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Risk Tolerance in Bank of China JSC

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Abstract: *Today, the banking environment presents unprecedented challenges to successfully manage risk and build a platform to achieve predictable and sustainable returns. Even in a tight economy, banks were able to effectively perceive risks and respond to them in a timely manner. Of course, there were notable cases when banking organizations in Kazakhstan did not sufficiently identify existing risks or responded to them insufficiently effectively. As practice shows, these results are not only unfavorable for banks, but also for the industry as a whole. That is why there is a need to consider the concept of risk tolerance as a tool that allows you to determine the maximum level of risk that the bank considers optimal to achieve its goals. The purpose of this article is to determine risk tolerance, as well as the possibilities of its assessment at the present time. The object of the study is the second-tier bank "Bank of China Kazakhstan" JSC. The subject of the study is the assessment of risk tolerance in Bank of China Kazakhstan JSC.*

Keywords: *risk tolerance, risk assessment, banks, credit risks, limits*

1. Introduction

Risk tolerance is a critical tool for effective decision-making and management of the effectiveness of the financial results and reputation of the bank [1]. It is important to determine a bank's risk tolerance before undertaking risk management. This is because the level of risk a bank is willing to take on will determine strategies for managing these existing and potential risks. A consistent approach will ensure that all transactions accepted throughout the transaction are carried out in accordance with the overall strategic goals of the bank.

Risk tolerance is primarily determined by the goals and expectations of the bank. A bank should not determine risk tolerance without taking into account its ability to accept risk. The board and management of a bank may have a high risk appetite but may not have the capacity to cope with potential volatility or exposure to risk. Conversely, risk tolerance may be high, but the bank may decide, based on strategy, management objectives, and shareholder expectations, to accept lower levels. Thus, it can be noted that risk tolerance sets the limits of the investment risk that the bank is willing to accept. If the bank declares that it does not want to take investment risks that may lead to a decrease in its income by more than 10%, thus it demonstrates risk tolerance.

Despite the fact that risk profiles have been created in banks today and they really cover most of the risks, Kazakhstani banks do not pay due attention to assessing risk tolerance.

2. Methods

As practice shows, the majority of Kazakhstani banks use the VaR method. However, the analysis of practice showed that banks use VaR to calculate the limits of their positions on risks that have nothing to do with risk tolerance. The use of VaR is quite logical, however, from a slightly different perspective. As we found out earlier, risk tolerance includes two levels of risk limits - upper and lower. Therefore, the application of VaR should be used in the context of limits for assessing risk tolerance.

Kazakhstani banks practically do not consider such a category as risk tolerance and set only the limits of risks, based mainly on the NBK standards. Meanwhile, the Basel Committee on Banking Supervision and Regulation considers risk tolerance as one of the main aspects of risk management in banks.

VaR does not take into account return extremes, since empirical distributions have "fat tails" and are not normal in practice [2]. The most correct option for assessing the risk tolerance of banks is the CVaR (Conditional Value at Risk) method, which allows you to estimate the expected losses if the worst limit of the VaR point is overcome. With the help of CVaR, it is possible to determine the risk exposure corridor,

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that is, the lower and upper limits for risk tolerance.

If α reflects a confidence interval, then the expected loss, estimated as a conditional expectation, exceeding the VaR values will be as follows [3]:

$$CVaR = \int_{VaR}^{\infty} \frac{x*f(x)}{f(x)} dx \quad (1)$$

α – quantile distribution of the corresponding level of probability;

f(x) – loss distribution probability function;

x – amount of loss.

To assess risk tolerance, we used the financial statements of Bank of China Kazakhstan JSC for the period from 01/01/2011 to 01/01/2021. and currency trading operations from 01/01/2019 to 01/01/2021. The calculation was made for some areas of the bank's activities as an example.

3. Results

Some definitions consider the adoption of risk tolerance as a quantitative measure to link actions and consequences in risk assessment methodology. Therefore, the bank's propensity to take risks should correspond to acceptable risk values. This is important when assessing investment risks, since capital investments in banks play a significant role in active operations, allowing not only to receive additional income, but also to maintain the liquidity of banking operations.

Risk tolerance, on the one hand, can be measured as an acceptable / unacceptable range of variation relative to the achievement of a particular goal. The risk tolerance provides limits on the level of risk that can have upper and lower bounds. Risk tolerance can be assessed using the same units of measure as the respective targets. These risk tolerances can be accompanied by a risk objective, which is the desired level of risk that the bank is willing to take on. This can often be some level within acceptable risk limits.

First of all, STBs of Kazakhstan should draw up a single map, where you can see all risk tolerances for all risk categories at the same time. For example, banks in Kazakhstan could develop a risk tolerance matrix that is individual for a particular bank and based on the specifics of its investment activity (Table 1).

<table>
<tr><td colspan="3">risk correlation</td><td rowspan="6">risk correlation</td></tr>
<tr><td>Shares A</td><td>risk correlation</td><td>0,433</td></tr>
<tr><td>Shares B</td><td>risk correlation</td><td>0,731</td></tr>
<tr><td>Stocks C</td><td>risk correlation</td><td>0,871</td></tr>
<tr><td>Shares D</td><td>risk correlation</td><td>0,4781</td></tr>
<tr><td colspan="2" rowspan="2">risk tolerance</td><td>risk correlation 3,2%</td></tr>
<tr><td>risk correlation Non-market risk</td><td rowspan="6">risk correlation</td></tr>
<tr><td>Bonds A</td><td>0,5-1%</td><td>0,034</td></tr>
<tr><td>Bonds B</td><td>0,5-1%</td><td>0,577</td></tr>
<tr><td>Bonds C</td><td>0,1-0,3%</td><td>0,213</td></tr>
<tr><td>Bonds D</td><td>0,1-0,2%</td><td>0,544</td></tr>
<tr><td colspan="3">risk correlation</td></tr>
</table>

Table 1: An example of a risk tolerance matrix for a bank

In this example matrix, green indicates low levels of risk correlation, orange indicates medium levels of risk correlation, and red indicates high levels of risk correlation. Instead of risk categories indicated on the map, banks can use investment instruments.

Currently, the risk assessment models recommended by the Basel Committee are based on the assessment of economic capital. At the same time, there is no single approach to assessing risk tolerance in the world yet.

Some banks still use the definition of risk limits based on the budgets of previous years. At the same time, banks simply carry forward the budget of the previous year to the next year with minor adjustments for the expected exchange rate and inflation. As a result, the shortcomings of the previous period are gradually transferred to the planned year.

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Being aware of residual risk and investing within risk tolerance gives management greater confidence that the bank is staying within its capabilities. This, in turn, provides a higher level of comfort for the bank to achieve its strategic goals. As a result, risk tolerance demonstrates the level of investment risk that a bank is able and willing to accept on a particular financial instrument. Banks must take risks in order to make a profit or make a profit for their customers. At the same time, banks may be able to tolerate or absorb a different level of risk without significant losses and impact on the achievement of their strategic goals, which is expressed in their risk tolerance. It can be noted that risk tolerance is the risk that the bank prefers to accept in reality in relation to a certain type of investment.See Table 2 for specific data.

Table 2: Percentage risk of investment, million tenge

Indicators	01.01.2019 г.	01.01.2020г.	01.01.2021г.	01.01.2022 г.
Impact on earnings				
Financial assets: Loans to customers	15888	27511	28636	35878
Financial liabilities: Due to credit institutions	841	16628	473	4369
Net impact on earnings	15047	10883	28163	31509
Impact on equity				
Financial assets: Loans to clients	15888	27511	28636	35878
Investment securities for sale	24943	55659	64283	59383
Financial obligations: Funds of credit institutions	841	16628	473	4369
Net impact on equity	9896	39031	36120	27874
Note: based on source [4]				

According to the table, the impact of interest rate risk on the profit of the bank increased noticeably in 2022 by more than 2 times compared to 2019, when this figure amounted to 15,047 million tenge. However, it is worth noting that in 2020 the impact on earnings decreased by almost 1/3 compared to the base year 2019.

The impact on equity reflects the effect of possible changes in interest rates due to changes in retained earnings and the effect of the revaluation of investment securities held for sale with fixed interest rates. The impact on equity in 2020 increased by almost 3 times compared to 2019, but at the same time had an annual downward trend, which experienced a sharp increase in 2021.

4. Discussion

According to the data obtained, the risk tolerance for currency investment transactions in US dollars has the following values.See Table 3 for specific data.

Table 3: Results of risk tolerance calculation

df	σ	Average value, mln tenge	Most probable value	min,%	max, %	CVaR long	CVaR short
99%	1,94%	9,70	0,12%	4,1	4,4	4,5	4,0
97%				3,4	3,6	3,7	3,2
95%				3,0	3,2	3,3	2,8
Note: based on the source [5]							

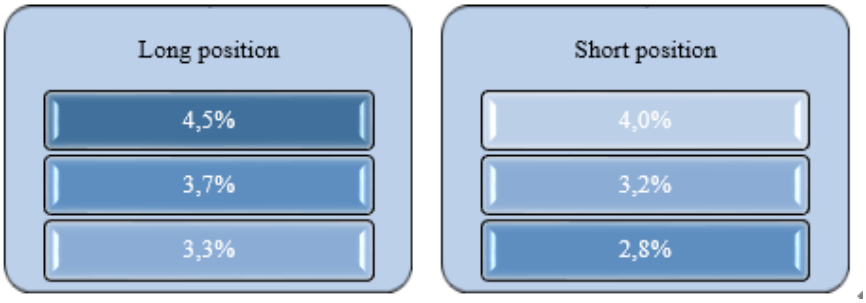

Figure 1: Risk tolerance for foreign exchange investment transactions in US dollars Bank of China Kazakhstan JSC

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You should evaluate the values separately for long (buy) and short (sell) positions. To determine the CVaR for a long position, the maximum value plus the most probable value is taken into account. For a short position, on the contrary, the minimum value minus the most probable value.

Thus, we obtain the following values of risk tolerance for the currency investment operations of the bank (See Figure 1 for specific data):

According to the data in the table, with a 99% probability, the bank's US dollar amount will not decrease by more than 4.1% of the average value and will not rise by more than 4.4%. As a result, the lower limit must be considered at the position of the 95% confidence interval, and the upper one at the level of 99%. As a result, risk tolerance for Bank of China Kazakhstan JSC should be set as follows: for a long position 3.3-4.5%, for a short position - 2.8-4.0%.

5. Findings

A big problem for Kazakh banks is to set limits on risks. RTBs set risk limits, but do not sufficiently limit risk tolerance. Limits are often set so high that it is almost impossible to break them. This calls into question the whole structure of risk tolerance. In addition, if the limits were violated, then this is limited to explanations in the report, but no significant action is taken. When a bank simply increases or redistributes limits, thereby undermining the very idea of a risk tolerance structure.

Of course, the presented methodology for assessing risk-tolerance should be adapted to the specifics of the bank's activities and strategic goals. Backtesting is well suited for this, allowing you to return to forecasts and calculations and calculate data on facts for comparison with forecasts. If there are discrepancies, the previous calculations should be corrected, “tamping” the values under the real coefficients. Only after the methodology is adapted in this way to the activities and goals of the bank and reflects real positions, it can be applied in the future, but with constant monitoring.

6. Conclusion

In this paper, the second-tier bank "BOC Kazakhstan" JSC is used as a research object to study the risk tolerance of BOKA KCA. The study found that banking organizations in Kazakhstan did not adequately identify existing risks or did not respond effectively to those risks. Therefore, in order to make these banks perceive risks effectively and react in a timely manner in the new economic environment, it is necessary to think of the concept of risk tolerance as a tool to determine the optimal maximum level of risk that banks believe to achieve their objectives.

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