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## WHY DO BORROWERS CHOOSE SUBOPTIMAL MORTGAGE CONTRACTS? A BEHAVIORAL ECONOMICS APPROACH

*Mortgage contracts have evolved to include a variety of contract design features whose aim is to address the demand of heterogeneous borrowers. Given that borrowers know best their budget constraints and preferences for risk exposure, the question is why many borrowers fail to maximize their welfare through the choice of mortgage contract. The aim of this paper is to explain the causes of suboptimal outcomes in the mortgage market, relying on the theoretical framework of behavioral economics. The first part of the paper provides an overview of the main differences between the rational choice and behavioral economics approach to contract efficiency and discusses the most relevant cognitive biases, identified within behavioral economics. The second part of the paper applies the findings of the two approaches to the issue of mortgage contracts. Considerable attention is devoted to contract design features that are expected to exacerbate the borrower's cognitive biases. Finally, the paper addresses the issue of why market forces fail to "debias" borrowers and, hence, eliminate inefficient mortgage terms.*

Key words: *Behavioral law and economics. – Mortgage contracts. – Contract efficiency. – Cognitive biases.*

### 1. INTRODUCTION

A decision to buy a real estate and to finance it through a residential mortgage loan (hereafter: mortgage) stands out as one of the most important financial decisions in an individual's life. The obligation aris-

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ing from the mortgage contract to repay the principal and pay the interest usually spans a period of twenty or thirty years. By the very definition of the mortgage, the asset purchased by the loan is used as collateral in the event that the borrower defaults on the loan. Some legal systems make a distinction between a loan agreement, which stipulates the obligations of the parties to a loan contract, and a mortgage agreement, which creates a lien on the property used as collateral. For the purpose of this paper, the term mortgage contract will be used to encompass all the rights and obligations arising from both types of contractual relationships.<sup>1</sup>

Given the long-term horizon and severity of the consequences of defaulting, the parties to a mortgage contract have an incentive to adhere to the contract terms that maximize their expected welfare. This implies that their choice of contract clauses is superior to other available alternatives, as well as that the very decision to enter into a mortgage contract was justified from an *ex ante* perspective. Yet, one can observe that rather frequently borrowers fail to enhance their welfare through the choice of mortgage terms.<sup>2</sup> Consequently, the question arises as to what explains the persistence of inefficient contract clauses in the mortgage market, and why market forces fail to eliminate them. The aim of the paper is to analyze these issues within the framework of rational choice theory and a behavioral economics approach to law.

The remainder of the paper proceeds as follows. Section 2 briefly introduces the rational choice approach to the contract efficiency. Section 3 provides some background on the main principles of behavioral economics and reviews most important cognitive biases. Once the major concepts in relation to contract efficiency have been introduced, the paper turns to the issue of mortgage contracts. Section 4 discusses the application of the rational choice approach to the issue of the efficiency of mortgage terms. Section 5 examines the efficiency of mortgage contracts from a behavioral law and economics perspective, in particular addressing the complexity of the cost structure, biased risk assessment, and deferred costs. Section 6 examines why market forces fail to “debias” borrowers and eliminate inefficient contract terms. Section 7 concludes the paper.

## 2. RATIONAL CHOICE APPROACH TO CONTRACT EFFICIENCY

Economic analysis of law has been dominated for decades by rational choice theory. This theory predicts that in competitive markets with

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<sup>1</sup> A recourse loan, adopted in civil law countries, also entails that the lender is able to seize the borrower’s assets that were not assigned as collateral.

<sup>2</sup> As the 2008 financial crisis has shown, mortgage market outcomes can also have spillover effects on the economy as a whole.

complete information, parties to the contract choose a contractual design that maximizes their joint welfare.<sup>3</sup> Maximization of joint welfare implies that the chosen contractual features ensure the greatest difference between the utility one contractual party derives from the consumption of goods and services and the costs the other party incurs to produce them.<sup>4</sup> Certain contractual terms will prevail if one party can offer such terms at a cost that is lower than what the other party is willing to pay for such terms.

Efficiency predictions rely on an assumption that people are rational decision-makers. This implies that, given the autonomy of will, they will enter into a transaction only if the total benefits exceed the costs. Moreover, rational behavior implies that people are always able to “rank available alternatives according to the extent that they give them what they want”<sup>5</sup>, whereas in the context of contracts such alternatives stem from different contract design features. While the rationality assumption seems self-evident in simple transactions, the complexity of contracting requires that individuals are able to process the available information in a fast and correct manner. If the transaction involves uncertainty about future events, which can affect the costs and benefits of contract compliance, rational parties are able to estimate the probability of the outcomes and take them into consideration *ex ante* at the time of the conclusion of the contract. In other words, parties are able to assess the expected utility stemming from the contract, which is the reason why rational choice theory is often associated with expected utility theory.<sup>6</sup> The ability to assign a probability to different outcomes should hold true independently of whether they are endogenous or exogenous, although this

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<sup>3</sup> Joint welfare (surplus) “is computed as the difference between the buyer’s willingness to pay and the seller’s willingness to accept.” F. Parisi, *The language of law and economics: a dictionary*, Cambridge University Press, Cambridge 2013, 42. The rational choice theory also predicts deviations from socially optimal outcomes in the presence of market failures, which will be partially addressed in this paper.

<sup>4</sup> Such outcomes are deemed efficient according to the Kaldor Hicks criterion. Under certain conditions, they are also Pareto optimal. Economic analysis of law that focuses on the efficiency of rules is not preoccupied with distributional concerns as to how the surplus is divided between the parties. However, it has been shown that, under certain conditions, efficient contractual features will be aligned with buyers’ interests since sellers will pass on their benefits to buyers in the form of lower prices. For a discussion on the convergence of efficiency and distribution concerns see: R. Craswell, “Passing on the costs of legal rules: Efficiency and distribution in buyer-seller relationships”, *Stanford Law Review* 43/1991.

<sup>5</sup> R. Cooter, T. Ulen, *Law and Economics*, Addison-Wesley, Boston-Columbus 2016<sup>6</sup>, 13.

<sup>6</sup> The rational choice theory evolved over time to encompass several versions, *inter alia*, most well-known expected utility theory. For a discussion see: R. B. Korobkin, T. S. Ulen, “Law and behavioral science: Removing the rationality assumption from law and economics”, *California Law Review* 88/2000.

distinction will often have an effect on the allocation of risk between parties.<sup>7</sup>

Finally, rational choice theory predicts that people's ranking of available alternatives is consistent over time; they do not experience a conflict between their wants and "shoulds".<sup>8</sup> This implies that the way they choose to trade off benefits in the present against expected benefits in the future is not subject to a change in preferences in the long run.<sup>9</sup>

However, rational choice theory predicts conditions under which efficient contractual terms will not prevail. These conditions involve some of market failures, and two of them play major roles: information asymmetry and transaction costs. Information asymmetry assumes an imbalance of information between the parties to the transaction. If it is severe enough, the problem of adverse selection can impede the exchange.<sup>10</sup> Transaction costs are the costs of an exchange, which encompass "all of the impediments to bargaining".<sup>11</sup> According to the Coase theorem, if transaction costs were zero, private bargaining would ensure efficient contractual terms.<sup>12</sup> Thus, the rational choice approach assumes that a market failure is the only ground on which the law should interfere with the contractual design freely chosen by the parties. Whenever market-based mechanisms are able to attenuate the asymmetry of information or transaction costs, government intervention should be constrained.<sup>13</sup>

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<sup>7</sup> The contract usually stipulates that certain risk will be borne by the party who is better able to prevent, mitigate or bear it. H. Luth, *Behavioural economics in consumer policy: The economic analysis of standard terms in consumer contracts revisited*, Intersentia, Antwerp – Oxford 2010, 136.

<sup>8</sup> M. Statman, *Finance for Normal People: How Investors and Markets Behave*, Oxford University Press, Oxford 2017, 35.

<sup>9</sup> A conflict of a "young self versus an old self" depicts the time inconsistency of preferences. R. A. Posner, "Rational choice, behavioral economics, and the law", *Stanford Law Review* 1551/1998, 1555–1556. Posner opens a discussion on how time-inconsistent preferences can be incorporated into rational choice theory.

<sup>10</sup> This phenomenon is known as "market for lemons". See: G. A. Akerlof, "The market for 'lemons': Quality uncertainty and the market mechanism", *The quarterly journal of economics* 84(3)/1970.

<sup>11</sup> R. Cooter, T. Ulen, 85.

<sup>12</sup> The major implication of the Coase theorem is that, in the absence of transaction costs, the market will ensure efficient outcomes independently of the initial allocation of rights. See: R. H. Coase, "The problem of social cost", *The Journal of Law and Economics* 56(4)/2013.

<sup>13</sup> Government intervention should not go beyond what is necessary to "simplify the task of receiving and understanding information". H. Luth, 27.

### 3. BEHAVIORAL ECONOMICS APPROACH TO CONTRACT EFFICIENCY

Recent developments of economic analysis of law have been motivated by insights from behavioral economics, which denotes a departure from the rationality assumption. Drawing on the findings of various fields of psychology, behavioral economics calls into question the idea that people are always able to choose the best means to their ends, even if information about alternatives is readily available or obtainable at low cost. Instead, behaviorists assert that individuals are boundedly rational – their brains are not always able to “process a huge amount of information quickly and correctly”.<sup>14</sup> Their limited capacities of computation and understanding induce cognitive errors that lead them to choices that are not welfare-enhancing. In the context of contracting, cognitive errors translate into contract clauses that would not have been chosen had individuals processed all the available information. Cognitive errors have been associated with the use of the intuitive system in our brains, which relies on cognitive shortcuts. As opposed to the reflective system, which is slow and effortful, the intuitive system allows individuals to make decisions when faced with an information overload, by decreasing the number of attributes that are taken into account.<sup>15</sup> Simply put, individuals “answer a hard question by substituting an easier one”.<sup>16</sup>

It is important to emphasize that rational choice theory does not predict that the choices of each and every individual are always aligned with welfare maximizing predictions. However, deviations from rational

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<sup>14</sup> M. Statman, 9. The concept of bounded rationality was introduced by Herbert Simon in 1957. See H. A. Simon, *Models of Man Social and Rational, Mathematical Essays on Rational Human Behavior in a Social Setting*, Wiley, New York 1957.

<sup>15</sup> The distinction between the intuitive and the reflective system was introduced by Keith Stanovich and Richard West. See: K. E. Stanovich, R. F. West, “Individual differences in reasoning: Implications for the rationality debate?” *Behavioral and brain sciences* 23/2000.

<sup>16</sup> C. Jolls, “Behavioral law and economics”, *National Bureau of Economic Research*, w12879/2007, <http://www.nber.org/papers/w12879>, last visited 30 August 2017, 12. The use of cognitive shortcuts is not necessarily faulty when overlooked attributes are of negligible importance for the final outcome in comparison with costs of additional effort. However, they turn into errors if individuals disregard or misinterpret important aspects merely because they find a fast answer due to the intuitive system. It has been shown that the level of education and sometimes context-specific knowledge play an important role in deciding when is optimal to substitute the intuitive system with the reflective system. In the context of financial decisions see for example: S. Agarwal, M. Bhashkar, “Cognitive abilities and household financial decision making”, *American Economic Journal: Applied Economics*, 5(1)/2013; S. E., Woodward, “Consumer confusion in the mortgage market”, 2003, <http://ssrn.com/abstract=2049629>, last visited 10 September 2017; A. Lusardi, P. Tufano, “Debt literacy, financial experiences, and overindebtedness”, *Journal of Pension Economics & Finance* 14(4)/2015.

behavior are deemed random and they cancel each other out so that the mean or the average of the distribution of individual behaviors is welfare-enhancing.<sup>17</sup> In contrast, behavioral economics stresses that deviations from rational predictions are systematic and it attempts to explain their different causes. Deviations from rational behavior are commonly known as biases. The paper will only discuss biases that are relevant to mortgage contracts without the intention of providing a comprehensive overview.

As cognitive shortcuts involve focusing on a limited number of attributes that are perceived as particularly important, the question is whether the chosen attributes are indeed the most relevant for a welfare-maximizing decision. It has been shown that their attractiveness to the decision-maker varies depending on how they are presented or framed.<sup>18</sup> Highlighting different aspects of a complex phenomenon leads to different choices by individuals. Consequently, the framing bias occurs once individuals erroneously give more weight to certain features of attributes merely because they are made more salient.

Other types of bias are particularly prominent in situations in which an individual is dealing with probabilistic questions.<sup>19</sup> A cognitive bias that has received sustained attention in literature is availability bias – people assess the likelihood of an event based on how easy it is for them to recall such an event from their memory or recent experiences.<sup>20</sup> An event whose instances are easier to recollect is thought to be more likely to occur. However, the easiness of retrieving certain associations also depends, *inter alia*, on their salience or the familiarity of the context in which they appear. Consequently, availability is not necessarily correlated with the actual likelihood of the outcome, thus leading individuals to erroneous estimations. Availability resembles another common shortcut known as hindsight – people extrapolate past events into future predictions. However, past outcomes are not always reliable predictors of future outcomes. For example, if the outcome had occurred, individuals are prone to overestimate the likelihood of its reappearance in the future, overlooking other factors that might have an effect.<sup>21</sup>

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<sup>17</sup> For a discussion see: R. A. Posner, 1556.

<sup>18</sup> For a detailed discussion of framing phenomenon see: I. P. Levin, S. L. Schneider, G. J. Gaeth, “All frames are not created equal: A typology and critical analysis of framing effects”, *Organizational behavior and human decision processes* 76(2)/1998.

<sup>19</sup> A. Tversky, D. Kahneman, “Judgment under Uncertainty: Heuristics and Biases”, *Science* 185/1974, 1131.

<sup>20</sup> Probabilistic questions arise when an individual is supposed to evaluate whether certain objects or events belong to a particular class or a process, to estimate the frequency or plausibility of a course of events, or to make certain numerical predictions. A. Tversky, D. Kahneman, 1127–1128.

<sup>21</sup> C. Jolls, 15.

Another cognitive tool used for predicting uncertain future events is anchoring. It is mainly applicable in situations in which individuals are supposed to predict a numerical value. It has been shown that in the early stage of a decision-making process people create a preliminary estimation of an unknown value that serves as a benchmark for their actual prediction, which is subsequently adjusted to a small extent under the influence of additional considerations.<sup>22</sup> Many experiments have demonstrated that such anchors are context-specific while at the same time the subsequent adjustments are insufficient.<sup>23</sup> As a consequence, different anchors yield different final choices. Anchoring is highly relevant once individuals are supposed to assess the likelihood of compound events, which consist of several simple events linked into a conjunctive or a disjunctive structure.<sup>24</sup> The earliest event is a natural benchmark for the predictions of the likelihood of the compound event. It has been shown that anchoring leads to erroneous optimism regarding desirable events, while at the same time it prompts individuals to underestimate risks.<sup>25</sup>

Unwarranted optimism regarding future events is also known as the optimism bias. Optimism bias has been described in literature with respect to the decisions that involve a time dimension i.e. costs and benefits that accrue at different points in time. For the analysis of mortgage contracts, it is important to draw attention to the phenomenon known as present bias or myopia, which means that people tend to give excessively more weight to benefits that materialize in the present, compared to those in the future.<sup>26</sup> Similarly, people typically underestimate the burden of costs that are supposed to be borne in the future.<sup>27</sup> While shortsightedness can be observed through the lens of bounded rationality, it is often associ-

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<sup>22</sup> A. Tversky, D. Kahneman, 1128.

<sup>23</sup> In the context of loan terms see for example: C. Dougal, J. Engelberg, C. A. Parsons, E. D. Van Wesep, “Anchoring on credit spreads”, *The Journal of Finance* 70(3)/2015.

<sup>24</sup> A conjunctive structure implies that every isolated circumstance or event is a necessary but not sufficient condition for the occurrence of the compound event. Consequently, the probability of the isolated circumstances is higher than the probability of the compound event. Desirable events are usually compound events with a conjunctive structure. In contrast, in a disjunctive structure, the occurrence of any of the isolated circumstances results in the occurrence of the compound event. Thus, the probability of the compound event is higher than the probability of the isolated circumstances. Events that involve risks are typically compound events with a disjunctive structure. A. Tversky, D. Kahneman, 1128–1129.

<sup>25</sup> *Ibid.*

<sup>26</sup> T. O’ Donoghue, M. Rabin, “Doing it now or later”, *American Economic Review* 89(1)/1999, 103–124.

<sup>27</sup> Since even extremely high interest rates are not able to explain people’s shortsightedness in some instances, this phenomenon is also denoted as hyperbolic discounting. This concept was introduced by D. Laibson, “Golden eggs and hyperbolic discounting”, *The Quarterly Journal of Economics* 112(2)/1997.

ated with another strand of behavioral economics literature – bounded willpower. This creates the time inconsistency of preferences as “people fail to follow through on the plans they make.”<sup>28</sup> They are unwilling to give up something in the present in order to achieve their long-term aims. The hypothesis of bounded willpower was used to reexamine life-cycle theory, which predicts that people optimize their spending and saving behavior during their lifetime to ensure smoothed spending patterns or “permanent income”.<sup>29</sup> Behavioral insights, on the other hand, emphasize that people often fail to match their permanent income.<sup>30</sup>

Differences between rational choice theory and behavioral economics have important implications on the discussion concerning the extent to which the interference of legal rules with the parties’ autonomy of will is desirable. Since behavioral economics predicts that unregulated market will yield suboptimal outcomes even in the absence of the market failures described by rational choice theory, it calls for legal intervention of much greater scope. Legal rules assume a new role in “debiasing” parties to the contract,<sup>31</sup> by virtually protecting them from their own cognitive errors and weakness of will.

#### 4. MORTGAGE CONTRACTS FROM THE RATIONAL CHOICE PERSPECTIVE

A mortgage contract is a type of a loan agreement in which the obligation of the borrower to repay the principal and pay the interest is secured with collateral of a specified real property purchased with the loan amount. The paper will focus on residential mortgage agreements, which entail that the loan is originated for the purpose of buying a home.<sup>32</sup>

A typical mortgage contract stipulates the amount of principal, the maturity of the loan, repayment details,<sup>33</sup> administrative fees of different sorts, insurance, and other rights and remedies. An inherent characteristic

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<sup>28</sup> C. Jolls, 16.

<sup>29</sup> M. Statman, 219.

<sup>30</sup> This is either due to insufficient self-control or because they find it difficult to correctly estimate their wealth, longevity or future consumption needs. M. Statman, 221–227.

<sup>31</sup> C. Jolls, 2.

<sup>32</sup> Although many aspects of the analysis can be generalized to encompass other types of loan contracts, and to a certain extent some consumer contracts, the focus of the paper is motivated by the widespread and significance of residential mortgages and the fact that behavioral traits are expected to be more common among consumers or households as compared to firms.

<sup>33</sup> Repayment details typically include monthly payments, the interest rate, and interest rate adjustment rules.



of a loan contract is that the lender's benefits from the exchange depend on "borrower controlled activities"<sup>34</sup>, which is the reason why the contract typically includes various terms that allocate the risks to the borrower.

According to the rational choice approach, the heterogeneity of borrowers with respect to their ability to control and bear certain risks, explains the complexity of the contracts. An array of mortgage contracts reflects the efficiency consideration that people are best off with an abundance of alternatives to choose from, since they know their preferences and constraints. However, this implies that before entering into a mortgage contract the borrower is able to correctly estimate a whole set of contingencies and price them accordingly. Such contingencies usually encompass interest rate risk, inflation risk, foreign currency risk, refinancing options and penalties, prepayment options and penalties, the borrower's constraints today and in the future. The efficient contract terms are not necessarily the most protective vis-a-vis the borrower nor do they allocate most of the risks to the lender. In essence, the efficiency of contract terms depends on whether the borrower is willing to pay a risk premium to alleviate such risks. For efficient contract features to prevail, it is not required that the borrower is effectively able to negotiate every contract clause.<sup>35</sup> Despite the fact that most of the mortgage contracts are standard form contracts, the possibility to shop for different terms offered by competitors is expected to prompt lenders to offer efficient contract design features.<sup>36</sup>

However, rational choice theory allows that, in many instances, borrowers are unwilling to read certain parts of the contract and, consequently, to shop for the best terms.<sup>37</sup> Such behavior can be explained by the positive costs of informing – if the costs of reading, understanding

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<sup>34</sup> V. L. Smith, "The borrower-lender relationship", *American Economic Review* 66 (3)/1976, 406.

<sup>35</sup> Individual negotiations are rather rare given the high transaction costs.

<sup>36</sup> A group of "comparison shoppers" is expected to discipline the market. A. Schwartz, L. L. Wilde, "Intervening in markets on the basis of imperfect information: A legal and economic analysis", *U. Pa. L. Rev.* 127/1978, 649. In connection to this, efficiency will not entail that available contract design features are customized to the preferences of all borrowers. Instead, they will reflect the demand of prevalent groups of borrowers. The reason is that "the costs of information, monitoring, negotiating and transacting do not make it worthwhile". For example, interest rates, which incorporate the default risk premium, are not fine-tuned to the default risk of individual borrowers. V. L. Smith, 406.

<sup>37</sup> Some recent papers address this issue empirically. See for example: F. Marotta-Wurgler, "Does Contract Disclosure Matter?", *Journal of Institutional and Theoretical Economics*, 168(1)/2012; Y. Bakos, F. Marotta-Wurgler, D. R. Trossen, "Does anyone read the fine print? Consumer attention to standard-form contracts", *The Journal of Legal Studies* 43(1)/2014.

and comparing various contract dimensions are too high compared to the possible benefits of more appealing terms, it is rational for the borrowers to remain ignorant. This is known as rational apathy.<sup>38</sup> It is expected to result in the adverse selection with respect to some contract design features, since the borrowers' rational ignorance incentivizes the lenders to compete on price, thus lowering the protection of borrowers stemming from these features.<sup>39</sup> Yet, there are two important caveats. First, the chosen terms are not necessarily inefficient, because the preferences of the borrowers remain unrevealed. Borrowers' interests can be also served by the low protection or risk-shifting terms, if their willingness to pay for better contract conditions is comparatively low.<sup>40</sup> Second, the phenomenon of rational apathy only applies to those contract clauses that allocate small or remote risks or set fees of negligible importance. Borrowers are expected to shop for clauses whose content substantially contributes to the financial burden stemming from the mortgage contract, such as the interest rate clause. In such cases, the benefits of shopping for better terms are higher than the costs of becoming well informed. As a consequence, lenders offer efficient terms.

## 5. MORTGAGE CONTRACTS FROM THE BEHAVIORAL ECONOMICS PERSPECTIVE

In contrast to the rational choice approach, behavioral economics asserts that contract inefficiency can emerge even if the net benefits of becoming acquainted with the meaning and consequences of contract terms are positive. This is when the theory of imperfect rationality steps in to complement the theory of imperfect information.<sup>41</sup> Inefficiency is the result of biased perceptions, which cause borrowers to underestimate the true cost of the mortgage contract. Alternatively, borrowers overestimate their ability to repay the loan in the long run.<sup>42</sup> The question is what

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<sup>38</sup> M. G. Faure, H. A. Luth, "Behavioural economics in unfair contract terms", *Journal of Consumer Policy* 34(3)/2011, 340.

<sup>39</sup> The market for contract design has been compared to a "flea market", in which one party to the contract is offered low prices, but can only get a minimum of rights with respect to the other party. Schäfer, H. B., Leyens, P. C., "Judicial Control of Standard Terms and European Private Law—A Law & Economics Perspective on the Draft Common Frame of Reference for a European Private Law", 2009, <http://ssrn.com/abstract=1520457>, last visited 25 September 2017, 107.

<sup>40</sup> Transaction costs reduction due to the absence of shopping for terms should also be taken into consideration when assessing the efficiency of terms.

<sup>41</sup> O. Bar-Gill, "The law, economics and psychology of subprime mortgage contracts", *Cornell L. Rev* 94/2008, 1127.

<sup>42</sup> The inefficiency of mortgage contracts emerges either because borrowers would not enter into the loan contract in the first place or would opt for a different set of contract terms if they were able to correctly assess the expected net benefits.

kind of mortgage contract clauses prompt borrowers to miscalculate the expected value of the contract and how they relate to the biases and the bounded willpower identified within behavioral economics.

The first source of inefficiency of mortgage contracts lies within their complexity and multidimensionality. For efficient conditions to prevail, borrowers have to be able to properly estimate many price dimensions and to aggregate them into a true cost of borrowing. This cost mainly depends on two distinct elements: fees and interest.<sup>43</sup> The difficulty of assessing the total cost of a loan is aggravated by the fact that different price dimensions are contingent on future circumstances, some of which are exogenous for both sides. Once uncertainty is involved, borrowers are expected to calculate the compound expected value, which implies that each price component is multiplied by the expected probability of the outcome.<sup>44</sup> Since such an analysis is computationally exhaustive, information overload induces borrowers to rely on cognitive shortcuts that reduce the number of attributes and price components being considered. Cognitive shortcuts used in such circumstances can be qualified as framing, in line with behavioral economics terminology. Framing does not imply that the borrowers' choice of contract dimensions is completely random. Instead, they are prone to focus on features that they perceive more salient. There are two important implications of framing based on saliency. First, market forces are expected to achieve efficiency only with respect to salient contract attributes and price components.<sup>45</sup> Non-salient terms are expected to go unnoticed, thus reducing lenders' incentives to compete on them.<sup>46</sup> Second, lenders have incentives to shroud some price terms and other important contract attributes that prompt borrowers to underappreciate the total expected cost of the mortgage.<sup>47</sup> Since the underestimated cost of the mortgage translates into a higher expected value

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<sup>43</sup> While the role of fees is to compensate the lender for the costs incurred to originate and service the loan, interest reflects the opportunity cost of capital and compensates the lender for various risks she is exposed to. These risks include default risk, inflation risk, foreign currency risk, and interest rate risk.

<sup>44</sup> In order to compare the cost of different mortgage products, the analysis has to be both "nonselective and compensatory". Non-selective analysis means that the borrower takes into consideration all relevant attributes, whereas compensatory analysis assumes that they are able to trade off desirable contract design features of one mortgage contract against desirable contract design features of another. R. Korobkin, "Bounded rationality, standard form contracts, and unconscionability", *The University of Chicago Law Review* 70/2003, 1219–1291.

<sup>45</sup> *Ibid.*, 1234.

<sup>46</sup> *Ibid.*

<sup>47</sup> For a discussion on when shrouding attributes is an optimal strategy for sellers see: X. Gabaix, D. Laibson, "Shrouded attributes, consumer myopia, and information suppression in competitive markets", *The Quarterly Journal of Economics* 121(2)/2006.

of the contract, it allows for credit expansion among borrowers who would not otherwise enter into a mortgage.<sup>48</sup>

Inefficient mortgage contracts can also appear as the result of bias related to the perception of risks embedded in the contract terms. In principle, the main risk that affects the total cost of a loan is the risk of interest rates changing over the life of the loan.<sup>49</sup> The allocation of interest rates risk can vary from imposing all the risk on the lender in the case of fixed interest rates, to imposing all the risk to the borrower in case of fully adjustable interest rates.<sup>50</sup> In countries in which banks mainly rely on deposits and other borrowings in foreign currency, the total cost of the loan is even more influenced by changes in foreign currency exchange rates. Similarly to adjustable interest rate clause, mortgage contracts often contain a foreign currency clause, which shifts the exchange rate risk to the borrower. Borrowers are sometimes able to choose between several foreign currency clauses, depending on the foreign currency used as a reference for recurring adjustments.<sup>51</sup>

From the outset, a proliferation of different risk-allocation clauses is expected to benefit borrowers, who are able to choose a contract that fits their preferences concerning the degree of risk exposure.<sup>52</sup> However, the inefficiency can result from systematic biases borrowers are prone to when assessing the risk. Biases that lead to underestimation of risks decrease the expected cost of the loan and in turn, increase the expected value of the loan. Several psychological traits identified within behavioral

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<sup>48</sup> It is important to emphasize that framing shortcut will turn into a framing error only if, contrary to rational choice predictions, borrowers fail to assume that complex terms and shrouded prices are in fact terms that privilege the borrower and increase the total cost of the loan. “Complexity is attractive to lenders as long as the borrower’s approximation is an underestimation.” O. Bar-Gill, 1123.

For the empirical evidence that borrowers do not necessarily infer that shrouded prices are high prices in mortgage contracts see: V. Stango, J. Zinman, “Fuzzy math, disclosure regulation, and market outcomes: Evidence from truth-in-lending reform”, *The Review of Financial Studies* 24(2)/2011.

<sup>49</sup> Other sorts of risks associated with the stream of payments arising out of the mortgage contract include foreign currency risk and inflation risk.

<sup>50</sup> Accordingly, it is common to denote mortgages as fixed-rate mortgages (FRM) or adjustable-rate mortgages (ARM). Adjustable interest rates assume a periodic adjustment of interest rates in accordance with a specified market index. Recently, there has been a flood of hybrid and more complex interest rate clauses, which entail a fixed interest rate only in the first years of the loan followed by an adjustable interest rate.

<sup>51</sup> In the Central and Eastern Europe countries, borrowers can typically choose between loans indexed in Swiss francs and loans indexed in euros.

<sup>52</sup> For a discussion of factors affecting the choice of interest rate clauses see: J. Sa-Aadu, C. F. Sirmans, “Differentiated contracts, heterogeneous borrowers, and the mortgage choice decision”, *Journal of Money, Credit and Banking* 27(2)/1995.

economics make such expectations plausible. The paper will focus on biases peculiar to exchange rate risk.<sup>53</sup>

First, if exchange rates were relatively stable for a significant period preceding the decision to enter into a mortgage contract, borrowers may commit the availability error by failing to retrieve from their memory the existence of less favorable rates.<sup>54</sup> Simply because substantial changes in rates appear remote, they underestimate their variance in the future. Similarly, borrowers commit the hindsight error by extrapolating past exchange rates into future predictions. Since the exchange rates were favorable at the time of the conclusion of the contract, they unreasonably assume that such rates will persist during the life of the loan. Finally, underestimation of risks can be a product of an anchoring error, which entails that people make a preliminary evaluation of an unknown value (future exchange rates) based on idiosyncratic circumstances, and then adjust this value to an insufficient extent in line with other relevant information. One can expect that borrowers use the exchange rate at the time of the origination of the loan as a faulty anchor, which they fail to adjust according to other pertinent factors.<sup>55</sup>

The final source of inefficiencies in mortgage contracts is time-related bias. Mortgage contracts create benefits in the present, while the financial burden is mainly spread over the life of the loan. According to behavioral economics, if individuals are shortsighted and they put excessively more weight on instant gratification as compared to future costs, the financial burden that appeared welfare-maximizing *ex ante* can lead to welfare loss in the long run. Shortsightedness is reinforced by certain mortgage clauses that defer the stream of payments.<sup>56</sup> Such clauses include low down payments, which translates to increased interest payments in the future, and interest rates clauses that offer a lower rate only during an initial period (escalating payments or teaser rates).<sup>57</sup> Focusing on the short-term dimension of the price of a loan is rational only if bor-

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<sup>53</sup> Behavioral economics literature mainly focused on interest rates risk, thus leaving the issue of exchange rate risk in mortgage contracts unaddressed.

<sup>54</sup> Less favorable exchange rates assume that the domestic currency depreciates with respect to the foreign reference currency.

<sup>55</sup> Such factors include the duration of the contract, the historical variance of exchange rates, economic cycles etc. This is in line with the predictions that the probability of disjunctive events, which include multiple alternative triggers, such as the case with factors driving the exchange rates or interest rates, is usually underestimated. Systematic underestimation of risks associated with adjustable interest rates was found in a study: B. Bucks, K. Pence, "Do borrowers know their mortgage terms?", *Journal of Urban Economics* 64(2)/2008.

<sup>56</sup> O. Bar-Gill, 1119–1121.

<sup>57</sup> *Ibid.*

rowers can reasonably expect that their income will rise in the future.<sup>58</sup> An alternative behavioral explanation for what might seem as an unwarranted optimism is the bounded willpower of borrowers.

However, it is important to emphasize that borrowers differ among themselves concerning the level of financial literacy and tendency to make cognitive mistakes.<sup>59</sup> This can explain, in addition to the heterogeneity of preferences, the abundance of mortgage products. If some borrowers are boundedly rational, it is a perfectly rational response of banks to react to the demand by offering suboptimal contract design features.<sup>60</sup>

## 6. MARKET FORCES AND “DEBIASING” OF BORROWERS

The question is whether market mechanisms are able to correct contract inefficiencies associated with the behavioral traits of borrowers. Demand-side market correction assumes that borrowers are able to overcome their biases when choosing a mortgage contract, either as a consequence of individual learning process or information sharing among different borrowers. The limitation to the individual learning process is that, due to the long duration of the mortgage contracts, they rarely involve a repeated interaction, from which borrowers could gain a valuable experience and prevent errors.<sup>61</sup> Interpersonal learning is expected to be fairly limited as well due to the fact that once borrowers become aware of the mistakes they made at the time of the origination of the loan, market conditions change to such an extent that their experience is not necessarily relevant to other borrowers.<sup>62</sup>

Supply-side market corrections assume that lenders themselves have an incentive to reveal information that enhances borrowers' welfare or to elucidate the misleading offers of their competitors. Theoretically, if dissemination of information is costless for the lender, there are reasons

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<sup>58</sup> Alternatively, escalating payments are rational if borrowers correctly predict that their spending on other goods and services will decrease.

<sup>59</sup> S. Agarwal, M. Bhashkar; S. E., Woodward; A. Lusardi, P. Tufano; S. Agarwal, I. Ben-David, V. Yao, “Systematic mistakes in the mortgage market and lack of financial sophistication”, *Journal of Financial Economics* 123(1)/ 2017.

<sup>60</sup> Market corrections can theoretically belong to both the demand and supply side of the mortgage market. O. Bar-Gill, 1079.

<sup>61</sup> The possibility to refinance the loan after a drop in interest rates alleviates this limitation, although, it has been demonstrated that the least informed borrowers are the ones that rarely use such an opportunity. See: S. Agarwal, R. J. Rosen, V. W. Yao, “Why do borrowers make mortgage refinancing mistakes?”, 2012, [https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=2446753](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2446753), last visited 8 September 2017.

<sup>62</sup> It is also arguable that borrowers have little incentives to spread their knowledge among other borrowers.

to expect that competitive forces will eliminate contract inefficiencies. Yet, “competitive debiasing” does not occur due to “the debiasing curse”, which implies that information revealing harms rather than enhances the welfare of the lender.<sup>63</sup> The debiasing curse emerges when lenders use shrouded attributes (non-salient contract terms) to cross-subsidize the price of salient attributes, and therefore, make their services appear cheaper to borrowers. It is not in the lender’s interest to educate borrowers since this would only incentivize borrowers to shop the main service (with salient attributes) from the competitor for a subsidized price, while at the same time avoiding or substituting away from inefficient non-salient terms.<sup>64</sup> However, this finding is based on the assumption that inefficient non-salient terms are avoidable or detachable from other terms of the contract.<sup>65</sup> Finally, long-term reputational concerns can incentivize lenders to offer only efficient terms. However, such incentives are limited by the fact that there are almost no repeated market interactions, whereas the time gap between the origination of the loan and the revelation of inefficiencies is wide enough to alleviate potential harm to the reputation.

## 7. CONCLUSION

This paper has investigated the question as to why some borrowers fail to maximize their welfare through the choice of mortgage terms, giving rise to contract inefficiency. It has been shown that, from the rational choice perspective, inefficiency is expected to prevail only with respect to contract terms where the costs of reading, interpreting and comparing different alternatives outweigh the potential increase in utility stemming from better terms. Mortgage clauses that substantially affect the financial burden incurred by borrowers, such as foreign currency or interest rate clause, should induce borrowers to compare offers from various lenders, thus incentivizing lenders to provide efficient terms. In contrast, insights from behavioral economics suggest that some borrowers fail to maximize their welfare even if the expected net benefits of becoming informed outweigh the costs, due to cognitive biases that cause borrowers to overestimate the expected value of the loan. The paper has stressed the importance of three mortgage contract attributes that exacerbate borrowers’ cognitive biases: the complexity of the cost structure, risk-allocation clauses, and deferred costs. It has contributed to the existing body of lit-

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<sup>63</sup> X. Gabaix, D. Laibson, 4.

<sup>64</sup> *Ibid.*, 1–7.

<sup>65</sup> Competitive forces are expected to debias borrowers if salient and nonsalient terms are linked into a contract structure in which specific clauses are not negotiable or their consequences unavoidable.

erature by pointing to behavioral economics rationale as to why borrowers underestimate the risk inherent in foreign currency clauses.

The contrasting views of rational choice theory and behavioral economics that have been reviewed in the paper have important implications for rethinking the policy approach to mortgage contracts, in particular, risk-allocation clauses. While rational choice insights imply that the law should aim to minimize search costs by compelling lenders to present information in a simple and transparent manner, behavioral economics findings indicate that mere information disclosure rules are not sufficient to eliminate the incidence of cognitive mistakes. Instead, it encourages a more paternalistic approach that entails a deeper interference of the state in parties' autonomy of will. An important caveat to such approach, however, lies in the direct and indirect costs of state intervention, notwithstanding the behavioral traits of the state agents themselves.

The paper has raised two questions in need of further investigation. First, future work should empirically test whether behavioral traits can account for underestimation of risk stemming from foreign currency clause, in line with arguments advanced in the paper. Moreover, it needs to examine whether a more paternalistic policy approach is able to attenuate cognitive biases of borrowers at a comparatively low cost of state intervention.

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