

## **EXECUTIVE SUMMARY**

### **Problem**

The IT team of the Department of Banking and Finance (DBF) has developed a computer-based simulation of financial and macroeconomic data with the aim to deploy it for the seminar “Advanced Portfolio Management Game”, offered by the University of Zurich. The first objective of this thesis is to expand the existing simulation by adding an economic view and thus make the simulation more realistic and enhance the learning opportunities for seminar participants. The second objective of this work is to enable any game master to lead the simulation by simply reading the instructions and applying the proposed gameplay steps and without having previously been involved in the simulation development process.

As the game participants are provided with economic forecasts upon which they decide on an asset allocation, it is crucial for them to understand the effect which macroeconomic, financial and other factors have on the financial market. This thesis, however, chooses to focus specifically on how those factors influence the bond market to create a valuable addition to Kotsonis' (2019) previous work. Hence, the work includes a literature overview section, describing the theoretical effect of all factors featured in the simulation and comparing those results to empirical findings. The objective of this thesis' empirical part is to further develop and elaborate economic scenario sequences that are replicable by the game master and to supplement all scenarios with forecast materials. Moreover, several surprise announcements are developed and integrated into the gameplay to increase both the suspense and the educational purpose of the seminar. Finally, the thesis terminates with a conclusion and further implementation ideas.

### **Method**

To generate gameplay options that are easily replicable by the game master, this thesis uses seeds which were previously generated by the DBF's IT team. The seeds are created by defining 20 seed scenarios and constructing 10 seeds for each seed scenario, resulting in a total of 200 seeds. Each of these seeds triggers a fixed outlook with corresponding returns.

As a first step to generating gameplays, the thesis constructs 4 strategies based on the possible input factors of the simulation, namely Real Gross Domestic Product (RGDP), long-term Interest Rate (IR) and Exchange Rate (ER). It is furthermore ensured that those strategies mostly adhere to the theoretical business cycle approach. As a second step, specific seeds, matching the strategy premise, are examined in their outlook and return results. Following that, six specific seeds are chosen and then strung together in a reasonable sequence, building a gameplay option consisting of six periods. Overall, the economic outlooks, triggered by all the chosen seeds, mostly match the seed returns and the represented business cycle such as expansion or recession.

Additionally, one gameplay option of each strategy embodies the possibility to include a surprise announcement in one of the six periods. Such surprise announcements are generated by picking seeds with distinctive returns and fabricating a matching story.

The forecast materials which are created within the scope of this thesis allow the student to analyze realistic outlooks and are mostly modeled after articles of important business newspapers. The created articles thereby granularly focus on the up- or down-movement of solely one country-specific factor. The articles also do not mention any specific returns and refer to the future as the upcoming period. This allows the game master to use the same forecast material for several different seeds as it is generally applicable. It also hinders the students to predict the returns based on the forecast article.

## **Results**

With the method described above, four gameplay strategies are formulated in this thesis. The first strategy focuses solely on RGDP input characteristics. The second strategy concentrates on IR input characteristics and the third strategy limits itself to the ER input characteristic. The last strategy combines all three input characteristics thereby creating a mixed strategy. Each of the strategies has a certain number of gameplay options from which the game master can choose. There are three gameplay options adhering to the RGDP based and the mix-based strategy and two options following the IR and ER based strategy, resulting in a total of ten gameplay possibilities.

Additionally, one gameplay option of each strategy holds the possibility to activate a pop-up announcement, changing the game development to the surprise of the participants. Overall there are six surprise announcements detailed in this thesis. Each announcement possibility comes with a matching seed and story. The story is kept in text format, allowing the game master to easily input that text in the ongoing simulation and making all pop-up announcements look the same.

The generated forecasts describe the up- and down-movement of all the following factors: European, Swiss and US GDP; European, US and Chinese Consumer Price Index; European, US and Swiss long-term IR; US, Russian, Chinese and Brazilian Exchange Rate; European, US and Japanese Unemployment Rate; US, Chinese and Indian Consumer Confidence; and European, US and Chinese Business Confidence. This results in 44 forecast materials.

## **Evaluation**

The constructed gameplay possibilities, announcements and forecast materials facilitate the lead of the Advanced Portfolio Management Game while also making the simulation more realistic. The suitability of the gameplay options is tested with an extension of the original Python modules and while not all factor movements fit perfectly the overall results are very satisfactory. Therefore, this thesis fulfills its main objectives. Possible additions to the simulation are an increased number of seed scenarios and, accordingly, a bigger variety of factor movements which could further improve the educational outcome for the seminar participants.