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CREDIT RISK RESULTING FROM BANK GUARANTEES – DEVELOPMENT OF A RISK ADJUSTED PRICING

Abstract: *This paper focuses on the credit risk of bank guarantees from the perspective of banks. Bank guarantees represent a specific type of credit instruments. Issuance of a bank guarantee means a potential asset for a bank. So, the bank guarantees are treated as an off-balance sheet transaction. After the agreed event occurs, the potential receivable becomes a real receivable – a balance sheet asset. As the bank guarantee is a credit instrument, it is joined with a credit risk. The bank faces the risk that the customer will not meet his obligations (default). This fact can lead to negative impact on banking business and so it is important to pay sufficient attention to this risk and implement an effective risk management. The level of the credit risk is determined by the quality of the customer's business or the bonity of the customer. The goal of the paper is to calculate the credit risk of bank guarantees given by the banks. The calculation is based on the classical spread analysis (as done in [8] pp. 17) and the migration matrix of S&P. The first part of the paper contains the definition of the bank guarantees and their characteristic features. The next part is devoted to the credit risk resulting from bank guarantees. There is stated a basic formula of the risk premium and the method for calculation of the costs of guarantee. After that, the calculation of the credit risk is done. A final conclusion sums up the main results of the article.*

Keywords: *bank guarantee, credit risk, risk premium, risk adjusted pricing, spread*

JEL : G 21, G 24, G 32

1 Introduction

The business environment is associated with a wide range of risks which market participants must face. One of the most important risks is the counterparty's default. To eliminate this risk, the contractual subjects can arrange a bank guarantee. Bank guarantees are an effective instrument for risk management, especially in the field of the international trade. The risk can be substantially decreased.

However, this does not mean that the risk disappeared. Assessing a bank guarantee, the risk is transferred from one subject to another. In fact, the risk is carried by the bank that issued the bank guarantee. It has to be kept in mind that a guarantee is the same as a classical credit – only without transferring the funds in cash. The main focus of the paper is to structure credit risk resulting from bank guarantees and to calculate the corresponding risk premium.

2 Characteristics of Bank Guarantees

Bank guarantees represent a specific type of bank credit products (for detailed analysis see [2]). According to Polouček (see [7] p. 237), it is a guarantee made by a bank (guarantor) on behalf of a customer of the bank (consignor). The bank opens a written certificate to the beneficiary at the consignor's request. If the consignor fails to perform his contractual obligations, the beneficiary may claim for compensation from the bank.

The level of the responsibility of the bank depends on the type of the guarantee. If the commitment of the bank is unconditional and irrevocable, the bank takes the highest level of responsibility. The unconditional commitment means that when the beneficiary requires the bank as a guarantor to pay the amount, the bank must immediately pay the amount guaranteed.

The bank pays the amount which is guaranteed only in the case of the request of the beneficiary. It means that the bank issuing the guarantee does not know whether it will pay the amount in the future or not. The payment depends on the external circumstances which the bank cannot control. Bank guarantees are contingent liabilities and thanks to this fact they are treated as an off-balance sheet activity.

In the Czech Republic, the bank guarantees are treated as a potential asset. If the customer (consignor) fails to perform his obligations, the bank may be claimed for compensation. Once the compensation is made, the bank will have a credit receivable (balance-sheet asset). This corresponds to Bessis (see [1], p. 7) who asserts that given bank guarantees "not to generate "immediate" exposures since there is no outflow of funds at origination, but they do trigger credit risk because of the possible future usage of contingencies given."

3 Components of the Fee of Bank Guarantees

The risk premium of guarantees has to be done similar to the calculation of classical credit. The only difference is the liquidity premium (see [3], p. 744 for the basic idea of the calculation of a guarantee's risk premium). As no liquidity is transferred, only costs and the risk premium have to be calculated (see [3], p. 744):

$$cg = \underbrace{p_{usage} \cdot spread_{default}}_{riskpremium} + \cos ts_{prod} + \cos ts_{equity} \tag{1}$$

with:

cg	=	costs of guarantee
p_{usage}	=	probability of usage of the guarantee
p_{spead}	=	spread of the customer depending on rating and maturity
$costs_{prod}$	=	costs of producing the guarantee
$costs_{equity}$	=	equity costs of the guarantee according to Basel II / III

According to the calculation of the risk premium, an additional question has to be answered: Does the usage of a guarantee depend on the bonity of the customer? Some of the guarantees depend on the *quality of the customer's business* – bid bond, contract guarantee/performance bond, some depend on the *bonity of the customer* – e.g. guarantee of payment (Häberle offers a good overview on typical forms of guarantees. See [3], p. 725). Accordingly, p_{usage} depends on the kind of guarantee. In very case the type of guarantee depends on the bonity, it is 100%, otherwise it has to be evaluated by the bank's internal controlling.

To determine the customer's bonity, the *scoring* of the customer is made. The scoring is based on qualitative and quantitative criterions and results in *rating* of the customer. Generally, the rating is determined by financial, nonfinancial, personal and behavioural data of the customer (see [10], pp. 334 defines and describes rating and scoring). The lower the rating the lower the securities and the higher the maturity is, the higher the risk premium should be (see [9], p. 367).

This article focuses on the risk premium of the guarantees and not onto the other costs. The new aspect is that only the credit risk premium but not the liquidity premium has to be calculated. Accordingly, no spread analyses of e.g. traded bonds can be done (as done in [6], pp. 658). Therefore; a mathematical evaluation based on the migration matrix of S&P has to be done. The basic matrix for this calculation is defined as shown in Figure 1 (see [11], p. 53).

Fig. 1

Migration matrix of S&P

	AAA	AA	A	BBB	BB	B	CCC/C	D	NR	Sum
AAA	**88,210%**	7,730%	0,520%	0,060%	0,080%	0,030%	0,060%	0,000%	3,310%	100,000%
AA	0,560%	**86,600%**	8,100%	0,550%	0,060%	0,090%	0,020%	0,020%	4,000%	100,000%
A	0,040%	1,950%	**87,050%**	5,470%	0,400%	0,160%	0,020%	0,080%	4,830%	100,000%
BBB	0,010%	0,140%	3,760%	**84,160%**	4,130%	0,700%	0,160%	0,260%	6,680%	100,000%
BB	0,020%	0,050%	0,180%	5,170%	**75,520%**	7,480%	0,790%	0,970%	9,820%	100,000%
B	0,000%	0,040%	0,150%	0,240%	5,430%	**72,730%**	4,650%	4,930%	11,830%	100,000%
CCC/C	0,000%	0,000%	0,210%	0,310%	0,880%	11,280%	**44,980%**	**27,980%**	14,360%	100,000%
D								100,000%		**100,000%**

Source: see [11], p. 53

The equilibrium can be defined as follows: the value of a risk free asset must be the same as the value of an asset with spread combined with the relevant (cumulated) probability of default (PD). The $spread_t$ bases onto the following formula accordingly (see e.g. [4], pp. 74).

$$(1 - p_{cum,k}(t)) \cdot \frac{1}{(1 + r_f(t))^t} = \frac{1}{(1 + r_f(t) + spread)^t}$$

$$\frac{(1 + r_f(t))^t}{(1 - p_{cum,k}(t))} = (1 + r_f(t) + spread)^t$$

$$\frac{(1 + r_f(t))}{(1 - p_{cum}(t))^{\left(\frac{1}{t}\right)}} = (1 + r(t) + spread) \qquad (2)$$

$$spread = rp = \frac{(1 + r_f(t))}{(1 - p_{cum,k}(t))^{\left(\frac{1}{t}\right)}} - (1 + r_f(t))$$

with:

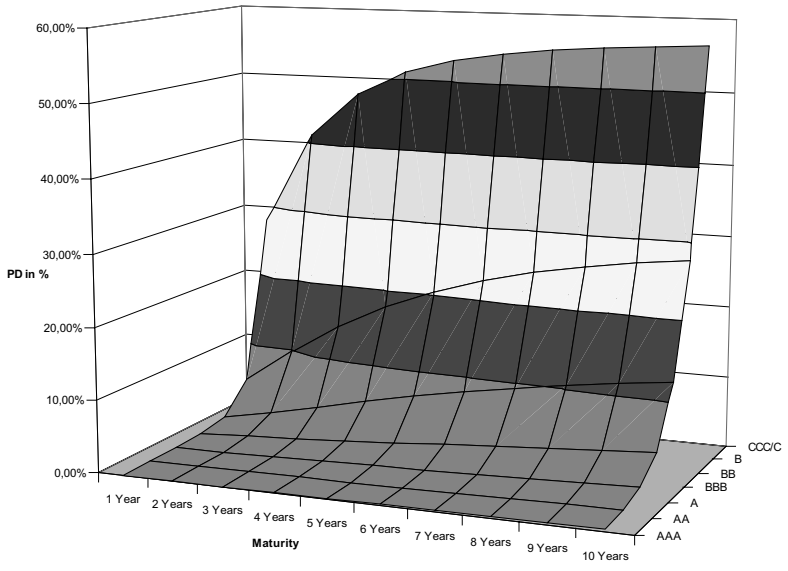
r_f = risk free ratio

$p_{cum,k}$ = cumulated probability of default depending on the rating

Consequently, a cumulated probability of default has to be evaluated. This is done by multiplying Figure 1 with itself for 10 times. The results can be summed up in Figure 2:

Fig. 2

Cumulated PD's

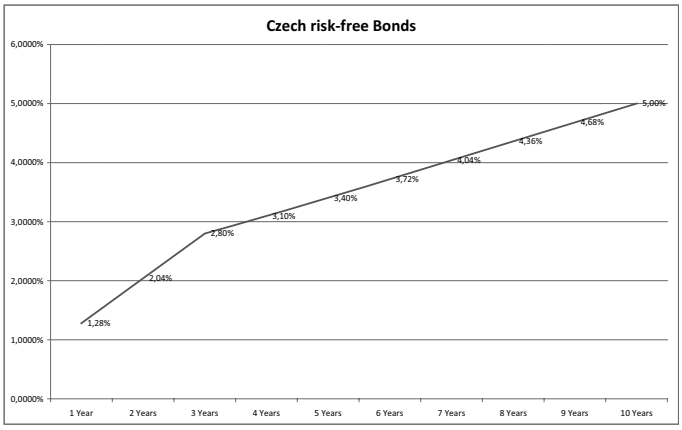


Source: own calculations

It becomes clear that the cumulated PD increases dramatically depending on the maturity and the rating. The next step is to calculate the spread. Therefore a risk-free yield structure has to be used. This is defined as the Czech risk-free ratio of Nov. 5th, 2010:

Fig. 3

Risk-free ratio in the Czech Republic at Nov, 5th, 2010

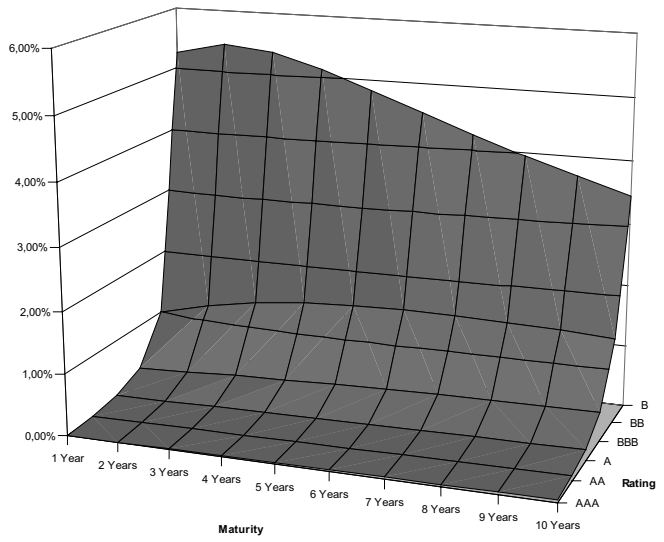


Source: see [5]

According to (2) the risk premium can be defined as follows:

Fig. 4

Spread for the guarantees



Source: own calculations

Figure 4 is the final result. It offers the risk premium for guarantees only depending on the PD of the customer. Is becomes clear that the risk premium increases depending on the maturity and the rating. Especially in the ratings lower than BBB an increase has to be stated. The conclusion is that a guarantee is becoming expensive in these rating categories. This fits to practice: without a good rating, good credit costs cannot be realized.

4 Final Conclusions and Main Results

Bank guarantees represent a specific type of bank credit products. A bank that issues the guarantee assumes the responsibility of its customer (consignor). So a guarantee is a classical credit product, only without the liquidity transfer. The price of a guarantee has to consist only of credit risk premium accordingly. The presented article offers a simplified solution to calculate the credit risk of guarantees. Assuming that reliable internal data according PD and p_{usage} are available, the presented model can be implemented in practice.

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