Psychological Factors in the Credit-Grating Process

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Proposition: This study aims the objective of analysing the influence of the psychological factors in the persons credit risks.

Methodology: A questionnaire was conducted with 147 queries, answered by 847 individuals from 18 to 85 years of age. The results were estimated by means of regression, adopting the SPC Score of SPC Brasil bureau as a dependent variable in substitution of the good standings/default decisions. We also utilized the following psychological scales, in addition to the variables commonly used in the credit risk assessment models as independent variables: Meaning of the Money, Self-efficacy, Locus of Control, Optimism, Self-esteem and Compulsive Buyer; in addition to the behaviour variables for Literacy Finance, Social Comparison, Buying Behaviour, Self-control and Long-term time frame.

Results: The main results show that: i. assigning negative beliefs to money; ii. showing evidences of higher levels of self-efficacy and lower levels of optimism; iii. expressing compulsive buying behaviour; iv. A lack of previous financial guidance and self-control; and v. short-term consideration for financial planning; are the higher risk person related characterisitics.

Originalities: With this research, scoring models could receive contributions from another foundation: the psychological profile of the borrower.

Keywords: Economic Psychology; Behavioral Finance; Credit risk; Indebtedness.

Research category: Original Article
1. Introduction

Since the economic policies towards the consumption of goods in the past few years, the expenses of Brazilian population have increased substantially compared to their income. Among the main justifications for that is the massive supply of credit in the market, aligned with the desire and the consumers real buying possibilities. With the simplified supply of credit, families begin to have the means to fulfill projects that would normally be difficult if their income were the limiting factor. With higher credit limits in their credit cards and immediate financial resources provided, such as checking account overdraft banking, the purchase power of the population was multiplied. However, the lack of control over the situation will lead to a default situation.

Although the conventional economic variables are able to foresee the individual’s good standing condition, the introduction of psychological factors is capable to increase this predictability. In this regard, recent approaches suggest an introduction of new alternative variables, with the intention to increase the predictability of the credit score models, which proves valid the effort undertaken to analyze the variables of psychological behavior linked to credit risk in the economical agent.


Hayhoe et al. (1999), Stone and Maury (2006), Veludo-de-Oliveira et al. (2014) and Vieira et al. (2014) demonstrated that people in debt tend to have more negative attitudes (anxiety, conflict, inequality, obsession, retention and preoccupation) towards money. Wang et al. (2011), by means of questionnaires in China, reported disparities of self-esteem between indebted and non-indebted individuals. Lea et al. (1995), Perry (2008), Tokunaga (1993) and Mewse et al. (2010) verified a tendency in individuals in debt to have a more outsourced locus of control, but
some of those researches did not show to be statistically significant. Kunkel et al (2015) showed that there is a positive relation between indebtedness and compulsive consuming.

From these readings, it can be observed that to the economic agents, certain behavior and psychological constructs can be associated with the decisive process in the granting of credit. Considering this fact, this study aims to analyze, under the point of view of the Economic Psychology, the psychological factor that influence in the determination of the person’s credit risks.

One of the research contributions for the Government and Society rests in the population’s enlightenment about a more adequate financial formation and better judgment when taking a decision that can involve saving money, investmenting, or getting into debt. This way, it is expected that a population’s education implies in a decrease of its level of indebtedness, and consequently, the improvement of its quality of life, because although the existence of substantial proof of the negative economic impacts that the indebtedness can cause in the enterprises and in society, few actions were taken to transform this knowledge in an information tool for citizens, as, for example, to evaluate the effect of being in debt in the health of the population (Awanis & Cui, 2014).

In the practical field, the contribution of this research will be the complementarity to the methods of credit analysis adopted nowadays, which focus basically in demographic and economic factors. On the basis of this research, it is understood that the scoring models could receive a contribution from another foundation: the borrower’s psychological profile. An improvement in analytic practices would prove a greater contribution to the credit market.

Another relevant question about the completion of this research is associated with the development of the Economic Psychology theoretical framework. Countless complementary disciplines handle the relation between Economics and Psychology, from among those the most relevant are the Economics’ Psychology, the Behavioral Finance, the Experimental Economics, the Behavioral Economics or Psychological Economics, the Socio-Economics, the Neuro-Economics, the Consumer Psychology, and the Anthropological Economics or Anthropologic Economy. For the purpose of this study, we focused on Economic Psychology, which, according to Kirchener and Holzl (2003), involves a research to comprehend the experience and the human behavior in economical contexts, with the aim to try to understand how economy can influence behavior. The Traditional Economy is restricted to analyzing decisions about the finite resources
allocation upon the premise of rationality and utility maximization. Economical Psychology provides economic descriptive models and not normative ones as the Economy does. In the Economic Psychology development, it should be stressed that the main researches about credit and consumers indebtedness were performed in developed countries (USA and Europe mainly), therefore, bringing this discussion to the national context (Brazil) proves relevant.

2. Theoretical and Empirical Surveys

Despite the preoccupation of the public and private entities with the indebtedness, mainly because its occurrence can affect the economic performance of companies and countries, many researches were conducted by economic psychologists in the last two decades. Their main purpose was understand the psychological profile of the individuals who possess higher to take credit and have debt problems. Numerous researchers presented various factors to understand this psychological profile, such as the meaning of money, self-efficacy, locus of control, optimism, self-esteem and compulsive buyer; as well as behavior variables for the financial education, social comparison, buying behavior, self-control and time horizon. For the purpose of this survey, each of these factors will be elucidated in its empirical relation with the individual’s indebtedness.

For the economic agents, money presents differences in its use and function, and limits considered to its universality, neutrality and fungibility; since money represents not only what you can by with it, but its meanings arise from obtainment sources and the ways in which it will be used (Moreira, 2000). Tokunaga (1993), by way of samples of North American individuals, shows that unsuccessful (debtors) users of credit, who regard money as a source of power and prestige, possess less ways to retain money and present higher anxiety towards financial matters, when compared with successful credit users (solvent economic agents). Trindade (2009), discovered, through a survey with 2,500 women from 31 cities in State of the Rio Grande do Sul, that women with debts tend to have a psychological perception of money as a fomenter of social status and power. Although Norvilitis and Mendes da Silva (2013) come up with North American university students with a higher debt/income index rate tend to have more positive attitudes regarding money. This relation is not statistically significant towards the study in question with
Brazilian students. Nevertheless, Norvilitis (2014) presented a more negative gradual tendency in relation towards debts in the last 10 years.

The self-efficacy is a set of beliefs that people have about their own capacity to carry out necessary actions to perform various challenging situations efficiently (Medeiros, 2006). Tokunaga (1993) found that lower scores of self-efficacy are related to the economic agents with serious debt problems. Wang et al. (2011) found that the person who obtained high rating points in one or more variables of self-efficacy, showed a higher control in the use of the credit card. Sotiropoulos and d’Astous (2013) found that self-efficacy has a negative effect in the tendency of the young consumer towards the excessive use of the credit card.

The construct of the locus of control has its origins in the social learning theory and deals with an indicator of the personal perception about who or what establishes the occurrences of events in the life of an individual. Those who perceive that the control of life events characterize as internal, possess an internal locus of control and, on the other hand, those individuals that perceive that everyday events are controlled by external factors to them are characterized as external (Dela Coleta & Dela Coleta, 1997). Livingstone and Lunt (1992) verified that the individuals who are in debt have the tendency to attribute their financial problems to the credit system rather than their lack of financial planning (i.e. have a more outsourced locus of control).

According to Mewse et al. (2010), the locus of control scales do not predict significantly the debt level reported by the person in that model. Cobb-Clark et al. (2016), carrying out a study with almost 4,000 Australian families, came up with results indicating that the families which have a person with internal locus of control possess better savings compared to the families with an external reference. To them, those perceptions of control can be important to explain the heterogeneity in the accumulation of wealth and the allocation of the family assets that, consequently, is understood as relevant to its indebtedness.

The optimism concerns the way people view their lives. To Bandeira et al. (2001, p. 251), “this construct was defined in terms of expectations that people have about the events that will occur in the future in their lives”. And the differentiation between the person’s optimistic and pessimistic condition is represented by the orientation given by oneself to the negative events in one’s life. Optimism becomes problem when it becomes unreal, that is to say, people begin to judge their probabilities of going through positive experiences during their lives as above average. Yang, Markoczy and Qi (2007) analyzed the unreal optimism related to the adoption of
credit cards and corroborated the hypothesis that an overreacting expression of optimism relates itself to the option for credit cards that are not adequate to the consuming behavior of the individual. Rogers et al. (2015) found that individuals with a higher degree of optimism have a bigger pre-disposition towards debt. Their survey was carried out with almost 1000 Brazilian individuals.

The self-esteem, such is elucidated by Avanci, Assis, Santos and Oliveira (2007), is defined as the judgment a person makes of him or herself. It expresses an attitude of approval or dissatisfaction of oneself and involves a self-evaluation of skill and value. The feeling of incapacity facing the challenges, incompetence to inadequacy towards life can be classed as low self-esteem. High self-esteem is characterized by the opposite feelings, such as competence and confidence; an average self-esteem shows a level where feelings fluctuate between adequacy and inadequacy. According to Wang et al. (2011), the possible influence of self-esteem in the condition of indebtedness would be mainly due to the reflection of the low self-esteem on the compulsive behavior of buying. For both American and Brazilian samples, Norvilitis and Mendes da Silva (2013) was found that the financial wealth can be predicted by a high financial self-esteem.

The compulsive purchase behavior is defined by Faber and O’Guinn (1992) as a chronic behavior recurrently answered to events or negative feelings. Gardarsdottir and Dittmar (2012) conducted a survey in Iceland and found strong associations between compulsive purchase behavior and high levels of debt. Brougham, Jacobs, Lawson, Hershey and Trujillo (2010) found that North American college students (n=628) that considered themselves responsible for paying their debts are less prone to buy compulsively. In the Brazilian scenario, Kunkel et al. (2015), by means of a survey with 1831 credit card users, and using structural equations, found that compulsive purchases is one of the determinant factors for debt, that is to say, people with compulsive shopping behavior tends to be less responsible when time comes to use their credit cards.

In relation to the financial education construct, it can be defined such as preparing people to make more adequate financial decisions, such decisions involve an analysis of possible alternatives and verification of possibilities aiming to meet the proposed personal goals. Perry (2008) developed a comprehensive research in the US with 8,769 people from ranging from 20 to 40 years of age, and realized that consumers with higher financial knowledge had a lower
probability to become defaulters. Kunkel et al. (2015) found, in Brazil, that the presence of healthy financial behavior reduces the individual propensity to incur debt.

To Lea et al. (1995), the social comparison is the observation of behavior characterized by the individuals’ adoption of a reference group, mainly in relation to consumption patterns. Among the researches that seek to relate social comparison to debt, of Livingstone and Lunt (1992) stand out by observing that indebtedness is worsened if the person refers their consumption patterns to an inadequate group or comparing themselves with groups of people who have more money than them. Norvilitis and Mendes-da-Silva (2013) found for the North American sample – but not for the Brazilian one – that financial well-being is related to a lower level of social-comparison, as well as the lower-level of debts in relation to the college student’s income. Sotiropoulos and d’Astous (2013) reported that the more friends thinking and behaving in an irresponsible way with their credit cards, the higher the possibility of the young consumer to spend excessively with their credit card (positive relation with the tendency to the excess use of the credit card).

Consumer behavior is related to patterns of purchase of goods and services shown by the individual. This factor becomes important when considering the inappropriate purchase of items, being this issue pertaining, mainly, to the distinctiveness between essential goods and luxury ones. Lea et al. (1995) verified that the indebted tend to judge items such as telephones and cars as a necessity, in addition to the habit to give gifts in commemorative dates; however, they did not prove dependence relationship between this factor and the condition of indebtedness. But Rogers et al. (2015) demonstrates that individuals who considered giving gifts to relatives and friends in commemorative dates as a necessity, have a bigger tendency towards indebtedness. To Gerard, Sousa, Souza, Carvalho & Pañaloza (2015), a consumer who assumes certain a lifestyle, habits in the handling of money, behavior in relation to risk, values and purchasing attitudes less severe, tend to get in-debt more often.

Lack of self-control arises from the moment that a concern with a temporary target reduces the general benefit of the decision maker and is inconsistent with what the individual would prefer for him or herself when they act with more thought. Gathergood (2012) states that situations of debt are associated with individuals orientated towards the present rather than the future, in order to be in line with a profile of low self-control. He performed his research by means of a questionnaire with 85 questions and a sample of 1,234 families from the UK. In
Germany, the study of Achtziger, Hubert, Kenning, Raab & Reish (2015) identified that self-control is negatively linked to indebtedness.

According to Webley & Nyhus (2001) the time horizon is referred to the period of time considered by the individual for financial planning, that is to say, it remits towards the agents’ orientation regarding patience for consumption, as for the present or to the future. These authors verified that the orientation towards the present and the lack of self-control are factors that improve the capacity of prediction for indebtedness; in a more elaborate way, it was verified that individuals affected by obesity, tobacco smokers and alcohol consumers tend to be part of the group with more disposition towards indebtedness. In a research performed in Brazil, Souza (2013) shows that individuals oriented towards the present rather than the future have the tendency to be more in debt with their payments, do not pay in full their credit card bills and take up to six months or more to recover financially from negative events.

3. Method

In the collection of necessary information to test the model, an auto fill closed survey with 147 queries was created. The survey requested the name and the register of private individual (CPF in Brazil). 975 questionnaires were answered; however, 128 were excluded surveys for invalid Registry of Private Individuals Number. The questionnaire was applied by the Instituto Veritá, which selected 35 of their researchers and instructed them to apply 30 surveys each among people of their personal interaction (which would reduce the reluctance in giving their Private Individual Number).

In relation to the sample characterization, the following are particularly worth highlighting:
i. there was a predominance of male individuals (468) in face of 379 female individuals; ii. 83,4% of the sample (396) was from single individuals and 310 from married ones; iii. the average age of the individuals was 34,79 years of age, however, 37,4% of the participants were between 18 to 37 years-old; iv. there was a predominance in participants with complete high school level (33,3%), followed by those (22,8%) who declared to have complete college education and 18,7% incomplete college education; v. the income of 54% of the sample is within range from R$400.00 to R$1,200.00 monthly income.

It this study we chose to use a model of scoring (as a dependent variable) previously built, instead of elaborating parameters to determinate the credit risk of the individuals, adopting, this
The SPC Score is a product from SPC Brasil (a large scale national credit bureau) that collects, as a dependent variable, the probability of a person to become defaulter in the next 3 to 12 months period. The researchers submit the Private Individual Number sample to the SPC Brasil and it measures the score of each of these persons. The model classifies the consumer in scores that can range from 0 to 100 points and this score is referred to the person’s probability of defaulting. The higher the score, the lower is the credit risk associated to the client, this way, clients who were characterized as high risk ones (D, E or F) presented a lower score (close to 0), and as the scores meet figures closer to 100, the clients were classified as medium risk ones (C) or low risk ones (B and A). The classification risk frequency of the Score SPC can be found in the Chart 1.

Regarding the independent variables, about the psychological scales analyzed:

- The Scale of the Significance of Money (SSDPOS and SSDNEG) was used, such as proposed by Moreira and Tamayo (1999). The wording proposed for the survey corresponds to the significance of the money was: “The proposed statement for the questionnaire corresponding to the meaning of money was: "Next, you will find several statements related to money. We are interested in whether or not you agree with what each sentence states. Use the five-point scale that will be placed to the right of each statement. Mark with an X the number that expresses your opinion ". From the responses of the individual it was possible to define whether there was a negative relation to money related to aspects of inequality, conflict and / or suffering, or a positive relation that could be of transcendence, harmony or altruism;

<table>
<thead>
<tr>
<th>Risk</th>
<th>Class of Risk</th>
<th>Score Range</th>
<th>Default probability</th>
<th>Sample frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Minimal</td>
<td>Medium</td>
</tr>
<tr>
<td>Low</td>
<td>A</td>
<td>89 a 100 (very high)</td>
<td>0,1%</td>
<td>1,8%</td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>75 a 89 (high)</td>
<td>&gt;4,0%</td>
<td>7,0%</td>
</tr>
<tr>
<td>Medium</td>
<td>C</td>
<td>57 a 75 (medium)</td>
<td>&gt;10,3%</td>
<td>15,1%</td>
</tr>
<tr>
<td></td>
<td>D</td>
<td>39 a 57 (low)</td>
<td>&gt;20,7%</td>
<td>27,7%</td>
</tr>
<tr>
<td>High</td>
<td>E</td>
<td>24 a 39 (very low)</td>
<td>&gt;35,4%</td>
<td>43,0%</td>
</tr>
<tr>
<td></td>
<td>F</td>
<td>0 a 24 (critical)</td>
<td>&gt;52,3%</td>
<td>63,5%</td>
</tr>
</tbody>
</table>
• To test the psychological construct of self-efficacy (SELF-EFFICACY) the Scale of General Self-Efficacy of Schwarzer (1192) was used;

• To measure the variables related to the locus of control we opted for the Levenson Scale of Locus Control due to its simplicity and generality (Romero-Garcia & Maldonado, 1985). It is composed by three sub-scales: 1) Internality (INTER) – sub-scale that measures the degree in which the subject believes he can maintain control over his life; 2) Other powerful (OTHERPOD) – sub-scale that measures the perception that this control is in the hands of powerful people; 3) Chance (CHANCE) – sub-scale concerning the perception of being controlled by chance, luck or faith;

• The construct of optimism (OPTMISM) was measured by the Life Orientation Test (LOT), proposed by Scheier, Carver and Bridges (1994) and validated in Brazil by Bandeira et al. (2002);

• We opted to use of the Self-Esteem Scale of Rosenberg, validated in Brazil by Avanci et al. (2007), by virtue of its practicality, consistency and theoretical appropriateness towards the Brazilian cultural theme, being it separated in low self-esteem (LOWSELFEST) and high self-esteem (HIGHSELFEST) and self-esteem (SELFEST);

• To analyze the variable related to compulsive consumption we opted to use the Scale of Faber and O’Guinn (1992), which enables classification of the individuals as compulsive and average buyers. Therefore, model 1 shall use this classification (COMPCOMP) and in model 2 the classification score between the compulsive purchaser and average purchaser (SCORECOMPCOMP);

• The financial education variable was analyzed through the adoption of four questions based on Hayhoe et al. (1999), but also a very strong relationship was found between the variables in the chi-square test and, therefore, only the variable related to the question (BUDGET) was used: You have a personal budget, in which you try to list all its expenses and revenues ?For the evaluation of the variable related to consumer behavior, we used the same strategy adopted by Livingstone and Lunt (1992) and Lea et al. (1995). Four questions were asked and respondents should consider it as a necessity (= 1) or luxury (= 0) to give friends on commemorative dates (FRIENDS), to present relatives on commemorative dates (PARENTS), to present children on commemorative dates (CRIANCAS) or to celebrate commemorative dates (FESTS); In order to
undertake the analysis regarding the self-control it was used a strategy similar with the one used by Rogers et al. (2015). This involved the use of two proxies to the identification of the tendency of the respondent in behaving in a way that could be considered harmful to him in the long run. The operationalization of this variable and its proxies are presented in Chart 2.

Chart 2 - Questions referred to the self-control

<table>
<thead>
<tr>
<th>Variable (code)</th>
<th>Question in the questionnaire</th>
<th>Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>ALCOHOL</td>
<td>In average, do you have more than five drinks a Day?</td>
<td>No (= 0) / Yes (= 1)</td>
</tr>
<tr>
<td>CIGARETTE</td>
<td>Do you smoke?</td>
<td>No (= 0) / Yes, I smoke from time to time or I smoke everyday (= 1)</td>
</tr>
</tbody>
</table>


- As for the temporal horizon (HORTEMP), we also adopted the strategy similar to the one used by Webley and Nyhus (2001) and Vio (2008). It consisted in the elaboration of a specific issue related to the time perspective considered by the individuals in the planning of expenses and savings, with answers from the lack of planning up to the superior limit of more than ten years.

4. Results

4.1. Estimate and robustness of models

To handle missing cases, either for non-response or inconsistency of the computed values before the calculation of the psychological scales, we tried to fill them from the regression of the item in question on all other items of the scales of the database. Subsequent to this procedure, we opted to exclude missing cases of behavioral variables. After these adjustments, the sample remains with 770 observations. For the estimate of the results, a model of multiple regression was used, in which the dependent variable represented the SPC Score and the explanatory variables were represented by scales and psychological sub-scales displayed in the previous section.
In order to analyze the joint influence of the explanatory variables on SPC Score, two models were constructed:

(1) the first takes into consideration the original SSD scales, that is to say, each construct variable is estimated separately (TRANS, HARMONY and ALTRUISM for the positive dimension and DES, SUFFERING and CONFLICT for the negative dimension); the rating between compulsive consumer and a normal one (COMPCOMP); and the question related to the financial education variable in the domestic budget (BUDGET);

(2) the second model takes into consideration the positive and negative dimensions of SSD jointly, that is, only the dimensions and not the scales are estimated separately; the rating score between compulsive consumer and the normal one (SCORECOMPCOMP); and the variable of social comparison (COMPSOCIAL).

The parameters estimated in the models 1 and 2, as well as their interference statistics, are found in the Chart 3.
<table>
<thead>
<tr>
<th>Variables</th>
<th>α of Cronbach</th>
<th>Model 1</th>
<th></th>
<th></th>
<th>Model 2</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Coefficient</td>
<td>t</td>
<td>Coefficient</td>
<td>t</td>
<td></td>
</tr>
<tr>
<td>CONSTANT</td>
<td>-</td>
<td>51,48</td>
<td>3,55**</td>
<td>52,95</td>
<td>3,79***</td>
<td></td>
</tr>
<tr>
<td>SSDPOS</td>
<td>0,84</td>
<td>-</td>
<td>-</td>
<td>0,14</td>
<td>1,69*</td>
<td></td>
</tr>
<tr>
<td>TRANS</td>
<td>0,65</td>
<td>0,22</td>
<td>1,21</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>HARMONY</td>
<td>0,83</td>
<td>0,08</td>
<td>0,55</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>ALTRUISM</td>
<td>0,78</td>
<td>0,08</td>
<td>0,38</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>SSDNEG</td>
<td>0,88</td>
<td>-</td>
<td>-</td>
<td>-0,18</td>
<td>2,40**</td>
<td></td>
</tr>
<tr>
<td>DES</td>
<td>0,84</td>
<td>0,14</td>
<td>1,01</td>
<td>-</td>
<td>-</td>
<td></td>
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<tr>
<td>SUFFERING</td>
<td>0,69</td>
<td>-0,23</td>
<td>-0,80</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>CONFLICT</td>
<td>0,84</td>
<td>-0,59</td>
<td>-3,52**</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>SELF-EFICACY</td>
<td>0,82</td>
<td>-0,64</td>
<td>-2,60**</td>
<td>-0,57</td>
<td>2,38**</td>
<td></td>
</tr>
<tr>
<td>INTER</td>
<td>0,67</td>
<td>-0,01</td>
<td>-0,04</td>
<td>-0,18</td>
<td>-0,67</td>
<td></td>
</tr>
<tr>
<td>OTHERPOD</td>
<td>0,77</td>
<td>0,09</td>
<td>0,30</td>
<td>0,23</td>
<td>0,83</td>
<td></td>
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<tr>
<td>CHANCE</td>
<td>0,74</td>
<td>0,03</td>
<td>0,09</td>
<td>-0,03</td>
<td>-0,11</td>
<td></td>
</tr>
<tr>
<td>OPTIMISM</td>
<td>0,58</td>
<td>0,69</td>
<td>1,86*</td>
<td>0,48</td>
<td>1,33</td>
<td></td>
</tr>
<tr>
<td>LOWSELFEST</td>
<td>0,70</td>
<td>0,36</td>
<td>0,75</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>HIGHSELFEST</td>
<td>0,79</td>
<td>0,10</td>
<td>0,20</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>AUTOEST</td>
<td>0,82</td>
<td>-</td>
<td>0,11</td>
<td>0,45</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SCORECOMPCOMP</td>
<td>0,73</td>
<td>-6,7</td>
<td>2,12*</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>COMPCOMP</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>2,79</td>
<td>3,96*</td>
<td></td>
</tr>
<tr>
<td>COMPSOCIAL</td>
<td>-</td>
<td>4,27</td>
<td>1,66*</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>BUDGET</td>
<td>-</td>
<td>4,14</td>
<td>-1,29</td>
<td>-4,15</td>
<td>-1,22</td>
<td></td>
</tr>
<tr>
<td>RELATIVES</td>
<td>-</td>
<td>1,54</td>
<td>0,45</td>
<td>1,33</td>
<td>0,39</td>
<td></td>
</tr>
<tr>
<td>CHILDREN</td>
<td>-</td>
<td>3,28</td>
<td>1,16</td>
<td>2,91</td>
<td>1,04</td>
<td></td>
</tr>
<tr>
<td>CELEBRATIONS</td>
<td>-</td>
<td>0,21</td>
<td>0,08</td>
<td>0,68</td>
<td>0,27</td>
<td></td>
</tr>
<tr>
<td>ALCOHOL</td>
<td>-</td>
<td>10,46</td>
<td>2,58***</td>
<td>-9,83</td>
<td>-2,45***</td>
<td></td>
</tr>
<tr>
<td>CIGARETTES</td>
<td>-</td>
<td>-0,56</td>
<td>-0,19</td>
<td>-0,77</td>
<td>-0,26</td>
<td></td>
</tr>
<tr>
<td>HORTEMP</td>
<td>-</td>
<td>1,77</td>
<td>1,50</td>
<td>1,99</td>
<td>1,71*</td>
<td></td>
</tr>
<tr>
<td>R2</td>
<td>0,248</td>
<td>0,254</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>F</td>
<td>2,23***</td>
<td>3,045***</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Durbin-Watson</td>
<td>.882</td>
<td>1,877</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Test BPG (Chi2)</td>
<td>0,806</td>
<td>0,560</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Test RESET (F)</td>
<td>1,671</td>
<td>2,347</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
In general, the models passed the robustness test, in order to prove their settings and inferential validities. The variable factors of inflation of variance (FIV) presented figures well beneath ten. The lack of normality of residuals did not demonstrate being a problem; the Breush-Pagan-Godfrey Test (BPG) accepted a homoscedasticity of residuals; the Durbin-Warson statistic and the RESET test of Ramsey certified that the models did not possess problems related to the incorrect specification; and the F statistics, respectively, of 2.23 and 3.04, both significant at 1%.

4.2. Analyzes of the Results

As it is verified in the Chart 3, the variables INTER, OTHERPOD and CHANCE, that are related to the locus of control, did not present a significant statistic. Despite a tendency of default individuals to have an external locus of control, it is not shown statistically in various surveys this relation, such as Mewse et al. (2010).

An absence of statistical significance also prevailed for the variables related to the self-esteem (BAIXAAUTOTEST, ALTOAUTOTEST and AUTOTEST. Even though Norvilitis and Mendes-da-Silva (2013) have found a relation between financial well-being and financial high self-esteem, it is understood that high self-esteem can be harmful to the person’s indebtedness because it can provides him or her with excessive confidence or unreal optimism. When trusting too much in his or her professional success, for example, the person can spend the money that he or she yet has to earn (indebtedness), but they firmly believe they will earn it. In light of this, is justifiable that these variables do not have statistic relevance just as occurred in this study.

In relation to the variables of social-comparison (COMPSOCIAL), the results of this survey are in consonance with Norvilitis and Mendes-da-Silva (2013), who have not found a relation between financial well-being and social comparison. It is possible that both results of these surveys did not show the statistical significance because the persons in this sample are participants in a group of friends from a similar socio-economic condition, which is very common in Brazil. Having this type of friendship relation, the sensation of having the same conditions of a friend is plausible.

None of the variables related to the buying behavior (FRIENDS, RELATIVES, CHILDREN and CELEBRATIONS) presented significant statistics. These results disagree with Rogers et al. (2015) that found a relation between presenting relatives and friends in commemorative dates and the propensity to indebtedness, but are in agreement with Leal et al.
(2005), who did not find a relation between buying behavior and indebtedness. It is possible that the difference related to the results of Rogers et al. (2015) is about the difference in the definition of default, once they create a model of scoring with database from its own sample to use as a dependent variable.

In the case of the meaning of money, the negative signs associated with the variables CONFLICT and the SSDNEG indicates, to the individuals, that negative beliefs related to money influences credit score negatively, which results in the increase of the risk associated to the individual. The opposite proves try, since that the positive sign associated to the variable SSDPOS indicates that positive beliefs related to money can influence credit score positively, which implies lesser risk of credit from the agents in question. These results corroborate Rogers et al. (2015), bearing in mind that the variables originating from the SSD show that the negative dimensions related to money are more associated to persons with debts problems.

The negative signs associated to the coefficients of SELF-EFFICACY in the two equations show that the increase in its score results in the reduction of the person’s credit score, and consequent increase in the risk of credit associated to them. It should be stressed that this result differs from Sotiropoulos and d’Astous (2013), Tokunaga (1993) and Wang et al. (2011), who have studied this relation in other countries. However, self-efficacy is strongly related to other constructs, including self-esteem, locus of control, excess of confidence and optimism (Bandeira et al., 2002). Because Brazilians have a different profile than North Americans and Chinese, more spontaneous, confident and optimistic, it is justified that in believing so much in their competence and abilities, they become more in debt by believing they have perfect conditions for future payment of these debts.

The positive sign associated to the coefficient of the variable OPTIMISM indicates that the more optimistic the credit consumer is, the higher their credit score and lower the risk of loss associated to him. Previous researches, such as Yang, Makoczy and Qi (2007) and Rogers et al. (2015) associates unreal optimism (excessive) to problems related to debt, justifying the survey in question.

As for the compulsive shopping profile, the signs associated to the coefficients of the variables referred to the behavior of compulsive shopping are different between them, as expected, which is due to the treatment given to the variable in each one of the cases. In the case where the classification of Compulsive Buyer was used (COMPCOMP), it was treated as a
nominal variable, its negative sign indicates that being classified as a Compulsive Buyer influences the SPC Score negatively, elevating credit risk associated to the person; whereas being regarded as a normal consumer influences the credit score positively. While treated as original scale, the SCORECOMPCOMP was associated to a positive sign, since the interpretation of this scale indicates that as its value increases, the purchaser recedes from the Compulsive Buyer profile. However, this variable influences the credit score with a positive sign, considering that the higher the rate of the Compulsive Buyer scale, the more the profile can be considered normal. Therefore, the higher one’s score is the lower the credit risk associated to them. These results were the same found by Kunkel et al. (2015) in his survey performed in Brazil, which concluded that compulsory purchases are one of the main determinants of indebtedness of an individual, as well as the international researches of Brougham et al. (2010) and Gardarsdottir and Dittmar (2012).

Regarding the financial education, the positive sign associated to the coefficient of the variable (BUDGET) indicates that to have previous contacts with healthy financial education practices influences the credit score of the person in the sense of elevating it. This represents a lower risk of loss associated to the credit consumer, evidenced by Hayhoe et al. (1999), people with habits deriving from financial education were less prone to become defaulters. In Brazil, Kunkel et al. (2015) found that attitudes and healthy financial behavior reduces the propensity of the person towards indebtedness.

The ALCOHOL variable presented statistical significance in both equations developed. The same occurred with the variables related to the significance of money, compulsive purchase and self-efficacy. The negative signs associated to the coefficient of this self-control proxy indicate that the consumption of alcohol influences the credit score by decreasing its value and, by consequence, would result in the elevation of the credit risk associated with the consumer. Rogers et al. (2015) support these results.

The positive sign associated to the HORTEMP variable indicates that considering a greater time horizon for the financial planning influences the credit score in the sense to elevate it, implying in a reduction in the default risk associate to the person. These results are in agreement with Souza (2013), who found that consumers understand their debts in a different way according to the framework: time or money.
Overall, the results indicate not only that some factors considered in the field of Economic Psychology relate more to credit risk, as expected, but also that the association of some of them influences the consumer’s score significantly, explaining the terms here presented.

5. Final Considerations

The practice of credit analysis comprehends a detailed assessment of the person’s socio-economic factors, but recent insights suggest the introduction of new alternative variables, in order to increase the predictive power of credit score. To this end, it the effort to to analyze the relation of behavior and psychological variables towards the credit risk of the economical agents proves valid.

The effort of this research justifies itself by the situation that the national credit scenario is in: recent surveys identified over-indebtedness of the Brazilian families. Therefore, this surveys shows itself relevant in concerning the population’s awareness about factors (behavior and psychological) that might increase credit risk. As for the improvement of the credit analysis, in relation to their predictive power through the inclusion of behavior and psychological variables that are significantly related to the risk of credit, it will result in the reduction of losses by indebtedness and in the consequent reduction of the interest rates charged by institutions.

Regarding the results found by this study, we have reached the conclusion that negative beliefs, compulsive purchase, higher self-efficacy and lower self-control are associated to the credit’s high-risk; and that positive beliefs, a bigger time-horizon considered for financial planning (personal and family wise), individuals who answered that they make a personal budget to control their income and expenses and individuals with excessive optimism are associated with a lower credit risk.

The results have been consistent with the theory of economic psychology, as well with logic and the intuition that are also important items in a process of credit analyzes. Thus, the development of this research represents an increment to the theoretical framework of credit analysis by proposing complementarity of the credit models already employed with the adoption of questionnaires for the manifestation of certain behaviors and psychological profiles. It is important to stress that we are not proposing a replacement of the credit score models based on
the persons social-economics analyzes, but the inclusion of some behavior and psychological variables in order to make them more efficient.

In face of the verified results, the main limitation that should be emphasized is the selection of the survey’s samples, for convenience, which restricts the elaboration of more forceful inferences as to verified results. In addition, three other restrictions can be related: (1) at the moment of the application of the questionnaire it was not clarified to the participants the real purpose of the academic research, so that they could answer the questionnaires in the most accurate way; (2) behavior and psychological questions were issued without the due attention to ethics concerning the use of these instruments in a context of the credit analyzes; (3) the structured questionnaire, in its final version, had a total of 7 pages and 195 queries, which filling consumed around 25 minutes of each participant, that, in a real situation, could represent a complicating factor to the instrument’s practical application.

Regarding future contributions, it is suggested an adequate application of this instrument in the samples selected at random. Furthermore, it is suggested the application of the same questionnaire in other countries, as to verify the differences in results between those from Brazil and the ones obtained in a different social and economic context. Furthermore, in terms of sample, it is suggested that the execution of the survey with actual consumers of credit, in a real situation of credit demand, with the intent so to verify the instrument’s performance in a truly practical context. Other options for futures surveys will be the incorporation in the questionnaires of alternative psychological and behavior variables and the utilization of different credit scores as dependent variables.

References


Hayhoe, C. R., Leach, L., & Turner, P. R. (1999). Discriminating the number of credit cards held by college students using credit and money attitudes. *Journal of Economic Psychology*, 20, 643-656.


