, J. The Probability of Bankruptcy: A Comparison of Empirical Predictions and Theoretical models // Journal of Banking and Finance, 1981, No5, p.317–344.
33. Shapiro, A. Currency Risk and Country Risk in International Banking // The Journal of Finance, 1985, Vol.XL, No3, p.881–891.
34. Shumway, T. Forecasting Bankruptcy More Accurately: A Simple Hazard Model // Journal of Business, 2001, Vol. 74, No1, p.101–124.
35. Startienė, G. Tarptautinės prekybos finansavimas: rizika, finansavimas, mokėjimai. Kaunas: Technologija, 2002.
36. Vaškelaitis, V. Pinigai: komerciniai bankai ir jų rizikos valdymas. Vilnius: "Lietuvos mokslo" redakcija, 2003.
37. Wilson, N. Trade Credit Terms Offered by Small Firms: Survey Evidence and Empirical Analysis /N.Wilson, B.Summers // Journal of Business Finance & Accounting, 2002, Vol.29, Iss. 3/4, p.317-351.
38. Wilson, N. Using Payment Behaviour Data for Credit Risk Modelling /N.Wilson, B.Summers, R.Hope // International Journal of the Economics of Business, 2000, Vol.7, No3, p.333–346.
39. Zavgren, C. The Prediction of Corporate Failure: the State of the Art // Journal of Accounting Literature, 1983, Vol. 2.

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Eksportuotojo teikiamo prekinio kredito rizikos modelio principai

Santrauka

Eksporto įmonėms vis aktualesnis tampa kredito rizikos vertinimas, nes pasaulyje populiariausias atsiskaitymo būdas – prekyba atvira sąskaita. Eksportuotojai, norėdami laimėti konkurencinę kovą ir sudaryti su pirkėju sandėrį, turi siūlyti kuo palankesnes atsiskaitymo sąlygas, t.y. suteikti pirkėjui kreditą.

Eksportuojančioms įmonėms kredito rizikos vertinimas yra daug sudėtingesnis nei firmoms, prekiaujančioms su vietiniais partneriais. Tai sąlygoja šios priežastys: visų pirma, pirkėjas yra kitoje šalyje, todėl daug kebliau gauti informacijos apie jo patikimumą. Antra, padaugėja eksporto kredito rizikai įtaką darančių veiksnių – kredito rizikai įtaką daro užsienio šalies politinė situacija, ekonominis stabilumas ir kt.

Straipsnio tikslas – išanalizuoti eksportuotojo teikiamo prekinio kredito rizikos priežastis ir nustatyti šio rizikos modelio pricipus.

Prekinio kredito sąvokoje atsispindi esminis kredito požymis – atsiskaitymas už prekes ar paslaugas po tam tikro laiko, nors prekių nuosavybės teisės pirkėjui atitenka iš karto gavus prekes ar paslaugas. Kol pardavėjas neatgavo suteikto pirkėjui kredito, kyla kredito rizika.

Eksportuodama prekes ar paslaugas, įmonė nebūtinai susiduria su kredito rizika. Kredito rizikos pasireiškimas priklauso nuo susitarimo tarp eksportuotojo ir importuotojo dėl atsiskaitymo būdo. Jeigu eksportuotojas pareikalauja išankstinio apmokėjimo sąlygų, kredito rizika nepasireikš. Tuo tarpu laikantis atidėto mokėjimo sąlygų, eksportuotojas patiria kredito riziką.

Sąvoka kredito rizika reiškia, kad skolininkas dėl tam tikrų priežasčių nevykdys savo įsipareigojimų, ir kreditorius negalės atsiimti paskolintų pinigų. Todėl kredito riziką galima apibūdinti kaip nemokumo rizikos tikimybę.

Didžiausias nuostolis ir poveikis eksportuotojui atsiranda, kai skolininkas tampa nemokus – tuomet kreditorius greičiausiai neatgaus visos kredito sumos. Todėl, vertinant prekinio kredito riziką, vienas iš pagrindinių veiksnių yra skolininko nemokumo rizikos įvertinimas.

Jeigu skolininkas ir kreditorius yra skirtingų šalių ūkiniai subjektai, kredito rizikos atsiradimą nulemia tiek skolininko veiksmai ir finansinis pajėgumas, tiek ir išorinės aplinkos veiksniai.

Skolininko veiksmus ir finansinį pajėgumą nulemia vidiniai verslo veiksniai. Vidiniai veiksniai – tai įmonės vadovų ir darbuotojų veikla, kompetencija, reagavimas į aplinkos pokyčius bei moralinės nuostatos eksportuotojo atžvilgiu.

Apibendrinę literatūroje pateikiamus eksportuotojo prekinio kredito rizikos ir skolininko nemokumo atsiradimo priežasčių skirstymus, siūlome jas klasifikuoti taip:

1. Pirkėjo (skolininko) nemokumo rizika, kuri kyla iš skolininko verslą veikiančių:
   - vidinių veiksnių,
   - išorinių veiksnių (šalies ekonominė rizika, tos rinkos konjunktūra ir kt.);
2. Skolininko šalies išoriniai veiksniai, turintys tiesioginės įtakos eksportuotojui (šalies politinė rizika).

Jeigu kreditiniai santykiai tarp skolininko ir kreditoriaus neperžengtų vienos valstybės sienų, prekinio kredito riziką sudarytų skolininko nemokumą tiesiogiai nulemiantys vidiniai ir išoriniais veiksniai, bet nepasireikštų politinė rizika, kuri eksporto atveju yra nukreipta ne į skolininką, o į eksportuotoją. Toks išorinių veiksnių išskyrimas gali būti svarbus atliekant prekinio kredito rizikos priežasčių analizę. Remiantis šiuo požiūriu, išorinių veiksnių įtaką eksportuotojo kredito rizikai galima vertinti atskirai: atlikti polinio klimato analizę (veiksnys, nukreiptas į eksportuotoją) bei ištirti užsienio šalies (eksporto rinkos) ekonominį stabilumą ir pajėgumą (veiksniai, nukreipti tiesiogiai į skolininką).

Paprasčiau ir patikimiau šalies riziką vertinti pasitelkiant pasaulyje žinomų kredito reitingų agentūrų nustatytus šalies kredito reitingus.

Išanalizuoti mokslininkų požiūriai į eksportuotojo teikiamo prekinio kredito rizikos vertinimą leidžia teigti, kad skolininko nemokumą būtina vertinti šalies rizikos kontekste, nes:

- pasireiškus šalies rizikai (politinei), prekinis kreditas gali būti negrąžintas nepriklausomai nuo skolininko finansinio pajėgumo;
- skolininkui tapus nemokiu, eksportuotojui yra galimybė atgauti bent dalį suteikto kredito pinigų ar suteiktų prekių forma (prekių susigrąžinimas), tuo tarpu jei skolininkas nesumoka dėl šalies rizikos (nors pats skolininkas finansiškai pajėgus), nuostolių kompensavimas tampa beviltiškas;
- šalies ekonominės aplinkos (ir valiutos kurso) pokyčiai paveikia daugumos tos šalies ūkio subjektų kreditingumą, o dėl to galimas skolininkų finansinės padėties pablogėjimas ir daugybiniai kreditų negrąžinimai (jeigu toje šalyje yra ne vienas skolininkas).

Skolininko nemokumo tikimybę galima įvertinti įvairiais skolininko nemokumo rizikos modeliais.

Statistinių diskriminantinės analizės modelių tikslas – išvesti tiesinę dviejų ar daugiau nepriklausomų kintamųjų kombinaciją, pagal kurią tiriamas įmones galima išskirti į dvi iš anksto apibrėžtas grupes – mokių ir nemokių įmonių.

„Teoriniai" nemokumo rizikos vertinimo modeliai yra grindžiami teoriniu požiūriu į nemokumo tikimybę.

„Teoriniai" modeliai skolininko nemokumo rizikos vertinime sudaro gausiausią modelių aibę; labiausiai paplitę yra „žlugimo rizikos", „lošėjo žlugimo", opciono kainodaros, „mirtingumo" ir „senėjimo požiūrio" modeliai

„Žlugimo rizikos" modeliuose bankroto modelis grindžiamas firmos egzistavimu tik du laikotarpius. Firmos vertybiniais popieriais prekiaujama einamuoju periodu, ji likviduojama kito periodo pabaigoje, o firma bankrutuoja, jeigu jos likvidacinė vertė periodo pabaigoje mažesnė negu įsipareigojimai kreditoriams.

Panašus ir „lošėjo žlugimo" modelis, pagrįstas lošimų teorija. Šioje tikimybių teorijoje lošėjas pradeda žaisti su tam tikra pinigų suma. Tikimybė laimėti yra p, pralaimėti 1-p. Lošimas baigtas, kai arba lošėjas, arba jo priešininkas praranda visus pinigus.

Lošėjo žlugimo ir opciono kainodaros modeliai (kurie yra itin panašūs) naudojami ir komercinėje kredito vertinimo sferoje.

Kitą „teorinių" modelių grupę sudaro „mirtingumo" ir „senėjimo požiūrio" modeliai, pagal kuriuos įmonės suskirstomos į tam tikras grupes pagal įmonių skolos vertybinių popierių neapmokėjimo tikimybes. Šiais modeliais siekiama nustatyti aktuarinio pobūdžio nemokumo tikimybes pagal istorinius obligacijų neišpirkimo duomenis ir atsižvelgiant į obligacijų kredito kokybę bei išpirkimo terminus.

Be klasikinių skolininko nemokumo rizikos modelių (statistinių diskriminantinės analizės ir „teorinių"), yra nemažai ir kitų – alternatyviųjų – modelių. Dažniausiai literatūroje analizuojami ekspertų vertinimo, pavojaus, nervinių tinklų modeliai. Tačiau jie kritikuojami dėl subjektyvumo, sudėtingų skaičiavimų ir naudojimo.

Pažymėtina, kad sudarant prekinio kredito vertinimo modelį, svarbu ne tik tai, kad jis būtų patikimas, bet ir kad būtų efektyvus kaštų atžvilgiu ne tik jo sudarymo stadijoje, bet ir naudojant.

Eksportuotojo teikiamo prekinio kredito rizikos vertinimas ypatingai svarbus rizika grindžiamai eksporto kainodarai, kuri remiasi pirkėjo (skolininko) kredito istorija, t.y. didesniu rizikingumu pasižyminčiam pirkėjui nustatoma aukštesnė kaina, mažesniu – žemesnė. Rizika grįstos kainodaros įgyvendinimas gausina naujų pirkėjų, kuriems alternatyvūs kredituotojai nesuteikė kredito arba nustatė pernelyg aukštas palūkanų normas, pritraukimo galimybes eksporto rinkose. Be to, rizika grįstos kainodaros taikymas sudaro galimybę patenkinti svarbiausių kreditoriui pirkėjų poreikius, suteikiant jiems kuo palankiausias sąlygas.

Straipsnio autorių atlikti tyrimai leidžia teigti, kad:

1. Vidinius eksportuotojo teikiamo prekinio kredito rizikos veiksnius nulemia įmonės vadovų ir darbuotojų veikla, kompetencija, reagavimas į aplinkos pokyčius bei moralinės nuostatos eksportuotojo atžvilgiu. Išoriniai rizikos veiksniai gali paveikti pirkėjo finansinį stabilumą arba būti nukreipti tiesiogiai į eksportuotoją.
2. Vertinant eksportuotojo teikiamo prekinio kredito riziką, skolininko individuali nemokumo rizika turėtų būti vertinama šalies rizikos kontekste.
3. Eksportuotojas turėtų naudoti statistinius diskriminantinės analizės modelius, tik tada, jei disponuoja pakankama informacija apie pirkėją.
4. „Teoriniai" skolininko nemokumo modeliai suteikia galimybę pasirinkti ir modeliuoti veiksnius, kurie gali turėti lemiamos įtakos skolininko mokumui.
5. Eksportuotojui vertinant kredito riziką, tikslinga atsižvelgti ne tik į šalies riziką ir skolininko nemokumo tikimybę, bet ir įvertinti eksportuotojo suteiktų kreditų sutelktumą tam tikroje šalyje – jeigu susiklosto nepalanki situacija toje užsienio šalyje, galimi daugybiniai nemokumo atvejai.
6. Eksportuotojo teikiamo prekinio kredito rizikos vertinimas ypač svarbus rizika grindžiamai eksporto kainodarai. Šios kainodaros įgyvendinimas ne tik išplečia naujų pirkėjų eksporto rinkose pritraukimo galimybes, bet ir leidžia geriau patenkinti svarbiausių pirkėjų poreikius, suteikiant jiems kuo palankiausias sąlygas. Pusiausvyros tarp priimtino rizikos lygio ir pirkėjų poreikių tenkinimo radimas yra svarbus įmonės pajamų didinimo ir ryšių su pirkėjais gerinimo aspektas.

Raktažodžiai: *eksportas, prekinio kredito rizika, rizikos vertinimas, eksporto kainodara.*

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