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Economic aspects of consumer credit

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Abstract

This article deals with methods of consumer credit analysis. In the case of consumer loans, the issue of their provision to creditworthy clients is discussed. The financial institution realizes its profit by providing a loan. However, it is in the public interest to ensure the stability of the financial sector that loans are provided to creditworthy clients. That is, to clients who are able to repay loans. The aim of the article is to suggest suitable methods for assessing the creditworthiness of the client. Their applications can be used by banks to prevent loans from being provided by a natural person who is unable to repay them in order to prevent default. The article presents suitable multicriteria analyses of variants for a given assessment.

Keywords: banks, consumer credit, multicriteria analysis of variants

1. Introduction

One of the serious and systemic problems of the Czech economy is the relatively high number of inhabitants (natural persons) in foreclosure and the increase of the loan principal by various taxpayers and contractual penalties above the tolerable level (Šmejkal, Vodička, 2019). Already mentioned for consumer loans with some delay began to regulate legislation. Assessing whether or not to grant a loan is a matter for the financial institution to assess the financial situation of the loan applicant through economic analysis methods. The result of the analysis is an assessment of the possibility of repaying the loan and the risks arising from the insolvency of the applicant. From this point of view, the use of an appropriate method is important. These are the following economic methods (Brožová, Houška, Šubrt, 2003).

2. Multicriteria analysis of variants

Multi-criteria analysis of scales seeks optimal solutions in cases where we have multiple purpose functions. Multi-criteria evaluation of variants offers the possibility of determining and sorting pre-selected criteria. However, it is necessary to realize that the individual criteria have different weights - some criteria are more important than others (e.g. experience in the field

than, for example, passing the school-leaving examination on the first try). Therefore, the determination of all variants is the most important phase of the whole process. The more variants we have, the more opportunities we have to find a real suitable solution. If we encounter in the examples the possibility that the decision-maker does not know the set of variants of solving the problem, then there are different methods for determining these variants. These are, for example, systematic-analytical methods and methods of stimulating intuition (Brožová, Houška, Šubrt, 2003).

3. Criteria weighting methods

Criteria weighting methods are essential methods for selecting the most appropriate set of solutions. We can have two types of criteria, quantitative and qualitative. It is then necessary to assign a weight to each individual criterion, which will determine its importance. The individual methods can then be divided according to the information about preferences.

It may also be the case that there will be no information on the preference between the individual criteria. If this happens, it is possible to give the criteria the same weight. We then determine the weight according to the relationship (Friebelová, Klicnarová, 2007):

$$v^{"} = \frac{1}{\overline{n}}$$

In order to correctly determine the importance of the chosen criteria, it is necessary to follow the basic rules. We choose the scales so that their sum gives the number one over all criteria. That is why it must apply

$$i = 1, ..., k$$

subsequently we choose the scales so that:

$$\sum_{i=1}^{k} v_i = 1 \; v_i \geq 0$$

Another rule for choosing the right weight is that the more important the criterion, the more weight we must give it. We can choose the weight directly, by saying how important the given criteria are for us, for example K1 = 10%, K2 = 30% and K3 = 60%, mathematically written:

$$v = (v_1, v_2, v_3) = (0.1, 0.3, 0.6)$$

We determine the weight using one of the following methods (Hrdáček, 2018):

- Direct determination of scales
- Ordinal comparison of criteria about all at once (order method) on pairs (Fuller's method)
- Cardinal comparison of criteria all at once (scoring method) by pairs (Saaty method)

4. Order method

The ranking method allows us to sort the individual criteria from the most important to the least important. This is a subjective decision and the order of importance of the individual criteria is chosen by the consumer himself (Hrdáček, 2018 ; Polouček, 2009).

An example of the ranking method can be seen in the following table, where in the first column the criteria were assigned, a ranking based on a subjective decision, in the second column the ranking is listed in reverse and then normalization was performed, i.e., the importance of individual criteria was calculated. The weight of the relevant criterion is then obtained according to the relation:

$$v_i = b_i / \sum_{(} = 1^{b_i}$$

Table 1: Order method

Criterion	Order	Reverse	Weight
k1	3	1	1/6 = 0,17
k2	1	3	3/6=0,5
k3	2	2	2/6 = 0,33
Sum		6	1

Source: Authors.

5. Fuller's method

The Fuller method, or the pairwise comparison method, is a multi-criteria method where each criterion is compared with each other. So each of the two criteria is compared and the one that is more important is always chosen. The comparison is performed in the so-called Fuller's triangle. The total number of comparisons is equal to (Kašparovská, 2010 ; Rejnuš, 2008):

$$N = / 1 = \frac{n}{2} \quad \frac{n(n-1)(n-2)!}{2!\,(n-2)!} = \frac{n(n-1)}{2}$$

For better visibility, the individual preferences are arranged in a Fuller's triangle as follows. The preferences are numbered from 1 to n and written in a triangle. A triangle always has x double lines. In the first line there are combinations for comparison with the first preference, in the second with the second, outside the one in the previous line. As a result, each

row has 1 member less than the previous row. From each pair, a more important criterion is selected and marked (Teplý, 2013 ; Fiala, Jablonský, Maňas, 1994).

1	1	1	…	1
2	3	4	…	*n*
	2	2	…	2
	3	4	…	*n*
			…	…
			…	…
				n-1
				n

6. Scoring method

The scoring method is similar to the ranking method. The difference is that this method allocates points to individual preferences. Points are assigned by the decision-maker on the basis of a subjective feeling, in such a way that a larger number of points gives a more important value and a smaller number of points gives a less important value. In this method we have a predetermined interval <0, 10>. For better clarity, we will show a sample in the table. The weight was calculated in the same way as for the ranking method (Kašparovská, 2010):

$$v_i = b_i / \sum_{(} = 1^{b_i\,4}$$

Table. 2: Scoring method

Criterion	Points	Weight
k1	5	5/17=0,29
k2	2	2/17=0,12
k3	10	10/17=0,59
Total	17	1

Source: Authors.

7. Finding a compromise solution

The next step, after finding the weights, of the multi-criteria analysis of variants is to find a compromise solution. We have several methods to find it (Kislingerová, Hnilica, 2008):

- 1 Basic methods

  - 1.1 first order method
  - 1.2.order method with weights
  - 1.3.Scoring method
  - 1.4.Scoring method with scales
- 2 Sophisticated methods
  - 2.1 1st method of weighted sum
  - 2.2. Basic variant method
  - 2.3 TOPSIS method
  - 2.4.Promethee method
  - 2.5.Analytical Hierarchical Process (AHP) method
  - 2.6.method ELECTRE
- 3 Basic methods

7.1 Order Method

The ranking method is one of the basic methods and together with the scoring method it is a very simple method that does not require knowledge of the weights of individual criteria. It therefore consists in determining the order of importance of individual criteria (1, 2,…, n, where n is the number of variants). In order to evaluate the importance of the criteria, it is necessary to determine their nature, whether it is maximizing or minimizing (eg: the nature of the price criterion will be minimizing, because we want to pay as little as possible for the product). Then the arithmetic mean is calculated and it tells us what it is like compromise solution. In the case of a minimizing nature, it will be the lowest value and in the case of a maximizing one, it will be the highest (Kislingerová, Hnilica, 2008).

As mentioned, the ranking method does not require knowledge of the weights, however, we can also encounter a variant where weights are assigned to the criteria. In this case, the procedure is completely identical, however, the result is not the arithmetic mean, but the scalar product of individual values, and based on the nature of the criteria, we again determine what the compromise solution is (Friebelová, Klicnarová, 2007).

7.2. Scoring method

The scoring method is the second basic method of multicriteria analysis of variants. Like the ranking method, the scoring method does not require knowledge of weights. However, even here we can encounter a variant where the scales are known (Kislingerová, Hnilica, 2008).

The difference between the methods is that in the scoring method we score individual criteria according to a scale, eg <0, 10>. We give the worst value to the number 1 and the best to the number 10. Here, too, we must determine the nature of the individual criteria and whether they are minimizing or maximizing. The result without specified weights is the arithmetic mean, where the highest number will correspond to finding a compromise variant. If we know the weights of the criteria, the result will be the scalar product of individual values. Here, too, the highest number will also be our compromise solution (Tichý, 2014).

8. Conclusion

The article presents methods suitable for assessing the creditworthiness of clients. In the context of consumer lending, it should be mandatory for lenders to apply these methods. The reason is the fact that the provision of loans to insurmountable problems leads to problems in

society (personal bankruptcies, foreclosures, etc.). For entrepreneurs, after applying the above methods, it should be considered whether the lender will transfer the risk of its provision to a riskier project.

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