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## Exploring consumer credit risk with Slovenian undergraduate students through a role-play

### Abstract

In this paper the authors introduce a role-playing classroom exercise on consumer credit risk, which was carried out during an undergraduate course on risk management. The purpose of this research is to find a teaching tool in credit risk, which would boost motivation, encourage basic intuition, and prevent from overconfidence into quantitative tools in risk management. The authors create a role-play which uses a modified form of “speed dating”. This forms the basis for the interaction between each bank representative and loan applicant. The results show that the learning process is being stimulated importantly.

**Keywords:** role-play simulation, teaching games, consumer credit, credit risk, risk management.

**JEL Classification:** A22, C90, G21

### Introduction

Teaching finance today without the use of some form of game, simulation or classroom experiment, would be as straight as teaching chemistry without using a laboratory. In the existing literature there are numerous classroom experiments proposed for microeconomics, including the role of money, financial markets or international trade. Higher education faces challenges in the teaching process (Light et al., 2009). New teaching methods in higher education are used in order to support collaborative learning, critical thinking and active learning. Teachers, therefore, use innovative concepts (Alden, 1999; Buchs and Blanchard, 2011). Also, teaching methods follow research methods, like Smith's (1994) experimental economics. An example for futures trading is given by Hunsader et al. (2011).

In banking, probably the best known classroom experiment is the bank run experiment by Dieter Balkenborg, Todd Kaplan and Tim Miller (2011). Kassis et al. (2012) present a teaching experiment, which deals with the role of banks as financial intermediaries as well as interest rates. It is intended as a discussion on the moral-hazard problem of deposit insurance and its impact on depositor and bank behavior. Servátka and Theocharides (2011) provide an experiment on credit risk with an emphasis on the notion of risk and return, the dynamics of bond prices, and other general characteristics of the bond markets. In the existing literature we did not find a game or a classroom experiment addressing consumer credit risk, therefore the focus of our exercise is to provide a teaching tool for topics in the consumer credit market and the risk management techniques employed there.

Another form of effective learning methods for the web-based generation are role-plays. An interesting example in economics is presented by Buchs and

Blanchard (2011). They have created a role-play to clarify the outline of the concept of sustainable development. Their role-play teaches theoretical snapshots, practical concepts, and key issues related to sustainable development.

As mentioned by Holt and Laury (1997) “abstraction can cause some students to lose basic intuition,” which the authors believe is fundamental to risk management. In an undergraduate risk management course, students might become overconfident in the quantitative tools used in risk management consumer credit risk. Therefore, before introducing undergraduate students to quantitative modeling of probability of default (PD), loss given default (LGD) and exposure at default (EAD), a simple consumer credit risk role-play was used.

The benefits of using simulations, games, role-plays and classroom experiments have been reported in the existing literature (e.g. Sutcliffe, 2002; Balkenborg and Kaplan, 2009). In the literature the positive impact of teaching experiments when they are combined with some additional task, like writing a report, was founded by Cartwright and Stepanova (2012). But regardless of the impact that an experiment can have on the learning outcome, it is always an interactive and dynamic way for a lesson in finance to be taught.

In this paper, the authors will describe the role-play scenario, which they have created. Next they are presenting our results. In the fourth chapter, the authors will outline the discussion that was sparked by this game when we tried it in our class. The authors will also report what learning outcomes could be expected. Finally, the authors draw conclusions, propose enhancements and policy implications.

### 1. Methodology

The authors created a role-play with the following methodological features. In order to keep the necessary time at a reasonable level (less than 30 minutes), the authors formed a group of 10 students for

this exercise. In author's class, the few remaining students assisted in managing the game, without taking a role in it. Depending on the number of students in the classroom, additional groups of ten could be added. If additional students cannot form a full group of 10, the teacher should prepare material in advance for groups of 8 or 12 students, or another even number. However, all students should participate in the classroom activity.

Additional groups should perform the game at the same time as the first one, in order to ensure that the duration time is the same. Also, additional groups should use the same game materials in order to gain the ability to make comparisons.

When there are 10 students in each group, five are assigned as bankers while the other five are loan applicants. In this way we get 5 pairs representing the credit market. If the number of pairs in a group would be augmented, the time needed for the game would be longer. Since the aim of the game is to build the starting point for a discussion, it should also leave enough time for discussion.

The role-play scenario follows the principle of the concept commonly known as "*speed dating*". In the game, the interaction between each bank representative and loan applicant is acted out. First, the general instructions are read aloud. Then, each student gets their instructions either for a bank representative or loan applicant (they are presented in the Appendix). Additionally, each applicant is given basic information about their role: monthly net income, age, education, employment, property, car ownership, stocks and savings, debt, and living costs (which cannot be reduced). There are also some characteristics that the students create before the game starts: gender, the purpose of the loan, job type, marital status, number of dependents, and the usual sorts of discretionary spending (i.e. travelling, restaurants, hobbies, sports, books, magazines, accessories, home entertainment electronics). If the banks ask for information that was not recorded on the sheet before the game, it can be added by the student during the game but should be noted immediately. In this way, the authors get five very different profiles of loan applicants. Two of them are purposefully extreme, for which the creditworthiness in one case, and inability to repay the loan in the other case, should be very obvious. Students playing the role of loan applicant are given some time before the game starts, during which they can make themselves familiar with the social and financial characteristics they have been given, as well as flesh out their own.

Students in the role of the bank representatives were given financial information about the loan products they may offer in 4 aspects: loan amount, costs of loan insurance, maturity, and interest rate. Loan insurance is associated with costs that are to be covered

by the loan applicant and are due immediately; therefore insurance will not be preferred by the applicant. The insurance reduces the loss in case of default, while the obligation to repay the loan remains, changing only the beneficiary, now being the insurance company. The authors expect the bank to request insurance in cases of weaker creditworthiness. Since all applicants prefer a higher loan amount, the banks are expected to approve such loans only in cases where they estimate the repayment probability as being very high. Before the game starts, students are given some time to get familiar with the loan product and options they may offer.

The aim of the exercise is to imitate consumer credit market interactions. The loan applicant has the goal of getting a loan, with his preference being the higher loan amount and with no additional costs associated with insurance. The banker's objective is to get clients for the bank in order to gain interest, while minimizing possible future losses from bad loans. Therefore, they must decide to either approve or reject each application.

After reading the instructions, the first round of the game is begun. In each round the pairs have 2 minutes to exchange information. The bankers ask for information that they believe to be relevant. At the end of the period the banker decides whether to approve or reject the application. Alternatively, he may offer a loan for a smaller amount or for a longer duration. He informs the applicant and notes his decision. In the next 30 seconds, the credit applicants switch seats and move to the left, so that new pairs are formed.

## 2. Results

Before conducting the role-play with a group of student, the authors have expected very similar decisions to be taken by loan officers. Ideally, the same decision would be taken by the bank representatives. At the very least, uniform decisions would be expected for the two extreme applicants. In our case, only one group of 10 students was formed; two students assisted in running the simulation. During the exercise they collected papers with decisions, gave time signals at the end of each period, and checked that the correct seat changes were made.

The banks' decisions are presented in Table 1. The students who played the role of bank employees did not decide in the same way with regard to particular loan applicants. What is more, for the extreme ones we do see more uniform decisions (4 out of 5 decided in the same way), but still not unanimity. Since the number of people in one group was very low (only 5 students), it seems unreasonable to calculate the percentages. It could be that some of the decisions were wrong due to misunderstandings, especially in the beginning of the game.

Table 1. Approved and rejected loan application

Bank's name	Loan approved	Loan amount H – higher (20.000) L – lower (10.000)	Loan insurance / collateral	Maturity (in years)	Annuity (in EUR)	Remarks
<b>Applicant 1</b>						
Bank 1	Yes / No	H / L	Yes / No	2 / 5	410	Housing
Bank 2	Yes / No	H / L	Yes / No	2 / 5		
Bank 3	Yes / No	H / L	Yes / No	2 / 5	410	
Bank 4	Yes / No	H / L	Yes / No	2 / 5	905	
Bank 5	Yes / No	H / L	Yes / No	2 / 5		
<b>Applicant 2</b>						
Bank 1	Yes / No	H / L	Yes / No	2 / 5		
Bank 2	Yes / No	H / L	Yes / No	2 / 5		
Bank 3	Yes / No	H / L	Yes / No	2 / 5	410	
Bank 4	Yes / No	H / L	Yes / No	2 / 5		
Bank 5	Yes / No	H / L	Yes / No	2 / 5	905	
<b>Applicant 3</b>						
Bank 1	Yes / No	H / L	Yes / No	2 / 5	905	
Bank 2	Yes / No	H / L	Yes / No	2 / 5	881	Variable interest
Bank 3	Yes / No	H / L	Yes / No	2 / 5	410	Husband unemployed
Bank 4	Yes / No	H / L	Yes / No	2 / 5	905	
Bank 5	Yes / No	H / L	Yes / No	2 / 5		
<b>Applicant 4</b>						
Bank 1	Yes / No	H / L	Yes / No	2 / 5	440	
Bank 2	Yes / No	H / L	Yes / No	2 / 5		
Bank 3	Yes / No	H / L	Yes / No	2 / 5	905	
Bank 4	Yes / No	H / L	Yes / No	2 / 5		
Bank 5	Yes / No	H / L	Yes / No	2 / 5	905	
<b>Applicant 5</b>						
Bank 1	Yes / No	H / L	Yes / No	2 / 5	440	Partner's salary 1200
Bank 2	Yes / No	H / L	Yes / No	2 / 5	190	
Bank 3	Yes / No	H / L	Yes / No	2 / 5	381	Variable interest
Bank 4	Yes / No	H / L	Yes / No	2 / 5		
Bank 5	Yes / No	H / L	Yes / No	2 / 5	452	

Source: The authors' own calculations.

If there would be more than one group, the authors could compare the results among them. Additionally, if the lecturer had had the results of previous years, he could compare them with the results achieved by the current group. In the end, feedback questions can be answered. In our case, the students reported that they liked the role-playing exercise and that they enjoyed participating. Also, they found it to be a good demonstration of how theory and reality are combined. However, they would have preferred having more time for each round.

### 3. Learning outcomes

Among financial risks, credit risk is regarded as being central to financial markets. Despite the significant amount of knowledge that the existing literature provides on the topic, uncertainty associated with debtors' repayments persists. The main goal of this game is to build up a starting point for a post-exercise discussion on consumer credit risk.

The first issue discussed is the role of time in the decision making process of the consumer credit market.

The students playing the role of bankers commented that they were under "time pressure" since the final decision had to be taken within a given time frame. The time-to-money rule is an important part of the daily business of banks, and is intensified by the expectations of loan applicants. The bank does not have unlimited time, otherwise it would lose its competitiveness. The authors discussed the role of automated application processing systems for banks, including their benefits and costs.

The second issue discussed was the informational asymmetry and characteristics of the loan participants. The results of author's game have shown that the banks never decided for any of the loan applicants in the same way. The students discussed how the bank could lower the informational asymmetry and the role of a credit bureau was also discussed.

The third topic was the evaluation of the applicants' creditworthiness. The students guessed which information in the loan application might have informational value for the bank. The authors compared their

ideas with the table of determinants of consumer credit given in a book by Daniela Vandone (2009, p. 22). They are given in three groups: socio-demographic, economic and institutional characteristics.

Next, an introduction to consumer credit risk modeling concerning the risk parameter PD (probability of default) was given. Credit scorecards were discussed. In author's game, students remarked that the different decisions of banks might result from the competitive advantages of one bank over another.

Additionally, studies from the field of behavioral finances were incorporated into the discussion (presented in Vandone, 2009). A special emphasis was given to psychological factors inducing individuals to make non-rational borrowing choices (Vandone, 2009): overconfidence bias, availability heuristic and hyperbolic discounting. The students who played the role of applicants should here be asked to decide whether they would actually like to take the loan, based on the data in the game. In this way, the author's question whether the behavior of taking a loan, would be rational in their position. Students should find out what the motivation of the customer is who is applying for a loan.

The fourth topic was how a loan officer's reward may impact their decision making process. The bank would like to accept as many good clients as possible, and reject the bad ones. Students reported that in the game they intuitively tried to accept good and reject bad loan applicants. However, this may not be the case in

the daily business of banking. The authors presented and discussed the results from a series of experiments with loan officers conducted by Shawn Cole, Martin Kanz, and Leora Klapper (2012), which among other things show that "incentive contracts distort judgment and beliefs, even among trained professionals with many years of experience."

The last topic discussed was the loss distribution on consumer loans and the costs of bad loans, as well as opportunity costs when rejecting good applicants. The authors gave the hypothetical outcome of the role playing game, which suggested that applicants 2 and 5 defaulted. Applicant 2 was self-employed and lost his most important client. Applicant 5 was a low-income young applicant, with a term contract for 12 months. After this period he failed to get a new job. For the others, the authors assumed that they fully paid back the loan.

Approving a good loan is a true positive, and the bank earns interest on it. Rejecting a bad loan is known as a true negative, and the bank avoids making a loss. Approving a bad loan is called a false positive and the bank records a loss that is equivalent to its exposure at default. When a good loan is rejected, the bank loses its potential return in interest and additionally, the client may prefer to do business with other banks in the future. In Table 2, the authors present the impact of loan approval decisions on the financial results of the bank, as taken by the subject of author's game.

Table 2. Decision outcome of the game

	A1	A2	A3	A4	A5	Profit (TP + TN)	Loss (FP)	Net result	Opportunity costs (FN)
Bank 1	1	2	1	1	3	2900	4800	-1900	0
Bank 2	4	2	1	4	3	1200	2400	-1200	2
Bank 3	1	3	1	1	3	3600	20800	-17200	0
Bank 4	1	2	1	4	2	2400	0	+2400	1
Bank 5	4	3	4	1	3	1200	7200	-6000	2

Note: 1 – approved good loan (TP), 2 – rejected bad loan (TN), 3 – approved bad loan (FP), 4 – rejected good loan (FN), A1-A5 stands for Applicant 1-Applicant 5.

Let the authors make a simple assumption: that the bank makes a net return of 500 EUR on each fully repaid loan with the lower, and 1,200 EUR with the higher loan amount, which implies a true positive. A rejected good loan (false negative) means that the bank did not earn 500 EUR or 1200 EUR respectively, which it could have. Opportunity costs will impact the future results of the bank, since the lost good client could have made a profit through the loan and through other banking products in the future. If the bank approved a loan that later defaulted, the loss associated with the unpaid loan amount accrues. In this case, the authors make another simple assumption concerning the exposure at default, which is 8,000 EUR in the case of the

lower loan amount and 16,000 EUR for the higher one. During the approval process, the bank had the opportunity to request insurance, which covers 70% of the remaining debt, that is 5,600 EUR for the lower and 11,200 EUR in the case of the higher amount. The insurance policy does not cover the full amount of the debt. Therefore, the remaining debt can be claimed from the debtor in subsequent periods and the result may still improve. In our game, banks employed various strategies. There was one bank that approved loans to all applicants (Bank 3). This bank posted the worst result, since it did not even have its loans insured. This demonstrated that approving every loan cannot be a winning risk management strategy. The best performing bank (Bank 4) did not have the



highest profit, but did have the least losses and it also lost only 1 client. The results show that it is crucial for a bank to find out which loans are bad loans and this motivates them to learn more about advanced techniques in risk management.

### Conclusions and policy implications

We proposed a new form of banking role playing in order to improve students' motivation and their understanding of risk management. Our game simulates the interaction of the bank and loan applicant on the consumer credit market. We followed the principle of "speed dating" to collect decisions on loan approval or rejection by several banks for the same loan applicant. The game is a simulation of the interactions that take place on the consumer credit market, whereas students playing loan officers might represent different branches of the same bank, or different banks in the same market.

In the forefront is the student's risk awareness, the ability to identify risks, and to provide an impression of the complexity of the credit market, as well as explore the many facets it contains. The authors aimed at highlighting several phenomena arising in both the market-sides and the aspects of assessing a consumer credit applicant's credit risk. At the end of the game, the author's proposed exploring the difference between risk and uncertainty. The latter could be incorporated into the game so that, for example, each loan applicant would by drawing a card face an amount of unforeseen spending, an extreme event in the economic environment, an extreme event regarding their family or dependents, a natural or ecological catastrophe, etc.

The authors experience in this role-playing exercise showed the authors that student motivation for the discussed topic was increased, especially since the same class of students in this lesson more actively participated in the discussion as the very same group of students at other lessons when no such game was conducted. It was used as an introduction to credit risk modeling for undergraduate students in a risk management course. The results of the game showed that decisions are not uniform among banks or loan officers even when their available information on the

loan applicant was the same and the framework of the loan product was the same. Such results provided a great opportunity to discuss several phenomena present in the consumer credit market: informational asymmetry, the competitiveness of the consumer credit market, time-to-money and expectations of loan applicants, credit risk distribution and loss from bad loans, the incentives of loan officers, behavioral finance (overconfidence bias, availability heuristic, and hyperbolic discounting). In the future we would like to enhance the scenario further.

The abstraction of the credit risk being present in the consumer credit market may have misled students into believing in the existence of a uniform level of information about loan applicants due to credit bureaus and other data providers present in the banking industry. Therefore, the conclusion could be made that the ability of an individual bank to manage credit risk better than others, is limited. However, banks have the possibility of outperforming others if they are able to better assess credit risk. On the other hand, the consumer has to understand their decision when taking a loan, which may not always be the best decision. This being said, educational policy in higher education should encourage the use of innovative teaching methods. In our study the proposed role-play has contributed to the effectiveness in the learning process. The authors find this is especially important for topics like credit risk in the sense of preventing from bad risk management. Finally, bank failures often become a heavy burden to public finance.

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## Appendix A. General instructions (read aloud by the instructor)

You are about to participate in a role-playing exercise on consumer credit risk.

Five students will be playing the role of a banking loan officer and 5 students will play the role of a bank customer. Following the principle of “speed dating” each bank has two minutes to either: grant a loan according to the customers’ demands, approve it under different conditions, or reject it.

Players, other than the actual bank-customer pair, are not allowed to communicate among themselves during the game. Before starting the game you will be asked to read the instructions carefully. The instructions should not be discussed with other students. If you do not understand any part of the instructions, ask your question before the game begins.

The bank and loan applicant have altogether 2 minutes of time to exchange information. You will hear a ringing alert 30 seconds before the end of each period. The bank representatives should make a final decision on the loan application and write it down. When the period ends, you will again hear the ringing alarm. If you are in the role of a loan applicant, you have 30 seconds to change the seat to your immediate left. Bankers do not change seats. In the meantime, the instructor will collect the decision sheets from the banks.

**1. Instructions (for the bank).** In this game, you are in the role of a bank representative. The data used in this game are fictional. Your goal is to grant loans to the applicants you believe will pay the money back. You should reject requests where you believe the case would be otherwise. Your bank offers only 1 credit product, but you can modify some of the loan characteristics, according to the data below:

1. Principal:

Higher: 20,000 EUR.

Lower: 10,000 EUR.

2. Collateral\* of the loan:

Without: no additional costs.

With: at the approval charged to the customer (850 EUR for the lower and 2,000 for the higher principal).

\* Collateral means that in case the borrower defaults, 70% of the remaining debt will be paid to the bank by the insurance company.

3. Maturity:

Shorter term: 2 years.

Longer term: 5 years.

4. Interest rate:

Variable: 6m EURIBOR + 5 % (currently, the 6m EURIBOR is 0.465 %).

Fixed: 8 %.

Table 1a. Annuities (the calculations *do not* reflect an offer from a concrete bank)

Loan		Fixed interest rate				Variable interest rate				Costs of loan insurance or collateral (due at approval)
Amount		Years	2	Years	5	Years	2	Years	5	
EUR	10,000	EUR	452	2 EUR	20	EUR	440	EUR	1	850 EUR
EUR	20,000	EUR	905	0 EUR	41	EUR	881	EUR	3	2000 EUR

Source: The authors’ calculations.

In this game, five loan applicants will be presented to you. You may ask the applicant for information about themselves in order to assess their ability to repay the loan. You may also request documents, which they may either provide or refuse to provide. Based on their responses, you must decide whether to grant the loan or not. Alternatively, you can also offer a loan for an amount lower than the originally requested amount.

**Time:** In each round you will have 2 minutes to ask questions and at the end make a decision. In the next 30 seconds, the loan applicants will change their seats.

**2. Instructions (for the loan applicant).** You are in the role of a loan applicant. There are 5 banks operating in your banking market. Your goal is to get an offer from each of the banks. To do so, the bank's loan officer will ask for information about yourself in order to assess your ability to repay the loan. The bank may also ask for documents that prove your answers are correct. In this game, you will not show any real documents, but only inform the bank whether you are willing to do so or not. However, if you refuse to provide information about yourself, the bank may reject your loan application due to a lack of information. You should answer the same questions or requirements of different banks in exactly the same manner.

You would like to get a loan for the amount of 20,000 EUR. You would prefer the shorter repayment period (the best would be 2 years).

Your bank might reject the loan you are applying for, but offer you a less favorable loan package. Alternatively, the bank may refuse to offer you any loan at all.

You will be given some personal and financial information about yourself for this game. Some properties are not defined, but you may add them by yourself (note them before the game starts). If your bank asks for any additional information, you should answer in a way that most closely matches your other personal information. Note the additional information immediately on your sheet.

At the end of the last period, think about if you would accept any of the banks' offers. According to your characteristics in the game, think about whether taking a loan is a rational decision or not. Note your final decision.

**Attention! You should not show the sheet with your description to the player representing a bank! Wait for their questions.**

## Appendix B

Table 2a. Loan applicants' characteristics

	Applicant 1	Applicant 2	Applicant 3	Applicant 4	Applicant 5
Average monthly net income in EUR	900	1500 and very variable	4.000	1.800	800
Age	36 years	47 years	45 years	56 years	26 years
Education	High school degree	High school degree	Master of science	Bachelor degree	Bachelor degree
Employment	Permanent	Self-employed	Permanent	Permanent	Short-term contract for 1 year
Property	No real-estate;	Half of a house worth 350.000 EUR	Owens a centrally located apartment worth 100.000 EUR	Half-owner of a house worth 80.000 EUR	No real-estate, no car
Ownerships	Owner of a car worth 7.000 EUR;	Owner of a car worth 37.000 EUR	Owner of a car worth 19.000 EUR	Life-insurance policy for 25.000 EUR	
Savings	No savings	Savings in a pension scheme worth 15,000 EUR	Shares worth 10,000 EUR		Savings of 5.000 EUR in the form of a bank deposit
Debt	80 EUR monthly (1 year left)	420 EUR monthly (8 years left)	0 EUR	120 EUR monthly (6 years left)	50 EUR monthly (5 years left)
Living costs*	500 EUR	800 EUR	1.900 EUR	800 EUR	550 EUR

Note: \* The usual living expenses that cannot be reduced (e.g. food, medicine, electricity, water, heating costs, car maintenance, insurance, fuel or public transportation costs, necessary clothes and shoes, etc.).