Rational vs. Heuristic Motives:
What Matters When Redeeming the Pledge?

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Abstract

Pawnbroking belongs to the secured loan market and in Mexico almost 90% of items pledged are personal or family jewels. The valuation of the collateral may differ between the parties involved in the pawn contract because the borrower, besides the economic value, may feel some attachment to the pledge entailing an affective value, but the loan is a function of only the economic value of the pledge. In this paper we test the hypothesis that if the emotions evoked by the pledge guide individual behavior, then the heuristic aspect, but not the rational motive, should be associated with higher likelihood of redeeming it. Besides showing that economic variables are related to the outcome of the pawning process, our model estimations confirm our hypothesis.

1. Introduction

The economic perspective acknowledges that decision making, even when including uncertainty, follows rational criteria resulting in a *homo economicus* behavior. However, economic analysis does not consider other motivations and this exclusion is not realistic from a psychological point of view (Kahneman, 2003). Nevertheless, many economists are still reluctant in including emotion-related variables in their analysis. In this paper we try to fill the gap by modeling the affective value attached by the borrower to the item pledged through rational and heuristic perspectives as follows:

Rational perspective: From the borrower's point of view, it is assumed that the willingness to pay (WTP) in order to retrieve the pledge is equal to the pledge's total value. The value of the item pledged corresponds to the sum of the economic value and the affective value. Accordingly, the "rational" borrower would gauge the affective value, in monetary terms, as the difference between the WTP and the economic value of the pledge.

Affect Heuristic perspective: Under this perspective the borrower's behavior will be guided by intuitive judgment (affect heuristic) rather than rational choice. We consider that the borrower may indicate whether the item has some non-monetary affective value (henceforth referred to as sentimental value) associated with the feelings it evokes in her/him.

Determining whether rational approach or affect heuristic is linked to the borrower's underlying motive for decision provides additional information about the elements that influence choice. The hypothesis of the paper posits that if the emotions evoked guide individual behavior, then those pledges that entail sentimental value, as compared to the rational motive, should be redeemed with higher likelihood.

2. Asymmetric information in financial markets

Credit rationing has been extensively analyzed in the literature as a consequence of adverse selection and moral hazard problems (Stiglitz & Weiss, 1981). The former (hidden information) appears when the lender ignores the borrower's default risk. The latter (hidden action) arises after the loan has been granted; in this case, the debtor might not be repaying the debt, regardless of being able to do so (Jaffee & Russell, 1976). As an attempt to reduce asymmetric information, lenders can monitor borrowers by acquiring information about the project to be financed or calling for collaterals (Bester, 1985; Besanko & Thakor, 1987; Manove, Padilla, & Pagano, 2001). However, monitoring is costly and credit rationing persists (Williamson, 1987). Borrowers with good credit history can get loans on better terms (Diamond, 1989; Boot & Thakor 1994; Berger & Udell, 1995), and defaulting, besides losing the collateral (Balkenhol & Schütte, 2001), will jeopardize any future financing (Eaton & Gersovitz, 1981).

2.1 Collateral

Collateral can be used to mitigate the asymmetric information problem. With reference to adverse selection, requiring collaterals in credit contracts is a common practice (Coco, 2000), but in this case the theory discerns loan granting according to the relationship between collateral and borrower's risk (Siebrasse, 1997). On one hand, the collateral is a positive signaling device when borrowers provide a guarantee in order to reveal their lower risk, thus achieving a lower interest rate (Bester, 1985; Chen & Kanatas, 1985). On the other hand, the collateral is a negative signaling device when it is a requirement imposed by lenders on higher risk borrowers or when seeking longer term loans (Leeth & Scott, 1989; Pozzolo, 2004). Regarding moral hazard, the collateral works as a useful guarantee when reducing the cost of enforcing the debt and lenders' loss when the debtor fails to fulfill her/his obligations. Collateral secures the debt when it is valuable for both parties involved in the contract, when the lender can take possession of the security without incurring high transaction costs according to the legal framework (Fleisig, 1995) and when its value does not diminish with use. Because the collateral's value often surpasses the loan (Picker, 1992), it is easier to recover a secured debt than an unsecured one. This is so because in case of default the debtor is expected to be uncooperative with the creditor; so, the cost of identifying the assets is lower ex-ante (Siebrasse, 1997).

3. Formal and informal financial sector

When considering the credit market, it is important to recognize the existence of formal and informal financial institutions that operate therein. In Mexico, intermediaries that belong to the formal financial sector operate under the government's financial and banking regulations. On the contrary, the informal counterpart includes several individuals who act as (unregulated) intermediaries providing loans and receiving deposits, such as: moneylenders, rotating savings and credit associations, pawnbrokers, traders, landlords, relatives and friends (Agénor, Montiel, & Haque, 1993).

Data reported in Agénor et al. (1993, p.18-19) show that informal credit could vary between one-third and three-quarters of total credit market transactions. Moreover, the informal sector represents a significant share in the credit market on the whole; even when individual loan amounts are not very high, they represent a large percentage of total loans (Dunn, 1996). A study for Latin American countries (Tejerina & Westley, 2007) found that, on average, the informal

sector in Mexico had a wider coverage than the formal sector, providing credit to 18.8% of households versus 6.2%.

In the formal financial sector a credit's maturity is generally longer in comparison to those provided by the informal sector, but the latter is much faster in granting funds. In Latin America, as well as in most developing countries, collaterals accepted by formal financial sector are almost exclusively real estate (Inter-American Development Bank [IADB], 2004). In contrast, the informal sector tends to accept a wider variety of guarantees, such as mortgages but also vehicles, jewels and debt cosigners (Raccanello, 2008) and in some cases the reputation of the borrower replaces the traditional collateral (Van Bastelaer, 2000; Dercon & De Weerdt, 2006). This is why most vulnerable people, who often lack properties or financial collaterals (Okurut, Schoombee, & van der Berg, 2004), are more likely to resort to informal financial sources to fund contingencies (Schrader, 1996; Rutherford, 2000; Leslie & Hood, 2009). In this case, low income and savings, as well as lack of financial education, promote relying on strategies that lead to excessive indebtedness due to the overestimation of repayment capacity (Stegman & Faris, 2003; Peterson, 2004), loss of assets and a drop in future income (Cohen & Sebstad, 2003; Schreiner et al., 2005).

In Mexico, the low penetration of banking system and the decline in consumer credit (Banco de Mexico, 2009; Comisión Nacional Bancaria y de Valores [CNBV], 2009; Morfin Maciel, 2009) imply that the majority of transactions are in cash (Caskey, Ruíz Durán, & Solo, 2006). To address the need for resources during the first months of 2009 the demand for pawn credit increased by 15% compared to 2008 (Díaz Sánchez, 2009).

3.1 Pawnbroking

Pawning consists of borrowing a sum of money which corresponds to a fraction of the value of the pledge established by the pawnshop's evaluator. Because the pledge is delivered at the beginning of the contract, loans can be considered as low risk because of the removal of moral hazard and searching for information on debtor's solvency (Barro, 1976; Bouman & Houtman, 1988; Skully, 1994). In order to redeem the pledge, the borrower has to pay the loan plus interests accrued but, in case of default, the pawnbroker becomes the owner of the pledge which is auctioned to the public thereafter. A loan's term is about 3 months but it can be extended through the monthly payment of accrued interest. Interest rates charged by the majority of Mexican pawnshops are very high: between 50 and 200 APR. However, the collateral covers abundantly the amount due at any time since the loan varies between 20 and 40% of its value. Even though the valuation of the collateral between parties may differ (Chen & Kanatas, 1985), it is unlikely that borrowers ignore the economic value of the pledge since the pawnbroker does the valuation in their presence. Nevertheless, because 88.8% of the items pledged are personal/family gold jewelry (Beade & García, 2009), evaluation may diverge because borrowers may assign an affective value as a function of the emotions that the object evokes to them. We suppose that the pledge has an economic value which may be different between the borrower (ECV_B) and the lender (ECV_L), and an affective value that only the borrower assigns to the item pledged. In decision making the affective value is modeled in two ways: on one hand the borrower can rationally incorporate this value in monetary terms; on the other hand, the borrower can assign a sentimental value; which corresponds to the presence of feelings that cannot be translated into monetary terms that, nonetheless, may influence a pawner's decisions related to the pledge.

4. The role of emotions in decision making

Although the individual's reasoning and behavior are guided by rational and intuitive elements, any analysis that would consider only the former cannot account for situations where the decision has been induced by the latter. The way in which these elements interact has been sketched out by Stanovich and West (2000) who indicated that the speed of the intuitive system (System 1), depending on the situation, may provide a stimulus to the reasoning system (System 2); thus, decisions can have a motivation beyond pure rationality. This would occur because "system 1" is based on heuristics (Finucane, Alhakami, Slovic, & Johnson, 2000), mental representations and/or somatic markers (Damasio, 1994), and emotions evoked by a particular situation can influence, and sometimes alter, the rational system's response (Loewenstein, Weber, Hsee, & Welch, 2001). Also, experimental research supports the hypothesis that feelings are not affected by cognition (Zajonc, 1980, 1984); so, a change in perceptions can result in wrong or inconsistent choices that cannot be traced back to the bounded rationality approach (Simon, 1956), since individuals also use simplified heuristics and strategies (Tversky & Kahneman, 1974) that should be considered (Slovic, Finucane, Peters, & MacGregor, 2004). Sensations, like sentiments among others, are one of the elements that motivate the individual's behavior (Epstein, 1994). Therefore, emotions may influence individuals' preferences so that subsequent decisions may reflect affective elements (Kahneman, Wakker, & Sarin, 1997; Hsee & Kunreuther, 2000) or other factors that are usually not taken into account by normative analysis (Hogarth & Kunreuther, 1995). That is, from a heuristic standpoint, those images that represent sentimental attachments for a person, guide her/his judgments as well as choices and decisions (Finucane et al., 2000).

A review of the literature revealed that the attachment to objects may be justified when items embed an intrinsic significance that can be explained through different symbolic functions. For instance, during adulthood and old age possession of objects can constitute a key to access reminiscences of the past stimulated by inherent affectivity, among other reasons (Sherman & Newman, 1977-1978). Yuste and González (1998, p.187) found that for adults and elderly, jewelry embeds most of their memories and affective life. In the same vein, individuals are willing to pay a higher amount of money for items that embed some sentimental value or for those that evoke positive feelings. When a person has more affection for an object s/he will devote more resources (money and effort) to keep in her/his possession or in good condition for continuing enjoying the benefit provided by possessing, or using it (Hsee & Kunreuther, 2000).

Because a lender's valuation of the collateral does not have to coincide with the borrower's, to the extent that the item evokes positive feelings, a higher probability to redeem it would be justified. However, the borrower's action to redeem the pledge could be motivated by either rationality or affective heuristics, along with other reasons.

5. Methodology and hypothesis

After piloting the questionnaire, data for the study were obtained through a random sample of 417 borrowers during May and June 2008 in the city of Puebla (Mexico). The selection criterion was to interview only those borrowers who had already completed a pawning process (redeemed or lost at least one pledge). The method was to interview the borrower, who provided information about socio-economic characteristics, the pawning process and her/his willingness to pay for redeeming a pledge through the closed-ended iterative bidding method (Boardman, Greenberg, Vining, & Weimer, 1996). In applying this method, the initial amount lent by the pawnshop was

taken   as   the   starting   value.

Most respondents are married (55.4%) or single (25.18%) while the most common educational level is high school/technical (37.41%). The monthly family income does not exceed 9,000 MXN for 80.81% of the sample and for 82.73% of the households' total savings do not exceed 2,500 MXN (1 United States Dollar [USD] = 10.4 Mexican Peso [MXN] at the time of the survey). According to the descriptive statistics 72.90% of the sample resorts to pawnshops once or twice a year, 19.90% relies 3-5 times a year and the remaining 7.20% more than 5 times per year. The presence of positive emotions toward the pledge was measured by asking respondents whether the item they pledged had some sentimental value attached or not. Also, according to the survey, 85.61% of respondents redeemed the pledge and 72.42% of the items had sentimental value (Table 1). Borrowers redeemed most of the pledges regardless of if they had sentimental value (86.09%) or not (84.35%).

Loans provided by pawnshops are low; the majority (54.68%) is less than or equal to 1,000 MXN, while amounts greater than 4,000 MXN represent only 7.68% of the sample.

INSERT Table 1 (Pledge redeeming and sentimental value) ABOUT HERE

In the questionnaire borrowers assessed through a Likert scale (0 to 10) their perception (p_i) about the amount of money received by the pawnshop compared to the value of the pledge they thought it had. The value of 0 meant that the amount received by the pawnshop was very high in comparison to the value of the pledge, 5 if the amount received was fair, and 10 if the amount received by the pawnshop was very low in comparison to the value of the pledge. In the overall sample only 8.88% considered that the amount received was higher than the value of the pledge ($0 \leq p_i \leq 4$) while 46.04% complained about having received a tiny loan ($6 \leq p_i \leq 10$). No significant differences on the perception of the amount received were detected based on the presence   of   sentimental   value.

The borrowers' willingness to pay (WTP) was higher than the amount loaned by the pawnshop when the pledge had sentimental value (84.77%) than when it did not (66.96%). We also detected that in the presence (or absence) of sentimental value the WTP was equal to the amount borrowed for 15.23% (32.17%) of the sample. In just one case WTP was lower than the amount borrowed.

To assess borrowers' financial education[1], participants were asked two questions related to debt and investment issues, similar to those used by Lusardi (2008).
1. Suppose you have a debt of 1,000 MXN; according to which rate would you prefer to pay?
   a)   36%   annual   interest
   b)   3%   monthly   interest   compounded   monthly

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[1] The lack of financial literacy has been reported in several countries (Matul, Pawlak, & Falkowski, 2004; Miles, 2004; Organisation for Economic Cooperation and Development [OECD], 2005; Orton, 2007; Mandell, 2009), particularly among Hispanic and African American minorities in the United States (National Council on Economic Education [NCEE], 1999; Kotlikoff & Bernheim, 2001; Lusardi & Mitchell, 2007; Sun, Barboza, & Richman, 2007), among women and middle-low educated citizens (Lusardi & Mitchell, 2006), among youth, elderly and low income people (Anderson, Zhan, & Scott, 2004; OECD, 2005; Lusardi, 2008; Agarwal et al., 2009).

c)   I   do   not   care
d) I do not know

2. Suppose you have to invest some money; which rate of return would you prefer?
   a)   A   rate   of   return   of   10%   yearly
   b)   A   5%   return   rate   compounded   every   semester
   c)   I   do   not   care
   d) I do not know

According to the number of correct answers provided by the respondent we assigned her/him a financial education level. That is, two correct answers: high financial education, one correct answer: average financial education, no correct answers: low financial education. Only 5.76% of the borrowers had a high financial education level while the majority (58.27%) failed to answer both questions.

According to equation A.7 (see appendix for details), the affective value (*AfV*) is a function of *WTP* to redeem the pledge and the borrower's economic value of the pledge (*ECV$_B$*):

$$AfV = WTP - ECV_B = WTP - \frac{loan}{x}(\phi)$$ (A.7)

Although the percentage of the loan to the value of the pledge (*x*) varies across pawnshops, according to our experience, this ranges between 25 and 40%. Table 2 provides the distributions of affective values for different percentages of x.

INSERT Table 2 (Affective value (rational approach)) ABOUT HERE

5.1 Hypothesis and model
Although the economic value of the pledge may be important for the borrower, because the pledge may intrinsically embed some affective or sentimental value, s/he should make an effort in order to redeem it. Therefore, our hypothesis posits that: the repossession likelihood is higher for those items pledged that have sentimental value than items that do not. Indeed, when heuristics motivates recovery, affective value should not be significant. To test our hypothesis we estimated a *dprobit* model with robust standard errors where *redeemed* is the dependent variable that takes value of 1 if the pledge was recovered, 0 if it was lost.

5.1.1 Socioeconomic characteristics of the borrowers
Age is a discrete variable representing the age of the borrower while the marital status of the borrower is modeled through the dichotomous variable *married* (base category) that takes value of 1 if the borrower is married or s/he is living with a partner, 0 otherwise. Similarly we defined the variables: *single*, *widow*, and *divorced* (includes separated couples). *Avg_finedu* and *low_finedu* stand for the financial education level of the borrower and take value of 1 according to the number of correct answers (one or none respectively) provided during the experiment and 0

if both questions were answered correctly (high financial education [*high_finedu*] is the base category).

5.1.2 Socioeconomic characteristics of the household
The number of household members aged over 60 was included in the model through the discrete variable *elderly*. Likewise, the variable *irreg_contr* represents the number of members who contribute irregularly to the household' total income. In this model, the household' monthly income is represented by the continuous variable *income* in monetary terms (MXN). The continuous variables *savings* and *debt* indicate total saving and debt in MXN. Household's assets have been taken into account through the dummy variable *vehicle* that takes value of 1 if the household has at least one vehicle (car, truck, van or motorcycle), 0 if it has none. Also, the dichotomous variable *own_house* takes a value of 1 if the household own a house/apartment, 0 otherwise; for those households actually paying a mortgage on their house/apartment, the dummy variable *mortgage* takes a value of 1, 0 otherwise. The omitted category in the model consists of those households that are renting (*rent_house*). The dichotomous variable *no_card* takes a value of 1 if the household has no bank card (credit or debit), 0 otherwise.

5.1.3 Pawn credit
In order to take account of the specific pawn contract, the variable *term* represents the number of months during which the loan was outstanding. The continuous variable *loan* represents the amount lent by the pawnbroker; the monthly interest rate (including 15% VAT) charged by the pawnshop has been included through the variable *int_rate*. The borrower's sentimental feelings (affect heuristic perspective) toward the pledge have been modeled by introducing the dichotomous variable *sentimental* that takes the value of 1 if the pledge evoked some feelings and 0 otherwise. From the 'rational' perspective, the dichotomous variables *dav25*, *dav30*, *dav35* and *dav40* take value of 1 if the affective value (based on Table 2) is positive or zero according to the rate of the loan provided by the pawnshop to the estimated economic value of the pledge by the pawnshop (x = 25%, 30%, 35% and 40% respectively), 0 on the contrary (negative affective value). For different models, specification variables *afv25*, *afv30*, *afv35* and *afv40* represent the unconstrained monetary affective value (positive or negative) according to x (25 to 40% respectively).

The reasons for which households pawned were included in the model through dummy variables: *medical* takes a value of 1 if pawning was intended to obtain resources to cover medical and/or funeral expenses, 0 otherwise. Similarly, we defined *education* (educational expenses), *food* (food purchasing), *services* (payment of services: electricity, water, telephone, etc.) and *paydebt* (old debt repayment); the omitted category consists of funding other expenditure (*other_exp*).

Finally, the dummy variable *high_freq* takes the value of 1 if the borrower resorts to pawnbroking as a common financing method (more than 5 times per year), 0 otherwise.

5.2 Discussion
Table 3 reports *dprobit* models estimates with robust standard errors; the discussion in the following section corresponds to the model in the first column where no affective variable is included.

Younger borrowers show a higher likelihood of recovering the pledge since *age* is negatively associated with the probability of redeeming it (-0.3% per year); this would indicate that older borrowers are less attached to their possessions, or are facing greater difficulties that prevent recovering them.

INSERT Table 3 (Dprobit model estimations (dichotomous affective value)) ABOUT HERE

Borrowers' marital status is also associated with the likelihood of recovery: singles are more likely to redeem the pledge (+5.7%) compared to those who are married or living with a partner. Single borrowers compared to the married ones have less economic/financial responsibilities arising from the needs of a partner or children. So, their resources availability would enable them to recover the items pawned with a higher likelihood. In contrast, divorced or separated borrowers (*divorced*) show a lower probability of redeeming the pledge (-12.3%) possibly because their children (in the case of women) or because they provide maintenance for their previous household (in case of men). So, regardless of gender, the divorced/separated face a lower likelihood of redeeming the pledge. This is probably because of the reduction in available income, unlike those who are married (or living with a partner) and may share the financial cost of debt and children.

Borrowers that are repaying a mortgage (*mortgage*) could have acquired some experience in terms of financial discipline for meeting monthly payments that would also allow them a higher probability of redeeming the pledge (+9.2%) than those who apparently do not (*rent_house*: base category). Also, those borrowers that do not have any link to the formal financial market (*no_card*) show lower recovery likelihood (-7%). Although variables associated with borrower' financial education are not significant (*low_finedu* and *avg_finedu*), they have the expected negative coefficients supporting that lack of financial literacy is associated with a lower recovery likelihood. It is noteworthy mentioning that pawnbroking provides funding to those households that, often, do not have access to formal financial market, and are the same ones who face a greater likelihood of losing their belongings.

In accordance with the hypothesis, items that have some sentimental value to the borrower have a greater chance of recovery (+6.1%) compared those that do not. On the other hand, the dummy affective value introduced in the model (*dav25*, *dav30*, *dav35* and *dav40*) is not significant nor do results vary substantially among the models (only models containing *dav25* and *dav40* are reported; results were similar when including *dav30* and *dav35*). Also, when replacing dummy variables for the monetary affective value (Table 4) results do not vary. Thus, pledge redeeming seems to be linked to affective heuristic (*sentimental*) but not rational motives.

About pawn credit contract characteristics, loan term (*term*), albeit not significant, show the expected negative association with the redeeming likelihood (-0.3% per month of the loan term), because a longer repayment period is associated with lack of disposable income that hinders recovering the pledge. To the extent that the amount borrowed increases, the economic value of the pledge for the borrower also increases. For this reason, the borrower would be motivated to recuperate the valuable pledge; according to estimates for every 1,000 MXN of total debt underwritten with the pawnbroker (*loan*) the recovery likelihood increases by 2.2%. Accordingly, the repossession likelihood would be related to both sentimental feelings as well as to the

economic value of the pledge; they are both significant and account for an increased probability between 10.4% and 11.3% for a 2,000 MXN loan on a pledge embedding sentimental value.

When pawnbroking was used to cover medical expenses (*medical*) we observe a higher redeeming likelihood (+6.7%) compared to funding other purposes (*other_exp*). In this case, pawnbroking could have provided a short term loan to finance the costs arising from the emergency, but it seems that the borrower has enough resources to retrieve the pledge. On the other hand, when pawning for repaying previous debt (*paydebt*) a significant decline (-18.1%) in the probability of redeeming the pledge is observed. In this case, pawning could be approximated as to selling the pledge, leaving open the option to buy it back. Similarly, when the funds were used for some service payment (water, electricity bills – *services*) we also observe a lower redeeming probability (-7.8%).

Finally, borrowers that resort to pawnbroking as a common financing method (*high_freq*) show higher recovery likelihood (+7.7%) compared to those who rely to pawnshops less than 5 times per year. In this case, experience acquired through frequent pawning allows borrowers to lose the pledge with a lower probability.

INSERT Table 4 (Dprobit alternative model estimations (continuous affective value)) ABOUT HERE

5.3 Corollary hypothesis and model
According to table 2 most affective values were negative, even when the borrowers stated that the pledge had sentimental value. This could be because the majority of respondents have a low household income (for 62.83% of the sample it is lower than 6,000 MXN), resulting in a low WTP. Also, because the loan received is just a fraction of the value of the collateral, and the majority of respondents have low financial education, the WTP might also have been influenced because of the poor understanding of the pawning process.

In order to shed light on the facts stated above, we established a corollary hypothesis: low income levels and low financial literacy are associated with lower affective value attached to the pledge. In our model *AfV* and *WTP* are the mutually endogenous variables; the former represents the monetary affective value of the pledge, and the latter stands for the borrower's willingness to pay, in monetary units, to redeem the pledge. To test this hypothesis a tobit model with instrumental variable was estimated (*ivtobit*). The threshold for the affective value was determined when *AfV* is less than 0. According to equation A.7 (see appendix) the affective value is obtained as a residual of the difference between the borrower's WTP and her/his appraisal of the economic value of the pledge; so, we instrumented *WTP* through *AfV* to solve the endogeneity problem.

5.3.1 Socioeconomic characteristics of the borrowers
Age represents the age of the borrower as in the previous model and her/his educational level is represented by four dichotomous variables: *prim_orless* takes the value of 1 if the borrower has primary schooling or less, 0 otherwise. Similarly we defined: *secondary* (secondary school), *high* (high or technical school) and *graduate* (graduate or postgraduate) which is the base category, and therefore omitted in the model. The borrower's financial education level has been incorporated into the model through a dichotomous variable *low_finedu* that takes the value of 1

if the borrower did not correctly answer either of the two questions on financial issues, and 0 if at least to one of them was answered correctly (i.e. s/he has average or high financial education).

5.3.2 Socioeconomic characteristics of the household

Hpersons is a discrete variable representing the number of people living in the household. The household's monthly income has been included in the model through five dichotomous variables; *income1* takes the value of 1 if the household has a monthly income below 1,500 MXN, 0 otherwise. Similarly, we defined *income2* (1,500 to 3,000 MXN), *income3* (3,001 to 6,000 MXN), *income4* (6,001 to 9,000 MXN) and *income5* (> 9,000 MXN - base category).

Because most of the households have low savings, *lowsavings* is a dichotomous variable that takes the value of 1 if household' savings do not exceed 2,500 MXN and 0 otherwise. Household's debt levels were also added to the model; in this case *debt0* takes a value of 1 if the household has no outstanding debt, and 0 otherwise. Other debt levels were managed similarly: *debt1* (1 to 2,999 MXN), *debt2* (3,000 to 6,000 MXN), *debt3* (6,001 to 15,000 MXN) *debt4* (15,001 to 25,000 MXN) *debt5* (25,001 to 40,000 MXN) and *debt6* (> 40,000 MXN - base category). If at least one household member has a bank account, which is a proxy for the household's access to formal financial markets, the dichotomous variable *bankaccount* takes value of 1 and 0 otherwise.

5.3.3 Pawn credit

Low_freq is a dichotomous variable that acknowledges the frequency with which the borrower resorts to pawnshops and takes value of 1 when relying on once or twice per year and 0 when pawning is a common method of financing (three or more times per year). The dichotomous variable *sentimental* takes value of 1 if the borrower expressed heuristic affective feelings for the pledge, 0 otherwise.

5.4 Corollary hypothesis – Discussion

Ivtobit model second step estimates, according to different values of x that were used to determine the affective value (*AfV*), are reported in table 5. Results do not vary according to x; the following interpretation is based on the case when x = 40%.

Estimates indicate that borrowers are willing to pay a higher amount of money for those items that have a positive affective value. When comparing estimations among the models, to the extent that the value of x increases, the marginal change of the probability related to the willingness to pay (*WTP*) increases, as expected according to equation A.7.

Rational affective value is negatively related to the age of the borrower; on average, for each year the affective value attached to the pledge decreases by 18 MXN. Schultz and Menzel (2004) suggest that attachment to material objects can be based on variables associated with person-object relationship and emotions involved among others, but the literature based on quantitative data is still in its infancy on this topic. Lower *AfV* in our results suggests that as borrowers grow older they exhibit lower attachment to material objects. Although our finding seems contradictory to the findings reported by Yuste and González (1998) for adulthood (35 to 64 years old) and elderly (65 to 85 or more years old), we are inclined to think that it is because our sample is comparatively younger (mean age=38.7 years old; s.d.=12.8).

Those borrowers who possess high/technical school (*high*) assign a higher affective value (+596 MXN) with respect to whose with higher education (*graduate*). Albeit some differences in variable coefficients exist, this finding is observed in all models. For the model where x = 25% we also noted that the secondary education level was significant (at 10%) being related with a higher affective value (+601 MXN). Probably, people with higher education tend to focus more on the monetary value of the pledge (i.e. they have a more developed rational view), having fostered an attitude toward/aimed at the material but obscuring the emotional aspect. These might be the result of the system of values, transmitted through the educational process and the social environment (Koford & Miller, 1991, p.23) that have been harshly criticized by other authors (Porfilio & Malott, 2008). Similarly, the lack of financial literacy (*low_finedu*) is associated with greater affective value (+441.5 MXN) with respect to those with average and high financial education levels. According to estimates, the borrowers with low financial knowledge would be associated with a greater affective value of the pledge. That is, borrowers notwithstanding their limited knowledge in financial concepts would be able to identify the affective value embedded in   their   possessions.

The variable *hpersons* (number of people living in the household) correlates positively (+130.6 MXN) with the pledge' affective value. As soon as more people are living in the household it is more likely that the pledge may belong to any of them. Based on the interpersonal ties between family members, the pledge may evoke affective value for the whole family because being inherently related to a certain event (and/or person), no matter whether all of them have witnessed it (or lived with the person), associated with it (Sherman & Newman, 1977-1978).

Average and low household monthly income levels – below 9,000 MXN – (*income1* to *income4*), are associated with a higher borrower's affective value with respect to high income (*income5* is the base category). In this case, borrowers belonging to households with fewer economic resources could be more emotionally attached to the few valuable items they possess.

The lack of savings to address any urgent needs (*lowsavings*) is related to a lower affective value of the pledge (-544 MXN). In this case, a sudden emergency combined with limited resources, can lead to the appearance of cognitive dissonance process. Because of the need of funds that motivate pawning, the affective value attached to the pledge would be lower due to the need to forgo it.

No debt or low amount of debt (1 to 6,000 MXN or between 15,001 and 25,000 MXN this is *debt0*, *debt1*, *debt2* and *debt4*) are related to a higher affective value of the pledge with respect to higher debt (*debt6* - base category). Consistent with the explanation given for the previous variable, a higher debt burden may be associated with the need of not being attached to possessions.

Borrowers that do not have access to the formal financial markets (*bankaccount* = 0) assign higher affective value to the pledge (+648 MXN) compared to those whose household that do. Lack of bank accounts is mainly associated with those households belonging to low socioeconomic strata; that also tend to have less education, financial knowledge and income (OECD, 2005). This result further supports that those borrowers whose belong to economic

disadvantaged households are those that are correlated with higher affective values.

According to the model, when resorting to pawnshops once or twice a year (*low_freq*) borrowers show a higher emotional value (+565 MXN). Households do not pawn very often when disposing of savings or when lacking items that can be pledged. Because the variables representing households' savings is already included in the model; the result could be related to lack of valuable collaterals. Therefore, as noted earlier, those households that own a few valuable objects would be attaching a greater affective value.

However, we note that sentimental value is not associated with affective value. This result does not imply that affective heuristics would have no relevance on rational analysis, but rather justifies the need to consider carefully both heuristics and rationality.

INSERT Table 5 (*ivtobit* model estimation) ABOUT HERE

6. Conclusions

It is a fact that emotions experienced by individuals may have a significant impact on their decisions (Mellers, Schwartz, & Ritov, 1999; Koenigs et al., 2007). Both economics and psychology, "siblings separated at birth," are aimed at understanding the behavior of individuals from different perspectives (Lowenstein, Rick, & Cohen, 2008, p.648). Therefore, it is expected that closing the gap through research that combine elements of both disciplines will allow a greater understanding of human behavior.

Our results support that affective value is primarily associated with the borrower's and household's characteristics. Borrowers belonging to the low socio-economic strata tend to show higher affective values; however, the presence of sentimental feelings was not significant in explaining 'rational' affective value.

According to our findings, those pledges that evoke some sentimental value to the borrower are more likely to be redeemed. Even though borrowers tend to redeem those pledges with a higher economic value, the associated 'rational' affective value has no role in the recovery likelihood. We found that a borrower's behavior is guided by the affective heuristics that interacts with contextual variables in explaining the outcome of the pawn contract (recovery/loss).

Because one of the limitations of the study may lie in the assumptions behind the model in the way affective value was calculated, applying a different methodology for obtaining the affective value and comparing results will be a natural extension of this work.

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Appendix

The pawnshop provides a loan (*loan*) that corresponds to a fraction (*x*) of the economic value of the collateral according to its valuation (ECV_L).

$$loan = ECV_L(x) \tag{A.1}$$

Therefore, from the pawnshop' viewpoint, the economic value of the pledge can be approximated to:

$$ECV_L = \frac{loan}{x} \tag{A.2}$$

The borrower and the pawnshop may not agree about the economic value of the pledge because the former could assess a greater or a lesser value. Because we consider that the evaluator has better skills that allow him to infer the market value of the item more accurately (being a function of the condition, quality and metal among others); his valuation is the most reliable for the economic value of the pledge. This is why the economic value of the pledge for the borrower (ECV_B) is equal to the economic value provided by the lender (ECV_L) multiplied by phi (ϕ).

$$ECV_B = ECV_L(\phi) \tag{A.3}$$

Borrowers stated their perception (p_i) of the amount received when pawning on a scale from 0 (I received a very high amount over the value of the pledge) to 10 (I received a very low amount of the value of pledge). Finally, we changed the scale of the perception in order to avoid a zero and

phi was determined as the relative value of the rescaled perception of the borrower with respect

to the median of the range of variation.

When substituting A.2 in A.3 we obtain:

$$ECV_B = \frac{loan}{x}(\phi) \qquad \qquad \textbf{(A.4)}$$

For $0 < \phi < 1$ the borrower judges that the loan exceeds his evaluation for the economic value of

the pledge; so, according to (A.3) the following condition holds:

$ECV_B < ECV_L$

When the borrower scored as fair the amount lent by the pawnshop compared with his view about

the economic value of the pledge $(\phi = 1)$ both economic values coincides:

$ECV_B = ECV_L$

Finally, $\phi > 1$ means that the borrower believes that the loan received undervalued the economic

value of the pledge. This is to say that the borrower's economic value of the pledge is greater

than the economic value of the evaluator:

$ECV_B > ECV_L$

In order to keep math easy, the simplest approach postulates that the (total) value of the pledge

(*PledgeValue*) is the sum of the economic value for the borrower and affective value (*AfV*) while

the willingness to pay to retrieve it (*WTP*) is equal to the total value of the pledge:

$$PledgeValue = WTP = ECV_B + AfV \qquad \qquad \textbf{(A.5)}$$

Thus, the unobserved affective value can be obtained from (A.5) as:

$$AfV = WTP - ECV_B \tag{A.6}$$

Replacing (A.4) into (A.5) allow obtaining the affective value of the pledge as a function of the

pawnshop' valuation:

$$AfV = WTP - \frac{loan}{x}(\phi) \tag{A.7}$$

Through borrowers, we elicited their willingness to pay to redeem the pledge (*WTP*), the loan

amount they received (*loan*) and their perception about it (p_i). We were not able to get the

percentage of the pledge lent by pawnshops. So, by substituting different values for (*x*), 25%,

30%, 35% and 40%, we could calculate the corresponding monetary affective values: *AfV25*,

AfV30, *AfV35*, and *AfV40*.

Tables to be included in the text

Table 1 – Pledge redeeming and sentimental value

Pledge	Sentimental value		Total *(%)*
	With	Without	
Lost *(%)*	42 *(13.91)*	18 *(15.65)*	**60 *(14.39)***
Redeemed *(%)*	260 *(86.09)*	97 *(84.35)*	**357 *(85.61)***
Total *(%)*	**302 *(72.42)***	**115 *(27.58)***	**417 *(100)***

Table 2 – Affective value (rational approach)

Affective value	x = 25%		x = 30%		X = 35%		x = 40%	
	Obs.	%	Obs.	%	Obs.	%	Obs.	%
Negative	370	88.73	363	87.05	336	80.58	323	77.46
Zero	9	2.16	1	0.24	2	0.48	3	0.72
Positive	38	9.11	53	12.71	79	18.94	91	21.82
Total	**417**	**100**	**417**	**100**	**417**	**100**	**417**	**100**

Table 3 – Dprobit model estimations (dichotomous affective value)

Redeemed =1	dF/dx	Robust Std.Err		dF/dx	Robust Std.Err		dF/dx	Robust Std.Err	
Age	-0.003	0.001	*	-0.002	0.001	*	-0.002	0.001	*
Single	0.057	0.030	*	0.060	0.029	*	0.059	0.029	*
Widow	0.073	0.033		0.071	0.034		0.070	0.035	
Divorced	-0.123	0.085	*	-0.130	0.086	*	-0.122	0.084	*
Low_finedu	-0.031	0.069		-0.024	0.070		-0.028	0.069	
Avg_finedu	-0.031	0.078		-0.028	0.077		-0.031	0.078	
Elderly	0.044	0.027		0.044	0.027		0.042	0.027	
Irreg_contr	-0.013	0.031		-0.015	0.031		-0.015	0.031	
Income	4.66E-06	3.67E-06		4.24E-06	3.63E-06		4.65E-06	3.66E-06	
Savings	-1.85E-06	1.73E-06		-1.81E-06	1.71E-06		-1.85E-06	1.73E-06	
Debt	-8.31E-07	9.63E-07		-8.62E-07	9.58E-07		-8.55E-07	9.48E-07	
Vehicle	-0.019	0.034		-0.015	0.034		-0.017	0.033	
Own_house	0.025	0.034		0.029	0.034		0.029	0.035	
Mortgage	0.092	0.023	**	0.091	0.024	**	0.094	0.022	**
No_card	-0.070	0.033	**	-0.070	0.033	**	-0.070	0.033	**
Term	-0.003	0.003		-0.003	0.003		-0.003	0.003	
Loan	2.16E-05	8.39E-06	**	2.21E-05	8.35E-06	**	2.20E-05	8.41E-06	**
Int_rate	0.148	0.348		0.117	0.349		0.138	0.352	
Sentimental	0.061	0.039	*	0.069	0.040	*	0.069	0.040	*
Dav25				-0.059	0.054				
Dav40							-0.035	0.036	
Medical	0.067	0.030	*	0.067	0.030	*	0.065	0.030	*
Education	-0.022	0.033		-0.028	0.034		-0.024	0.033	
Food	-0.068	0.050		-0.064	0.050		-0.061	0.033	
Services	-0.078	0.038	**	-0.077	0.038	**	-0.078	0.033	**
Paydebt	-0.181	0.059	***	-0.180	0.059	***	-0.180	0.033	***
High_freq	0.077	0.027	*	0.077	0.027	*	0.078	0.033	*
	N=417			N=417			N=417		
	Pseudo R2 = 0.1707			Pseudo R2 = 0.1741			Pseudo R2 = 0.1730		
	Wald chi2(25) = 62.04***			Wald chi2(26) = 63.23***			Wald chi2(26) = 62.81***		
	Correctly classified: 85.61%			Correctly classified: 85.85%			Correctly classified: 85.61%		
	Obs. Prob.: 0.85612			Obs. Prob.: 0.85612			Obs. Prob.: 0.85612		
	Pred. Prob.: 0.90299			Pred. Prob.: 0.90366			Pred. Prob.: 0.90354		

***p < 0.01; **p < 0.05; *p < 0.1

Table 4 – Dprobit alternative model estimations (continuous affective value)

Redeemed =1	dF/dx	Robust Std.Err		dF/dx	Robust Std.Err		dF/dx	Robust Std.Err		dF/dx	Robust Std.Err	
Age	-0.003	0.001	*	-0.003	0.001	*	-0.003	0.001	*	-0.003	0.001	*
Single	0.054	0.029	*	0.054	0.029	*	0.054	0.029	*	0.055	0.029	*
Widow	0.071	0.033		0.071	0.033		0.071	0.033		0.071	0.032	
Divorced	-0.125	0.085	*	-0.124	0.085	*	-0.124	0.085	*	-0.123	0.085	*
Low_finedu	-0.032	0.067		-0.031	0.067		-0.031	0.067		-0.030	0.067	
Avg_finedu	-0.030	0.076		-0.029	0.076		-0.029	0.076		-0.029	0.076	
Elderly	0.043	0.027		0.043	0.027		0.043	0.027		0.043	0.027	
Irreg_contr	-0.011	0.031		-0.011	0.031		-0.012	0.031		-0.012	0.031	
Income	4.79E-06	3.65E-06		4.74E-06	3.64E-06		4.71E-06	3.65E-06		4.68E-06	3.65E-06	
Savings	-1.87E-06	1.72E-06		-1.87E-06	1.71E-06		-1.87E-06	1.71E-06		-1.87E-06	1.71E-06	
Debt	-7.59E-07	9.69E-07		-7.75E-07	9.70E-07		-7.88E-07	9.71E-07		-7.98E-07	9.71E-07	
Vehicle	-0.019	0.033		-0.019	0.034		-0.019	0.034		-0.019	0.034	
Own_house	0.022	0.033		0.022	0.033		0.022	0.033		0.022	0.033	
Mortgage	0.090	0.023	**	0.090	0.023	**	0.090	0.023	**	0.091	0.023	**
No_card	-0.068	0.033	**	-0.068	0.033	**	-0.068	0.033	**	-0.068	0.033	**
Term	-0.003	0.003		-0.003	0.003		-0.003	0.003		-0.003	0.003	
Loan	3.19E-05	1.38E-05	**	2.92E-05	1.21E-05	**	2.71E-05	1.07E-05	**	2.53E-05	9.69E-06	**
Int_rate	0.152	0.344		0.153	0.344		0.153	0.344		0.153	0.344	
Sentimental	0.057	0.039	*	0.057	0.039	*	0.057	0.039	*	0.057	0.039	*
Afv25	3.66E-06	3.98E-06										
Afv30				3.77E-06	4.40E-06							
Afv35							3.75E-06	4.70E-06				
Afv40										3.64E-06	4.91E-06	
Medical	0.067	0.029	*	0.066	0.029	*	0.066	0.029	*	0.066	0.029	*
Education	-0.018	0.031		-0.018	0.032		-0.018	0.032		-0.019	0.032	
Food	-0.066	0.050		-0.066	0.050		-0.067	0.050		-0.067	0.050	
Services	-0.075	0.037	**	-0.075	0.037	**	-0.076	0.037	**	-0.076	0.037	**
Paydebt	-0.180	0.059	***	-0.180	0.059	***	-0.180	0.059	***	-0.180	0.059	***
High_freq	0.075	0.026	*	0.075	0.027	*	0.075	0.027	*	0.075	0.027	*

N=417	N=417	N=417	N=417
Pseudo R2 = 0.1728	Pseudo R2 = 0.1724	Pseudo R2 = 0.1722	Pseudo R2 = 0.1719
Wald chi2(26) = 64.49***	Wald chi2(26) = 64.68***	Wald chi2(26) = 64.81***	Wald chi2(26) = 64.88***
Correctly classified: 85.61%	Correctly classified: 85.61%	Correctly classified: 85.61%	Correctly classified: 85.61%
Obs. Prob.: 0.85612	Obs. Prob.: 0.85612	Obs. Prob.: 0.85612	Obs. Prob.: 0.85612
Pred. Prob.: 0.90516	Pred. Prob.: 0.90503	Pred. Prob.: 0.90488	Pred. Prob.: 0.90472

***$p < 0.01$; **$p < 0.05$; *$p < 0.1$

Table 5 – *ivtobit* model estimation

2nd step	x = 25%			x = 30%			x = 35%			x = 40%		
	Coef.	Std.Err.		Coef.	Std.Err.		Coef.	Std.Err.		Coef.	Std.Err.	
AfV												
Wtp	0.355	0.023	***	0.438	0.023	***	0.513	0.024	***	0.547	0.02	***
Age	-17.959	8.466	**	-18.387	9.384	**	-20.043	10.369	*	-18.184	9.736	*
Prim_orless	587.935	401.632		478.904	446.004		464.718	493.079		353.817	463.351	
Secondary	601.145	334.436	*	525.13	370.58		496.276	409.408		391.686	384.345	
High	703.863	280.597	**	688.016	310.924	**	704.335	343.502	**	595.884	322.474	*
Low_finedu	316.911	206.072		389.697	229.453	*	440.744	253.889	*	441.563	238.872	*
Hpersons	70.618	67.083		102.239	74.708		120.049	82.668		130.608	77.784	*
Income1	995.237	496.233	**	1307.631	551.483	**	1577.043	609.841	***	1566.4	573.274	***
Income2	701.936	366.938	*	927.927	407.7	**	1103.346	450.81	**	1068.542	423.736	**
Income3	702.738	325.269	**	969.02	361.56	***	1149.382	399.848	***	1119.286	375.909	***
Income4	474.415	330.451		615.519	367.935	*	698.798	407.115	*	626.782	383.03	*
Lowsavings	-343.373	282.462		-457.643	314.496		-539.967	347.983		-544.085	327.394	*
Debt0	850.958	382.758	**	913.25	424.251	**	1015.979	468.747	**	1072.702	440.111	**
Debt1	1019.932	402.78	**	1071.369	446.179	**	1153.702	492.881	**	1167.421	462.645	**
Debt2	715.012	431.79	*	718.186	479.427		765.614	530.005		858.649	498.02	*
Debt3	411.735	459.072		515.678	511.102		587.152	565.511		611.434	532.034	
Debt4	1642.13	647.951	**	1830.761	719.292	**	2051.456	795.124	***	2054.953	747.07	***
Debt5	1095.195	637.876	*	1173.921	708.25	*	1265.865	782.97		1174.685	735.718	
Bankaccount	-504.543	234.117	**	-575.752	260.278	**	-648.035	287.854	**	-648.374	270.639	**
Low_freq	278.134	231.234		442.08	257.516	*	566.293	284.956	**	565.224	268.122	**
Sentimental	-311.401	225.322		-283.857	250.009		-270.252	276.324		-189.078	259.567	
Constant	-2156.367	701.437	***	-2699.75	778.449	***	-3111.182	860.441	***	-3204.358	808.337	***
	N= 417			N= 417			N= 417			N= 417		
	R2= 0.4609			R2= 0.5614			R2= 0.6081			R2= 0.6951		
	Wald chi2(21)= 245.49***			Wald chi2(21)= 401.87***			Wald chi2(21)= 501.91***			Wald chi2(21)= 766.29***		

***$p < 0.01$; **$p < 0.05$; *$p < 0.1$