

MS-E2177 - Seminar on Case Studies in Operations Research

Assessing Concentration Risk in a Bank's Corporate Deposit Base

Interim Report

Case Group SEB

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1 Changes in the project objectives and scope

Compared to the previous project plan and the objectives mentioned therein, we have since narrowed the scope of the project. Initially, we set out to construct a model that the client would be able to incorporate as a ready-to-use product, but we have since realized that is not a realistic option given the limited resources and time-span of the project. Instead, we have pivoted more towards focusing on comprehensive reporting and outlining the methodology one can use to measure concentration risk, using different statistics and methods that provide an overall view of how concentration risk can be assessed in a given deposit portfolio.

In other words, there is a more notable emphasis on providing meaningful information to the client by constructing a set of reasonable measures and deriving recommendations from those, rather than developing a ready-to-use product. Additionally, the quantification of concentration risk has proven to be more so a set of different risk measures and assessments rather than one-dimensional measurement. That makes it more difficult to develop a general model to measure concentration risk. Identifying key factors is therefore also of less importance than initially thought, as the deposit portfolio might prove a bit difficult to control in terms of some variables, such as countries.

While we initially set out to benchmark our solution against existing methodologies covered in literature, or at use in banking and other industries, that proved to be quite challenging due to the lack of existing literature surrounding the topic. There is a lot of literature regarding concentration risk itself, but more often than not it was related to credit risk, and we found those a bit hard to connect to our case. Hence, we have more or less benchmarked against [1], which was introduced to us by the client.

Additionally, the assessment of deposit stickiness will not be considered at all. According to the client it was more of an optional idea that could be implemented if given enough time and deemed necessary, but it is not within the core aspects of the project and hence will not be implemented, at least based on the current outlook.

2 Description of the project status

This section is about the current status of the project. It will cover already completed tasks, current tasks, and remaining tasks. Overall the project is mostly on schedule based on our preliminary schedule.

2.1 Completed tasks

This project aims to assess the concentration risk in the depositor portfolio of SEB. We started our project by going through the literature on concentration risk. We evaluated how different industries assess concentration risk and we read literature about suitable mathematical models for concentration risk. After gaining a better understanding of concentration risk we came up with the following mathematical models and approaches:

- Time series approach
- Bayes' Network
- Social Network Approach

- Gini coefficient
- Partial Portfolio Approach

After consultation with our client, we decided to focus on the time series approach. The client provided us with the needed data for our approach. By implementing our model we were able to get some first insights into the degree of concentration in the depositor base of SEB. We concluded that for some of our approaches, we require more detailed data. Additionally, we evaluated the potential influence of external factors to concentration risk.

2.2 Current tasks

We received the updated data from our client, hence one current task is to run our model on the updated data.

Through conversation with Ahti Salo and inspiration from him, together with the insights we have developed throughout this project, we are considering the following approaches:

- Agent-based approach
- Brute force approach to find clusters
- Developing a more sophisticated algorithm to find meaningful clusters

After implementing these approaches, we benchmark the results we get.

2.3 Remaining tasks

The remaining tasks include testing and finalizing our approaches, summarizing the results, and presenting those to our client SEB. Additionally, we will write the final report, where we also present our approaches and results in detail.

3 Changes to the initial project plan

For the remainder of the project, there are some minor changes to the initial project plan. First of all, the selection of the final model was due at the end of March, but this task has to be postponed until mid-April. The reason for the delay was that by the time of the deadline of that task, our team felt that there are still potential solution possibilities to be discovered. On the other hand, the exploration of solution possibilities has also proven to be an even more important task than initially anticipated, hence taking slightly more time than originally planned.

When it comes to other changes to the initial project plan, we note the validation task was originally scheduled from the beginning of April to mid-April. However, the validation process has proven to be an ongoing process throughout the project, and we started with the task already in March when exploring the first solution possibilities. Contrary to the initial project plan, it will also be an ongoing task until the end of project or at least as long as new methods are being implemented. Lastly, the deposit stickiness analysis will be removed from the project plan, as indicated in Section 1.

4 Updated risk management plan

The risk management plan from the project plan has been updated to reflect the current state of the project. While most of the risks are retained, their likelihood of occurrence has been adjusted. The initial likelihoods are shown in parentheses in Table 1. The same scale [low (unlikely: not expected to occur, but possible), medium (may occur: as likely to happen than not), high (likely to occur)] is maintained.

The risk concerning the "Client is not committed / active" is removed, as we no longer consider it a risk. However, two new risks have been identified and added to Table 1. We have encountered difficulties in finding enough relevant literature to support our methodologies, and we have realized that our approaches may lack an insider's perspective.

The updated risk management plan, showing only the modified parts, is presented in Table 1.

Table 1: The updated risk management plan.

Risk	Likelihood	Consequences	Mitigation
Insufficient (too broad, narrow, misaligned) project scoping	Low (Medium)	Objectives are not met. Schedule risk increases.	Discuss with the client regularly. Spend enough time on the first stage (understanding the problem).
Coordinating meeting times	Low (Medium)	Problems with progress.	Agreed weekly meeting time. The whole group is not necessarily needed in all meetings.
Unable to find enough relevant literature	High	Finding suitable methods and approaches as well as justifying them is difficult. The obtained results are not useful or reliable.	Use diverse sources and explore similar applications in different fields. Discuss with the client and Ahti.
Lack of domain knowledge	High	The developed methods do not meet the client's needs.	Regularly discuss the methods with the client and adjust direction as needed.

References

- [1] Ragnar E Juelsrud. Deposit concentration at financial intermediaries. *Economics Letters*, 199: 109719, 2021. doi: <https://doi.org/10.1016/j.econlet.2020.109719>.