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LOAN PRICING MODEL FOR SMES BASED ON CREDIT RISK ADJUSTMENT

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Abstract:

Through comparatively analyzing the ways adopted by western commercial banks to make a loan price, this article establish a loan pricing model that suitable for SMEs from the standpoint of city small and medium-sized banks, in order to help banks to make better financial services for small and medium-sized enterprises (SMEs). At the same time, the article also adopt one regional commercial bank's data to made empirical test, to explain it is a viable method to use that loan pricing models to solve the problem of the interest changes from the control price into the market price.

Keywords:

Loan pricing model; Small and medium enterprises; Horizontal competition; Decisive regression analysis model

1. Introduction

Through marketing reformation, the interest changes from the control price into the market price. The interest rate marketing has initiated a series of explorations about domestic commerce bank loan pricing. How to choose and make loan pricing model independently and how to face a shock from foreign finance corporations in order to get with the need of survival and development are the questions that finance industry must face and solve. Specially, at present, being unable to price loans for small and medium-sized enterprises (SMEs) in China has resulted in a series of operational problems. Faced with the dual pressure of competing with foreign banks an a market-oriented interest rate at the same time, to find a suitable way to price loans for small and medium-sized banks has become the most pressing problem to be resolved by city small and medium-sized banks and their regulators.

The west commercial banks have early started to study loan pricing, and have experienced from the simplicity to complex, from primary to the process which consummates gradually. Correlation theories, such as the financial project, the risk management theory and so on, and the experience impel to loan pricing technology unceasingly to develop forward. Therefore, undergoes many year fumbles, the west commercial banks have mastered and developed the one set simple practical loan pricing method gradually in the management practice. Loan price formation essential factors and principal mode have been summarized, while on the process of the interest rate marketability in the developing country, which still have large space to serviceable revision [1-3].

The objective of this study is to find suitable methods of loan pricing for city small and medium-sized banks. This paper is organized as follows. In Section 2, comparison of merits of various loan pricing models. Section 3 analyzes how to determine the parameters of benchmark interest rate, time limit premium, and default risk premium in the methods of loan pricing one by one. Section 4 find a useful and external standard to pricing loan for small and medium-sized banks, by creatively making decisive regression analysis model, and with the help of abundant data gotten from the empirical study. Section 5 gives the concluding remarks.

2. Theoretical analysis on the loan pricing mode design

2.1. The comparison of typical loan pricing models

For current study and practice of lending pricing of the commercial bank, it has formed three typical pricing models, first is cost-oriented pricing model based on bank internal costing; second is market-oriented pricing model based on competition of bank in the same line; third is customer-oriented pricing model based on cost-income value of customers. Existing researches mainly are the extended of the three pricing models.

2.1.1 Cost-oriented pricing model

Cost-oriented pricing model deliberate the loan costs

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from the bank's internal point to help banks to maintain a certain profit level, at the same time, make a definition of the costs of the loan to help banks seek the space of reduce the cost. Cost-oriented pricing model has two main limitations. First one is that the model determines loan prices only according to the cost of corporate deposits and operating costs, which ignores that bank deposits are also a profitable product. So it is not conducive to bank debt service management. Second one is that only in accordance with the weighted cost of debt calculation, different ratio methods of maturity may induce different capital cost of the same loan. At present, the maturity mismatch is still significant in commercial banks, so cost of capital loans accounting from ratio method is not scientific. Third one is that the model is suitable only for commercial banks in loan seller's market, and is more suitable for small business loan, bank can decide the price of loans. Once the banks are in loan buyer's market, especially for high-quality loan customers and competitive conditions, because this model does not take full account of competition in the market, that is bound to affect market competitiveness of loan pricing; In calculating the risk of corporate default, it considers only the expected loss compensation of credit, hasn't taken into account compensation for unexpected losses.

2.1.2. Market-oriented pricing model

Market-oriented pricing model, first, in the financial market environment, it demands financial markets relatively well, and the degree of market competition and interest rates are higher, and the credit market is a buyer's market conditions; Second, it is more suitable for large-scale high-quality customers, because these clients are objects that a number of banks compete for, can form a competitive situation; Third, make a evaluation in association with lender's credit risk profile and the term structure.

This model does not require accurate calculation of costs, after the benchmark interest rate is chosen, pricing focuses on customer analysis and determination of the risk premium, and provide a foundation of profitability analysis of bank deposits and other products. The main limitation of the model are including: (1) Although you can use the interbank interest rate yield curve as a benchmark interest rate, but it only measures the cost of loans, has not considered the accounting of credit customer's deposit products, and lacks of considering the true costs of internal bank, is not conducive for bank to account the profit of full products; (2) it does not take into account the overall relationship between the customer and the bank, is not conducive to quality customer identification and competition; (3) market-oriented pricing model must reference to the benchmark interest rate that is generated by market competition. At present, China is lack of benchmark interest rate which is authority and formed by market competition.

2.1.3. customer-oriented pricing model

Customer-oriented pricing model, reflects business philosophy of "customer-centric" of the modern commercial bank, achieves a personalized operation mode of differential pricing. This way, provides a means for commercial banks to identify minority customer that provides the main income in "28 rule", identifies lower customer that have the lower contribution, and ensures profitability of banks by increasing the loan pricing. The model is premised on the use of bank customers' fine-consolidated income and comprehensive cost accounting; this is still very difficult for the domestic banks, even more difficult for small and medium banks.

2.2. Idea of loan pricing model design based on credit risk

If a loan pricing is reasonable, the key lies in the existence of market competitiveness. Competitiveness is crucial for regional banks, If the loan price is lower than the interbank lending rate, this shows loan price is not only meet the bank costs and profit needs, but also is competitive; However, if the loan price is higher than the current interbank lending rate (interbank interest rate assumption is reasonable), this shows that the bank's operating costs are too high, cost management should be strengthened. The scale of single-family credit constraints limit is lower as a result of the scattered small and medium enterprises, so the competition for quality customers must be considered of competition from other, loan price is not only limited to the costs and benefits within the requirements. In addition, the SME Loan Pricing model is also need to consider that: (1) Applicability. From the perspective of borrowers, SMEs are uncertainty, credit risk is strong, and they are in the loan market with the seller characterized, therefore they are necessary to based on cost-plus pricing method; (2) reasonable. Loan pricing must consider the relations of management costs and scientific. If loan pricing is more science, the complexity of the price is higher; the payment of management costs will be higher. For example, customer-oriented pricing model reflects the business philosophy of people-oriented and customer-centric, this pricing model is to develop an integrated financial services to customers, the customers' financial income is higher, the banks' loan pricing is more competitive, however, it

is very different from the business ideas of existing business and business-oriented of commercial banks, and pricing process is too complex.

Based on the comparison of advantages and disadvantages of the above three kinds of loan pricing models, combining with the features of small and medium bank loan pricing, we find it is not entirely suitable to use any kind of pricing models. Although cost-oriented pricing model is beneficial to the calculate of internal costs and benefits, but it is not suitable for the competition the of quality customers. Market-orientated model is not very suitable for the SMEs customers which faced by regional banks, it also don't have liabilities of cost accounting, so it is not conducive to the overall management of banks; Customer-oriented model is "customer-centric", it can full measure of the comprehensive contribution of customers to the bank, it is conducive to sustainable get customers, but it's calculation is complex, it requires a lot of dedication of IT system, and the construction of data collection and deal system, administrative costs and operating costs are very high, regional banks have numerous customers, and it is not economy to measure by the cost. Therefore, this article combines the advantage of cost-oriented and market-oriented, uses cost-plus pricing model of market-oriented, it is more suitable for loan pricing of small and medium sized commercial banks.

The inherent characteristics of small commercial banks determine their loan pricing must be through the pricing model of simple, practical and not heavily dependent on historical data. Combination of cost-oriented and market-oriented modes is the pricing model which is Suitable for small and medium banks characterize. Since the model is combination of cost-oriented and market-oriented pricing model, it not only can prices loans, but also can price deposits, In other words, the model can be universally applied to all kinds of bank pricing extensively.

3. Loan pricing model based on risk adjustment

3.1. Correlated variable description

In current situation, the loan research about loan pricing more concentrates to the credit risks, little attention to the trade or craft competition faced. Theoretically speaking, loan pricing model based on the risk adjustment and horizontal competition is more suitable for SMEs.

3.1.1. Variable of risk adjustment

r_{DP} -Default risk cost, is the cost of the loan credit default, also is expected loss preparation of the credit default. It is based on bank's internal estimates of default risk for the credit. Under the "New Basle Accord", commercial bank, on the basis of the credit rating before the loan, divides the customer into the different degrees then calculates the average probability of default (PD) of the different degrees according to the bank state of operation and the historical data, and estimates loss given default (LGD) according to the credit debt characteristic, finally based on PD and LGD determines risk premium during the loan pricing. From six aspects, which include the customer basic quality, the prospects for development, the financial structure, the credit capacity, business capacity, the effectiveness of operation, this paper carries on the internal credit rating through the construction of Z model to the borrower. Borrower's internal credit rating result will utilize in PD and LGD computation during the loan pricing, obtains the cost of default risk.

3.1.2. other variables

r_{CF} -Cost of capital, for the idea of market-oriented pricing model, references to inter-bank lending rate (SHIBOR) and consider recognized term premium factors of market, as the benchmark interest rate of capital; Cost of capital which is different from cost-oriented model is derived from the interest cost of capital within the bank.

r_K -Economic cost of capital is a calculation of the cost of unexpected losses, also is the shareholders of the capital requirements. As the risk is uncertainty, in a smaller probability, when the risk of loss is more than expected losses, there will be an unexpected loss, banks had to rely on capital to make up. Light of the new "Basel Accord", bank can calculate economic capital occupied of credit risk, market risk, operational risk through internal and external ratings [4], and in accordance with the principles of market orientation, according to average rate of return of bank capital in a competitive market, calculates the cost of occupied capital.

r_{AC} -Operating costs, is based on cost-oriented model, is the direct costs of the loan and indirect administrative of the loan accounted by management accounting allocation method. For example, the direct costs of a loan can be directly bringing to this loan, the management fees and other indirect costs made the personnel costs, fixed costs, normal operating expenses apportioned to the loans in accordance with the staff, area, volume and other cost drivers by cost-sharing system [5-7].

R^* -Expected rate of return, is the expect profit margins of credit assets of banks. As the credit assets are occupation of regulatory capital, regulatory capital come from shareholders, so the expected return should be return on capital of the credit assets to regulatory capital. We can calculate the corresponding regulatory capital loans according

to bank regulatory capital ratios, and then calculate the expected rate of return in accordance with the market-oriented model based on average return of bank capital in competitive market.

r_T -Tax costs, including sales tax and income tax of credit.

r_E -Excess return, is return which increase or decrease according to market competition, and the strength situation of demand for funds with significant market-oriented. The excess return customer loan pricing, is determined by the competitive position of banks and their customers, excess returns for high quality and large customers are generally less than 0 or 0; Excess returns for small customers generally greater than 0.

ε -Feedback correction factor, taste and modifier pricing models based on the real income of loan pricing, is used to reflect Other factors that impact on loan pricing.

3.2. Loan pricing model based on risk adjustment and horizontal competition

According to cost-plus pricing model of market-oriented, this article designed the loan pricing model for small and medium sized commercial bank. At the same time pull in of risk measurement and risk compensation variable in loan pricing model combined with the New Basel Capital Accord, it not only considers the bank's expected compensation, but also increases the compensation of non-expected loss in order to cover risks. Model form can be expressed as:

$$R_i = f(r_{CF}, r_{DP}, r_P, r_{AC}, R^*, r_T, r_E, \varepsilon) \quad (1)$$

R_i -interest rates of loans to SME clients *i*.

4. Empirical Analysis of Loan Pricing Model of SMEs

Using Tobit model to review regression analysis of the actual weighted average interest rate R0, result is as follows:

$$r_i = 7.054 + 3.396 r_{DP} + 0.564 r_k \quad (2)$$

$$Z=(42.02) \quad (5.81) \quad (1.22)$$

From the test results it can be seen that intercept 7.05 is more than the sum of various constant variables 6.76, that is, $r_{CF} + R^* + r_{AC} + r_E + r_T = 6.76$ which explained that the model estimates to the cost and the anticipated profit haggles over high. In the model, parameter is 3.396, much larger than 1, indicating that the model also considers the risk factors, the risk is more sensitive, that is, the higher credit risk customers with lower credit ratings, customer lending rates are generally higher. Therefore, the model set in this paper is a basic and effective and feasible.

5. Conclusion

The paper specially suggests market-oriented cost-plus pricing model and the model method according to the characteristics of SME loan pricing. Based on the cost plus loan pricing models, First, use the benchmark interest rate produced by market competition take the place of internal capital costs; Second, take place of internal target profit by interbank average capital ratio; Third, introduce excess earnings variable into pricing methods and adjust competitive position of bank and credit customers in the use of market competition principles; The fourth, on the purpose of fully cover the risk introduce Variable compensation for unexpected losses which is based on risk measurement techniques of "Basel Capital Accord" in pricing methods on the purpose of fully cover the risk. At the same time, the paper made an empirical test based on loan pricing examples of ten credit customers of small and medium banks, which proved the reasonable and effective of loan pricing model and method which the paper suggested.

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