STOCKHOLM UNIVERSITY Department of Computer and Systems Sciences

RIMA HT2019

Assignment 4: Financial Risk Management

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Word count: 2111

1. Introduction

In the fourth assignment, is asked to choose one of the case studies present in *Chapter 20 (Sweeting 2011)* and apply a thorough financial risk management process to the given problem and document it. After it, criticise the approach and report the risk methodological flaws and weaknesses.

The case study that I decided to choose is *Korean air;* it analyses a risk management case of a Korean flight company with a high percentage of aircraft per million departures. Precisely, this study case focuses on the 1997 crash of Korean Air flight 801 in Guam.
In according to Sweeting, "The majority of the case studies here relate to financial institutions since these are the ones that can be related most closely to the principles in this book" *(Chapter 20 - Sweeting 2011).* I decided to choose a non-financial example because it is a less specific field and can fit with different areas and cases that has similitudes with this case.

The case study is divided into five paragraphs, in which the first is the introduction of the case, the second explains the case, the third describes the reasons for the accident, the fourth talk about the improvement that the company has adopted to limit the number of crash, and at the end the fifth explain the Implications for financial organisations.

2. Case study - Korean air flight 801

In August 1997, Korean Air flight 801, a normal scheduled flight, was trying to land in bad weather. The Glide scope was out of action, so the captain decided to follow a radio beacon until the runway was in sight, and then carry out a visual approach. When the captain saw the airfield, he immediately switched the approach from the radio beacon to the visual, but a storm moved in, and the weather become a worse quickly. In this condition, the flight engineers decided to warn the captain twice, but in both cases, the warning was ignored. This situation catastrophically finished with the death of 228 people out of the 254 passengers on board.
One of the reasons about the crush can be found in the hierarchical nature of Korean society because as it is known, the Korean society is based on respect for the elderly and the highest job positions. For this reason, the flight crew didn't warn the decisions made by the captain, even if it was strictly necessary for them to do so.

After 1999, no more crush happened to Korean air.
We can find the reasons in multiple choices implemented by David Greenberg about the company.
To face the Guam crash and similar crashes, the main change that David Greenberg has implemented is to introduce a new strict rule: everyone in the cockpit are allowed to talk just English language. This was an elementary rule but so effective, because avoid all the possible misunderstanding between flight crew and air traffic control.
Also, this rule solves the problem that was mentioned before, about the hierarchical nature of Korean society. Talk English language, and not Korean, allow the Korean flight crew to "undress" themselves from the Korean rules, and be more shameless.

3. Financial risk management process - Korean air case study

3.1 Risk definition

In according to *chapter 7, headed Definition of risk, Sweeting (2011),* which also reflects Hopkins' idea*,* is fundamental for each company to identify the risks they face.
For this reason, in Table 1 I'm going to present some risks, connected to their type of risk, that Korean Air has to face after the 1997 crush which has led to an incredible number of deaths.
Is important to keep in mind that the types of risks that I'm going to include in the table 1, does not include all of them because there are countless types of risk.

Risk Index	risk for Korean Air	Type of risk
1	Equipment malfunction or failure on the aircraft	Operational risk: technology risk
2	Malfunction or failure of a piece of aircraft	Operational risk: technology risk
3	Bad weather during the whole flight, or just the departure or landing	Operational risk: Business continuity risk
4	Turbulence in flight, which cause bad mood and discomfort	Operational risk: Business continuity risk
5	Problems of communications between flight crew and air traffic control	Operational risk: people risk

6	Problem in dealing with emergency situations between flight crew and captain caused by cultural factors	Operational risk: people risk
7	Loss of agreement with other companies	Reputational risk

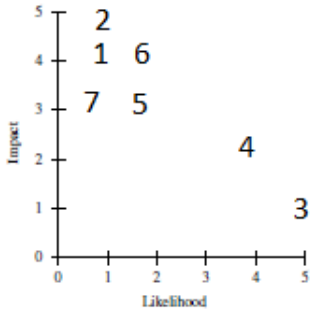
Definition of risks in according to Sweeting (2011):

- Operational risk: Business continuity risk: "are a group of risks which impact on the way in which a firm carries on business."
    - Business continuity risk: "This is the risk that an external event will affect the physical ability of a firm to carry on business at its normal place of work."
    - Technology risk: "This is the risk of failures in technology, including unintended loss or disclosure of confidential information, data corruption and computer system failure."
    - People risk: "non-criminal actions that can adversely affect an enterprise."
- Reputational risk: "is essentially a risk that arises from other operational risks."

3.2 Risk assessment

In according to Sweeting (2011), after identifying risks, another crucial step is the Risk assessment.

For the Korean Air case study, the best approach that I can use is the risk map. It consists in positioning every single risk that I found in the previous step, in a map based on the impact that the risk can have on the company, and the Likelihood of occurrence about that risk. I decided to identify every risk with an index number and represent the risk with it.



3.2.1 Deepening about financial risks: Risk measures

In according to Sweeting (2011), The risks can be measured in different ways, with a different level of complexity. Basically, the most straightforward approaches use the broad-brush methods, it means that "at best key risks can be overlooked, and at worst that there is active regulatory arbitrage in order to maximise the genuine level of risk for a stated value of a risk metric."

However, we know that if we use broad-brush approaches, we are using an

imperfect approach, we can use them to have an idea, an indication of the level of the risk.
Of course, if we are going to use complex approaches, a more significant range of risks can be covered, with better accuracy of different levels of risks between firms.
However, also complex approaches have their problem: one of this is the "false sense of security in models", especially for the risks that can come from events with extreme low likelihood, because most of the times, the models are not good in this cases.

3.2.1.1 Deterministic approaches

In the previous paragraph, we talked about the broad-brush approaches. These approaches are Deterministic.Mainly, the deterministic approach consists in "taking the item to be measured and performing a simple transformation of it in order to get to the item to be assessed."
We can see some examples:

- *Notional amount*: "*In market parlance, notional value is the total underlying amount of a derivatives trade. The notional value of derivative contracts is much higher than the market value due to a concept called leverage*"
  (https://www.investopedia.com/terms/n/notionalvalue.asp)
  The strong point of this approach is that it is easy to implement and interpret. The defects are that it can be used only if the asset class is defined. This approach also fails to distinguish between long and short positions.
- *Factor sensitivity*: produces a revised value of assets and, possibly, liabilities based on a change in a single underlying risk factor.
  The defect of this approach, consist in be bad at assessing a broader risk profile.
- *Scenario sensitivity*: consist in combine various stresses into scenarios.We could use this approach because it is more robust than considering individual factors.

3.2.1.2 Probabilistic approaches

In the paragraph 3.2.1, we talked about the complex approaches. Usually, they are probabilistic. The utility of this approach consists in using statistical distribution for measuring risk and the feature of that distribution.

In according to Sweeting (2011), there are different Probabilistic approaches. I will list the principals:

- Standard deviation: “The standard deviation of returns is often used as a broad indication of the level of risk being taken and is used in a number of guises.” It is used in the portfolio volatility, calculated in different ways: retrospectively, semi-prospectively, fully prospectively.
  One other common use of the ST is in pension scheme analysis.
- Value at Risk (VaR): “It can be defined as the maximum amount that will be lost over a particular holding period with a particular degree of confidence.” We can use different approaches to calculating VaR: empirical, parametric, stochastic.
- Probability of ruin: We can explain it as the reciprocal of VaR.
- Tail VaR: “Tail VaR can be defined as the expected loss given that a loss beyond some critical value has occurred”. Also, for the Tail VaR, we can use empirical, parametric and stochastic approaches to calculating it.

regarding the case study Korean air flight 801, it is hard to find risks to which to apply the approaches discussed in paragraph 3.2.1. The reason for this is that the risks connected to this case are difficult to be quantified. For this reason, I will use the risk map.

3.3 Responses to risk

In according to Sweeting (2011), after identifying risks and the Risk assessment, the final step is the response to risk. Last but not least, because explaining how to face the risk if it materialises in an event.
In according to Sweeting (2011), there are four types of action that the companies can undertake; these are the definitions that Sweeting (2011) give at these categories:
- Accept: “Accepting the risk implies that no action is taken to respond to the risk.”
- Transfer: “Risk transfer is a key response to risk. This involves changing the exposure to risk by transferring the consequences of a risk event to another party.”
- Remove: “Removing a risk means ensuring that an institution is no longer exposed to that risk at all.”
- Reduce: “Risk reduction involves taking active steps to limit the impact of a risk occurring.”

In the table below, I will represent the risks with the relative responses and actions:

risk for Korean Air	Response	Action
Equipment malfunction or failure on the aircraft	Remove	It's important to prevent this type of risk because the consequences could be devastating. So the company can invest more money in the maintenance of internal devices and not set monetary limits to this, in order to avoid breakdowns and malfunctions.
Malfunction or failure of a piece of aircraft	Remove	As the risk before, it is important to prevent this type of risk because the consequences could be devastating. So the company can invest more money in the maintenance of the aircraft and not set monetary limits to this, in order to avoid breakdowns and malfunctions. Could be better to focus more on the piece who are more likely to have problems
Bad weather during the whole flight, or just the departure or landing	Accept	Is an acceptable risk, can be solved just training flight crew to reassure travellers and keep calm.
Turbulence in flight, which cause bad mood and discomfort	Accept	As before, is an acceptable risk, can be solved just training flight crew to reassure travellers and keep calm.
Problems of communications between flight crew and air traffic control	Reduce	Is important to reduce this type of risk, it can be solved by standardising the spoken language, as did David Greenberg in this case study.
Problem in dealing with emergency situations between flight crew and captain caused by cultural factors	Reduce	As before, it can be solved by standardising the spoken language, as did David Greenberg in this case study.
Loss of agreement with other companies	Accept	Avoiding problems due to personal safety, the probability that this type of risk can occur is low. Consequently, a possible action is to lower the probability of occurrence of the safety-related risks mentioned above.

4. Conclusion

In conclusion, it was very interesting to work on this assignment.
This highlight how this type of approach can be adapted to many fields and real examples.
The only negative factor is that working on a qualitative case can be reductive since the approaches used (such as the risk map) are subjective.

References

- Sweeting, P. Financial Enterprise Risk Management. Cambridge University Press, 2011
- Hopkin, P. Fundamentals of risk management: understanding evaluating and implementing effective risk management. Kogan Page, 2017
- https://www.investopedia.com/terms/n/notionalvalue.asp