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THE LAW, ECONOMICS AND PSYCHOLOGY OF SUBPRIME MORTGAGE CONTRACTS

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THE LAW, ECONOMICS AND PSYCHOLOGY OF SUBPRIME MORTGAGE CONTRACTS

*Oren Bar-Gill**

ABSTRACT

Over 4 million subprime loans were originated in 2006, bringing the total value of outstanding subprime loans over a trillion dollars. A few months later the subprime crisis began, with soaring foreclosure rates and hundreds of billions, perhaps trillions, of dollars in losses to borrowers, lenders, neighborhoods and cities, not to mention broader effects on the US and world economy. In this Article, I focus on the subprime mortgage contract and its central design features. I argue that these contractual design features can be explained as a rational market response to the imperfect rationality of borrowers. Accordingly, for many subprime borrowers loan contracts were not welfare maximizing. And to the extent that the design of subprime mortgage contracts contributed to the subprime crisis, the welfare loss to borrowers, substantial in itself, is compounded by much broader social costs. Finally, I argue that a better understanding of the market failure that produced these inefficient contracts should inform the ongoing efforts to reform the regulations governing the subprime market.

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INTRODUCTION

Over 4 million subprime loans were originated in 2006, bringing the total value of outstanding subprime loans over a trillion dollars.¹ A few months later the subprime crisis began, with soaring foreclosure rates and hundreds of billions, perhaps trillions, of dollars in losses to borrowers, lenders, neighborhoods and cities, not to mention broader effects on the US and world economy.² In this Article, I focus on the subprime mortgage contract and its central design features. I argue that for many borrowers these contractual design features were not welfare maximizing. And to the extent that the design of subprime mortgage contracts contributed to the subprime crisis, the welfare loss to borrowers, substantial in itself, is compounded by much broader social costs. Finally, I argue that a better understanding of the market failure that produced these inefficient contracts should inform the ongoing efforts to reform the regulations governing the subprime market.

During the five years preceding the crisis, the subprime market experienced staggering growth as riskier loans were made to riskier borrowers.³ Not surprisingly these riskier loans came at the price of higher interest rates, which compensated lenders for the increased risk that they undertook.⁴ But high prices themselves are not the central problem; the problem is that these high prices were hidden by lenders and underappreciated by borrowers. In the prime market, the traditional loan is a standardized 30-year fixed-rate mortgage (FRM). Lenders could have accounted for the increased risk of subprime loans by simply raising the interest rate on the traditional FRM. Yet the typical subprime loan is a far cry from an FRM. The subprime market boasted a broad variety of complex loans with multidimensional pricing structures.

¹ See Yuliya Demyanyk and Otto Van Hemert, *Understanding the Subprime Mortgage Crisis*, Working Paper, pp. 6 (FN 6), 7 (Table 1) (2008) (The authors' data includes 2,646,000 loans. These data cover approximately 85 percent of securitized subprime loans. In 2006, 75 percent of subprime loans were securitized, implying a total of $2,646,000 / (0.85 * 0.75) = 4,150,588$); *State of the US Economy and Implications for the Federal Budget: Hearing Before the H. Comm. On the Budget*, 110th Cong. 5 (Dec. 5, 2007) (*The Current Economic Situation*, statement of CBO Director Peter R. Orszag) [hereinafter CBO Testimony] (available at <http://www.cbo.gov/ftpdocs/88xx/doc8876/12-5-Economic.htm>) ("By the end of 2006, the outstanding value of subprime mortgages totaled more than \$1 trillion and accounted for about 13 percent of all home mortgages."); The Center for Responsible Lending estimates that as of Nov. 27, 2007, there were 7.2 million outstanding subprime loans with an estimate total value of \$1.3 trillion (*A Snapshot of the Subprime Market*, <http://www.responsiblelending.org/issues/mortgage/quick-references/a-snapshot-of-the-subprime.html> (last visited Mar. 1, 2008) [hereinafter CRL, *Snapshot*]).

² Congressional Budget Office (CBO), *The Budget and Economic Outlook: Fiscal Years 2009 to 2018*, 23 (Jan. 23, 2008), www.cbo.gov/ftpdoc.cfm?index=8917&type=1 [hereinafter CBO] (citing estimates of between \$200 billion and \$500 billion for total subprime-related losses and noting the additional, and potentially substantial, indirect adverse effects of the subprime crisis on the economy). See also Treasury Secretary Henry M. Paulson, Jr., Remarks on Current Housing and Mortgage Market Developments, Georgetown University Law Center, Oct. 16, 2007 (available at <http://www.treasury.gov/press/releases/hp612.htm>).

³ See Demyanyk and Van Hemert, *supra* note 1, at 5-6; The Center for Responsible Lending, *Mortgage Lending*, <http://www.responsiblelending.org/issues/mortgage/> (last visited Mar. 17, 2008).

⁴ Lauren E. Willis, *Decisionmaking and the Limits of Disclosure: The Problem of Predatory Lending: Price*, 65 MD. L. REV. 707, 720-721 (2006) (describing the development of risk-based pricing in the mortgage market).

Hybrid loans, combining fixed and variable rates, interest-only loans, and option-payment adjustable-rate mortgages (ARMs), each product type with its own multidimensional design, were all common in the expanding subprime market. Many of these contractual designs were not new; they were known in the prime market since the early 1980s. But it was in the subprime market where they first took center stage.⁵

Common subprime mortgage contracts share two suspect features. The first is cost deferral. (Of course, any loan contract involves deferred-costs; I am referring to deferral of costs beyond that which is necessarily implied by the very nature of a loan.) The traditional, prime mortgage required a 20 percent downpayment, which implies a loan-to-value (LTV) ratio of no more than 80 percent. In the subprime market, in 2006, over 40 percent of loans had LTVs exceeding 90 percent. Focusing on purchase-money loans, in 2005, 2006 and the first half of 2007 the median subprime borrower put no money down, borrowing 100 percent of the purchase price of the house. The schedule of payments on the loan itself exhibits the same deferred-cost characteristic. Under the standard prime FRM, the borrower pays the same dollar amount each month – a flat payment schedule. Under a conventional ARM, where the monthly payment is calculated by adding a fixed number of percentage points to a fluctuating index, the dollar amount paid varies from month to month but without any systemic trajectory. The majority of subprime loans, on the other hand, exhibited an increasing payment schedule: they set a low interest rate for an introductory period, commonly two years, and a higher interest rate for the remaining term of the loan. Other subprime loans exhibited an even steeper payment schedule. Interest-only loans and payment-option ARMs allowed for zero or negative amortization during the introductory period, further increasing the step-up in the monthly payment after the introductory period ended. A direct implication of an escalating-payments contract is the “payment shock,” which occurs when a rate reset leads to a significant, up to 100 percent, increase in the monthly payment.

The second suspect feature of subprime contracts is their level of complexity. While the traditional FRM sets a single, constant interest rate, the typical subprime mortgage includes multiple interest rates, some of which are implicitly defined by non-trivial formulas that adjust rates from one period to the next. The typical subprime loan also features a host of fees, some applicable at different time-periods during the loan term, some contingent on various exogenous changes or on borrower behavior. The numerous fees associated with a subprime loan fall under two categories: (1) origination fees, including a credit check fee, an appraisal fee, a flood certification fee, a tax certification fee, an escrow analysis fee, an underwriting analysis fee, a document preparation fee and separate fees for sending emails, faxes and courier mail; and (2) post-origination fees, including late fees, foreclosure fees, prepayment penalties, and dispute-resolution or arbitration fees. These fees can add up to thousands of dollars, or up to 20 percent of the

⁵ A note on terminology: The residential mortgage market is divided into the Prime segment and the non-Prime segment. The non-Prime segment is further divided into Subprime (high risk) and Alt-A (lower risk), although the line between subprime and Alt-A is not always clear. See *infra* Section I.A. Many of the contractual design features studied in this Article were common in both the subprime and Alt-A segments. For expositional convenience, I will sometimes refer to these two segments together as “Subprime.”

loan amount. The prepayment option, which is of special importance in the subprime market, further complicates the valuation of these contracts. And so does the (implicit) default option. Finally, since a borrower must choose among many different complex products, each with a different set of multidimensional prices and features, the complexity of the borrower's decision problem is exponentially greater than the already high level of complexity of a single contract.⁶

What explains these contractual design features?⁷ I begin by exploring possible rational choice explanations. Consider the cost-deferral feature. A common explanation for deferred-cost contracts is based on the affordability argument. Many subprime borrowers, at the time they took-out the loan, were liquidity constrained: they could afford only a small downpayment and a small monthly payment. The catch, of course, is that a small downpayment and a small initial monthly payment imply higher monthly payments in the future, after the initial rate resets to the post-introductory level. Accordingly, the rationality of the affordability argument depends on the ability of the borrower to either make the high future payment or to avoid it. And so the argument splits into two sub-arguments: the "make" argument and the "avoid" argument. The borrower will be able to make the higher payment, if her income is expected to increase substantially by the end of the introductory period. Some subprime borrowers rationally expected such a substantial increase in income; many others did not.

Next, the "avoid" argument: The borrower will be able to avoid the higher payment, if she expects to prepay the mortgage before the introductory period ends. The prepayment option depends on the expected availability of refinance loans with attractive terms. Attractive refinancing options will be available if (1) the borrower's credit score improves, (2) market interest rates fall, or (3) house prices increase. Some borrowers rationally expected that such positive realizations will enable them to refinance their deferred-cost mortgage and avoid the high long-term costs. For many other borrowers these expectations were overly optimistic.

An alternative, rational choice explanation portrays the deferred-cost mortgage as an investment vehicle designed to facilitate speculation on real estate prices. If house prices rise, the speculator will sell the house (or refinance) and pocket the difference between the lower buy price and the higher sell price, without ever paying the high long-term cost of the deferred-cost loan. If house prices fall, the speculator will default on the mortgage, again avoiding the high long-term cost. Of course, default is not a cost-free proposition, but as long as the probability of a price increase is high enough, the upside benefit will offset the downside risk. Some subprime borrowers were surely speculators. Many others, however, were not.

⁶ Federal Reserve Board, Truth in Lending, 73 Fed. Reg. 44,522, 44,524-25 (July 30, 2008) (to be codified at 12 C.F.R. pt. 226) [hereinafter FRB Rule] ("products in the subprime market tend to be complex, both relative to the prime market and in absolute terms")

⁷ As noted above, these contractual design features appeared in the prime market well before the subprime expansion. The explanations considered below apply to prime mortgages that share the deferred-costs and high complexity features. These explanations also reveal why these existing design features rose to prominence in the subprime market and, as argued below, even facilitated the subprime expansion.

I now turn to the second identified design feature: complexity and multidimensionality. First consider the multiple, indirectly-defined interest rates.⁸ The index-driven rate adjustments of an ARM, further complicated by maximum adjustment caps, can be explained as a means to efficiently allocate the risk of fluctuating interest rates between lenders and borrowers. This explanation, however, was more powerful when interest rate risk was shared by the lender and borrower. During the subprime expansion, when securitization was prevalent, this risk could have been, and sometimes was, passed on to diversified investors. Next consider the proliferation of fees common in subprime mortgage contracts. At least some of these fees can be explained within a rational-choice framework. Charging separate fees for separate services allows each borrower to pick and choose between the offered services according to her individual preferences. But this efficiency story applies only to optional services; it does not apply to the numerous non-optional, yet separately priced services, such as the credit check and document preparation. Another explanation views the proliferation of fees as reflecting efficient risk-based pricing. For example, delinquency imposes a cost on lenders. Late fees and foreclosure fees allocate this cost to the delinquent borrowers. Absent such fees, non-delinquent borrowers would bear a large share of the costs imposed by delinquent borrowers, as lenders would raise interest rates to compensate for the forgone fees. Again, this explanation is plausible for certain fees, but not for others.

The rational choice theories explain some of the observed contractual designs in some contexts. They do not provide a complete account: the prevalence of cost-deferral and the exceedingly high level of complexity cannot be fully explained within a rational-choice framework. To fill this explanatory gap, I develop a behavioral economics theory of the subprime mortgage contract. I argue that the design of these contracts can be explained as a rational market response to the imperfect rationality of borrowers. Myopic borrowers unduly focus on the short-term dimensions of the loan contract and pay insufficient attention to the long-term dimensions. Optimistic borrowers underestimate the future cost of a deferred-cost contract. They overestimate their future income. They expect to have unrealistically attractive refinance options. Or they overestimate the expected value of a bet placed on the real estate market, perhaps because they irrationally expect that a 10 percent price increase last year will be replicated next year.⁹ If myopic and optimistic borrowers focus on the short-term and discount the long-term, then lenders will offer deferred-cost contracts with low short-term prices and high long-term prices.

A similar argument explains the complexity of subprime mortgage contracts. Imperfectly rational borrowers will not be able to effectively aggregate multiple price and non-price dimensions and discern from them the true total cost of the mortgage product. Inevitably, these borrowers will focus on a few salient dimensions. If borrowers cannot process complex, multidimensional contracts and thus ignore less salient price dimensions, then

⁸ To the extent that interest rate complexity is an artifact of the deferred-cost features, the preceding discussion applies here as well.

⁹ Compare Ben S. Bernanke, Chairman, FRB, Speech, *Financial Markets, the Economic Outlook, and Monetary Policy*, (Jan. 10, 2008) (available at <http://www.federalreserve.gov/newsevents/speech/bernanke20080110a.htm>) [hereinafter Bernanke 1/10/08 Speech] (suggesting that the ARM design responds to optimism about house prices).

lenders will offer complex, multidimensional contracts, shifting much of the loan's cost to the less salient dimensions.

While focusing on only one part of the subprime picture – the design of subprime loan contracts – this Article develops an alternative account of the dynamics that led to the subprime crisis. One common account focuses on the unscrupulous lenders, who pushed risky credit onto borrowers who were incapable of repaying.¹⁰ Another common account focuses on the irresponsible borrowers who took out loans they could not repay.¹¹ Both accounts capture some of what was going on during the subprime boom, but both accounts are incomplete. In many cases borrowers were not reckless; they were imperfectly rational. And in many cases lenders were not evil; they were simply responding to a demand for financing that was driven by borrowers' imperfect rationality.

This Article highlights a demand-side market failure: imperfectly rational borrowers "demanded" complex deferred-cost loan contracts and lenders met this demand. But the failures in the subprime mortgage market were not limited to the demand side. In fact, a supply-side market failure explains why lenders willingly catered to borrowers' imperfectly rational demand, even when the demanded product designs increased the default risk born by lenders.¹² The main culprit is securitization – the process of issuing

¹⁰ There are numerous accounts of abusive practices, falling under the general heading of predatory lending, many of them predating the recent subprime crisis. See U.S. Department of Housing and Urban Development, *Unequal Burden: Income and Racial Disparities in Subprime Lending in America* (2000) (available at http://www.huduser.org/Publications/pdf/unequal_full.pdf) (documenting "...the rapid growth of subprime lending during the 1990s..." and calling for increased scrutiny of subprime due to "...growing evidence of widespread predatory practices in the subprime market.") While there is surely some overlap between the contractual design features studied in this Article and the predatory lending problem, the extent of the overlap is unclear, largely because there is no agreed definition of predatory lending. See U.S. Dep't of Hous. & Urban Dev. & U.S. Dep't of Treasury, *Curbing Predatory Home Mortgage Lending: A Joint Report 17* (2000) (available at <http://www.huduser.org/publications/hsgfin/curbing.html>) [hereinafter "HUD-Treasury Report"]. Yet, two observations can be made: First, the more severe instances of predatory lending go far beyond manipulation of contractual design. Second, the identified contractual design features are more ubiquitous than at least the more severe manifestations of predatory lending. Cf. Todd J. Zywicki and Joseph Adamson, *The Law & Economics of Subprime Lending*, George Mason Law & Economics Research Paper No. 08-17 (2008) (available at SSRN: <http://ssrn.com/abstract=1106907>) (discussing the relationship between predatory lending and subprime lending).

¹¹ In some cases borrowers engaged in outright fraud. See Jennifer E. Bethel, Allen Ferrell and Gang Hu, *Legal and Economic Issues in Subprime Litigation*, Harvard Olin Discussion Paper, February 21, 2008 (citing evidence of widespread fraud in the application and appraisal processes among early payment default loans).

¹² An immediate response is that lenders priced the increased risk. And there is some evidence of such pricing. See Demyanyk and Van Hemert, *supra* note 1, at 4. But this response is misleading. The evidence shows that subprime risks were not accurately priced. See SEC Report on Rating Agencies, July 8, 2008 (finding that rating agencies underestimated risks associated with subprime mortgage-backed securities); Bethel, Ferrell and Hu, *supra* note 11 (arguing that even sophisticated market participants had limited experience with and understanding of the assets, subprime residential mortgages, underlying the securities (RMBSs and CDOs), and what risks these assets generate when pooled and securitized. In addition, credit-rating models underestimate the correlation of defaults and thus understate risk. Moreover, major investment banks are under investigation by the SEC, the FBI, and state Attorneys General with respect to pricing of RMBSs and CDOs, suggesting that mispricing may be the result of malice, not only incompetence.); SEC, Summary Report of Issues Identified in the Commission Staff's Examinations of Select Credit Rating Agencies, p. 11 July 8, 2008 (available at

securities backed by large pools of mortgage obligations. Securitization created a host of agency problems, as a series of agents, intermediaries tasked with originating loans, pooling and packaging them into mortgage-backed securities and assessing the risk associated with the different securities, stood between the principles, the investors who ultimately funded the mortgage loans, and the borrowers. The compensation of these agents-intermediaries was not designed to align their interests with those of the principles-investors: Their fees were based on the quantity, not quality of processed loans. As a result, the agents-intermediaries had strong incentives to increase the volume of originations, even at the expense of originating low-quality, high-risk loans, by promoting mortgage products that, with high levels of complexity and cost-deferral, created the appearance of affordability.¹³ Moreover, it is likely that even the sophisticated investors and financial intermediaries were caught-up in the frenzy of the real estate boom and underestimated the risks associated with the mortgage products that they were peddling.¹⁴ The multi-billion dollar losses incurred by these sophisticated

<http://www.sec.gov/news/studies/2008/craexamination070808.pdf>) (hereinafter “SEC Rating Agencies Report”) (citing an analyst from one rating agency who wrote in an email that “her firm’s model did not capture “half” of the deal’s risk”); Carrick Mollenkamp et al., Behind AIG’s Fall, Risk Models Failed to Pass Real-World Test, Wall Street Journal, p. A1, November 3, 2008 (discussing the failure of AIG’s risk models, and citing Warren Buffett: “All I can say is, beware of geeks . . . bearing formulas.”)

¹³ See generally Frederic S. Mishkin, FRM Governor, Speech, “Leveraged Losses: Lessons from the Mortgage Meltdown,” At the U.S. Monetary Policy Forum, New York, New York February 29, 2008 (arguing that rating agencies, underwriters, and CDO managers were driven by fees); Zywicki and Adamson, *supra* note 10, at 44-45 (discussing agency costs in the subprime market); Scott Woll, The Buildup to a Fall, 11/1,07 Mortgage Banking 50, Volume 68, Issue 2 2007 WLNR 24019676 (Lenders and securitizers profiting from increased loan volume “started looking at new ideas [to increase loan volume]...What followed was the largest introduction of new products to the mortgage market in decades.”) But see Gary B. Gorton, *The Subprime Panic*, NBER Working Paper 14398, pp. 28-31 (October 2008) (available at www.nber.org/papers/w14398) (arguing that agency costs were not that large, as many agents along the securitization chain retained substantial risks on their balance sheets). On the compensation structure and incentives of loan originators – see Ben S. Bernanke, Subprime mortgage lending and mitigating foreclosures, Before the Committee on Financial Services, U.S. House of Representatives, September 20, 2007 (<http://www.federalreserve.gov/newsevents/testimony/bernanke20070920a.htm>) (Since originators profited from fees and yield-spread premiums they were more interested in increasing loan volume than in increasing loan quality.). On the compensation structure and incentives of the rating agencies who were charged with assessing the risk associated with the mortgage-backed securities – see SEC Rating Agencies Report, *supra* note 12 (finding inadequate rating procedures and conflicts of interest. These shortcomings led to underestimation of risk, which in turn contributed to the failure of investors and investment banks to press originators for safer loans.); Jan A. Kregel, *Changes in the U.S. Financial System and the Subprime Crisis*, Levy Economics Institute Working Paper No. 530, p. 16 (April 22, 2008) (available at SSRN: <http://ssrn.com/abstract=1123937>) (rating agencies that provided more lax assessment of subprime risks got more business, and more fees, from securitizers.) These inter-institutional agency costs come on top of the intra-institutional agency costs stemming from the imperfect alignment of incentives between each one of the financial intermediaries and its employees. See, e.g., Martin Wolf, Why Regulators Should Intervene in Bankers’ Pay, Financial Times, January 16th, 2008. Beyond these more subtle, albeit financially substantial, agency costs, there is evidence that some agents-intermediaries withheld information from principles-investors. See Bethel, Ferrell and Hu, *supra* note 11 (Investment banks are under investigation, by the SEC, the FBI, and state Attorneys General, for withholding information affecting credit risk from rating agencies and investors.)

¹⁴ See Martin S. Feldstein, Housing, Credit Markets and the Business Cycle, pp. 3-4 (NBER Working Paper No. 13471, 2007) (arguing that investors underestimated and mispriced risks); Joseph R. Mason & Joshua Rosner, *Where Did The Risk Go? How Misapplied Bond Ratings Cause Mortgage Backed Securities and*

players provide (at least suggestive) evidence that imperfect rationality was not confined to the demand-side of the subprime market.¹⁵

The proposed behavioral economics theory offers a more complete account of the dynamics in the subprime market and of how these dynamics shaped the design of subprime loan contracts. These contractual design features have substantial welfare implications, especially when understood as a market response to the imperfect rationality of borrowers. First, excessive complexity prevents effective comparison shopping and thus hinders competition in the subprime mortgage market. Second, deferred-costs features are correlated with increased levels of delinquency and foreclosure, which impose significant costs not only on borrowers but also on surrounding communities, lenders and loan-purchasers, and the economy at large. Third, excessively complex, deferred-costs contracts have adverse distributive consequences, disproportionately burdening financially weaker, often minority, borrowers. Finally, backloading a loan's cost onto less salient or underappreciated price dimensions artificially inflates the demand for mortgage financing and, indirectly, for residential real estate. The proposed theory thus establishes a causal link between contractual design, on the one hand, and the subprime expansion and the real estate boom, on the other hand. Accordingly, the subprime meltdown that followed this expansion can also be attributed, at least in part, to the identified contractual design features.¹⁶

Collateralized Debt Obligations Market Disruptions 36 (May 2007) (arguing that investors and investment banks falsely believed that pooling mortgages diversifies risk); Bethel, Ferrell and Hu, *supra* note 11 (“[M]aybe the market did not fully anticipate the probability or effect of correlated market events or the very small probability of an extremely negative outcome.”); Gorton, *supra* note 13, at 26 (arguing that the complexity of the securitization process led to a loss of information along the securitization chain). Much of this underestimation of risk harkens back to optimism about house prices. See, e.g., Julio Rotemberg, *Subprime Meltdown: American Housing and Global Financial Turmoil*, Harvard Business School Case # 9-708-042, p. 1 (2008) (citing a letter that Fannie Mae CEO Franklin Raines sent to shareholders in 2001: “Housing is a safe, leveraged investment – the only leveraged investment available to most families – and it is one of the best returning investments to make... Homes will continue to appreciate in value. Home values are expected to rise even faster in this decade than in the 1990s.”)

¹⁵ See Bethel, Ferrell and Hu, *supra* note 11, at tbl. 2 (summarizing the tens of billions of dollars worth of subprime-related write-offs by banks; citing an estimate of \$150 billion in writedowns as of February 2008, and a forecast that this amount will more than double); Standard and Poor's, *Subprime Write-Downs Could Reach \$285 Billion, But Are Likely Past The Halfway Mark*, March 13, 2008 (<http://www2.standardandpoors.com/portal/site/sp/en/us/page.article/4,5,5,1,1204834027864.html>). These losses do not provide conclusive evidence that sophisticated players made mistakes; they could be the realization of the large (!) down-side risk in an (ex ante) rational bet.

¹⁶ While contractual design contributed to the subprime expansion, there are other factors that likely played a more central role in generating the subprime expansion. These factors include (1) the advent of new technology that enabled efficient risk-based pricing (see General Accounting Office, *Consumer Protection: Federal and State Agencies Face Challenges in Combating Predatory Lending* 21 (Jan. 2004) (available at www.gao.gov/new.items/d04280.pdf) [hereinafter “GAO Consumer Protection Report”]); (2) the increase in the supply/availability of funds brought about by securitization (see Mian, Atif R. and Sufi, Amir, “The Consequences of Mortgage Credit Expansion: Evidence from the 2007 Mortgage Default Crisis” (May 2008). Available at SSRN: <http://ssrn.com/abstract=1072304>), as well as by the global savings glut (see Ben Bernanke, *Speech, The Global Savings Glut and the U.S. Current Account Deficit*, Virginian Association of Economists, Richmond, VA, March 10, 2005 (<http://www.federalreserve.gov/boarddocs/speeches/2005/200503102/>); and (3) the increase in supply of funds for risky investments caused by investors underestimation of risk (see Feldstein, *supra* note 14, at 3-4). It is important to emphasize that the main purpose of this Article is to explain the contractual design

Importantly, the identified contractual design features and the welfare costs associated with them are not the result of the less-than-vigorous competition in the subprime market. In fact, enhanced competition would likely make these design features even more pervasive. If borrowers focus on the short-term and discount the long-term, then competition will force lenders to offer deferred-cost contracts. And if borrowers, faced with complex, multidimensional contracts, ignore less salient price dimensions, then competition will force lenders to offer complex, multidimensional contracts and to shift much of the loan's cost to the less salient price dimensions. Accordingly, ensuring robust competition in the subprime mortgage market would not solve the problem.¹⁷

The subprime crisis has spurred a plethora of reform proposals.¹⁸ One of these proposals has recently matured into law, as the Federal Reserve Board (FRB), in July 2008, issued a new set of regulations governing mortgage lending.¹⁹ The behavioral economics theory, developed in this Article, can be used to evaluate the existing and proposed regulatory solutions and to devise potentially superior solutions. In this Article, I focus on disclosure regulation. I argue that the centerpiece of the current disclosure regime, the Annual Percentage Rate (APR) disclosure, has the potential to undo the adverse effects of imperfect rationality, including the identified contractual design features and the welfare costs they impose.

The APR disclosure was the most important innovation of the Truth-in-Lending Act (TILA) of 1968.²⁰ A normalized total-cost-of-credit measure, the APR was designed to assist borrowers in comparing among different loan products. In theory, the APR should solve, or at least mitigate, both the complexity problem and the cost-deferral problem. Complexity and multidimensionality pose a problem if they hide the true cost of the loan. The APR responds to this concern by folding the multiple price dimensions into a single measure. The APR should similarly help short-sighted borrowers grasp the full cost of deferred-cost loans, since the APR calculation assigns proper weight to the long-term price dimensions. Moreover, since the APR, in theory, strips away any competitive advantage of excessive complexity and cost-deferral, lenders will have no reason to offer loan contracts with these design features.

The APR can solve these problems, but only if it lives up to the expectations of the Congress that enacted it, namely, if it provides a timely, true measure of the total cost of

features common in subprime mortgages, not the subprime expansion itself; although, as argued above, contractual design did contribute to the subprime expansion.

¹⁷ Compare: Oren Bar-Gill, *Seduction by Plastic*, 98 NW. U. L. Rev. 1373 (2004) [hereinafter Bar-Gill, *Seduction*]; Oren Bar-Gill, *The Behavioral Economics of Consumer Contracts*, 92 MINN. L. REV. 749 (2008) [hereinafter, Bar-Gill, *Consumer Contracts*]; Oren Bar-Gill & Elizabeth Warren, *Making Credit Safer*, 157 U. PENN. L. REV. __ (2008).

¹⁸ For a summary of mortgage reform bills currently pending in Congress – See S. 2136, 110th Cong. (2007); S. 2133, 110th Cong. (2007); H.R. 3778, 110th Cong. (2007); H.R. 3609, 110th Cong. (2007).

¹⁹ FRB Rule, *supra* note 6. See also Housing and Economic Recovery Act of 2008, Pub.L. 110-289, Sec. 2502(a), 15 U.S.C. 1638(b)(2).

²⁰ Truth in Lending Act, Pub. L. No. 90-321, § 107, 82 Stat. 146, 149 (1968), 15 U.S.C. § 1606 (LexisNexis 2008) (defining the APR); Truth in Lending Act, Pub. L. No. 90-321, § 121-31, 82 Stat. 146, 152-57 (1968), 15 U.S.C. §§ 1631-49 (LexisNexis 2008) (requiring disclosure of the APR).

credit, and borrowers rely on it in choosing among different loan products. The current APR disclosure does not live up to these expectations. First, the APR disclosure often comes too late to be useful for comparison shopping. Second, the APR does not measure the total cost of credit. Numerous fees paid by mortgage borrowers are excluded from the regulatory definition of a "finance charge," and are thus ignored in the APR calculation. Moreover, the current APR calculation assumes that the borrower will hold the loan for the nominal loan period, commonly 30 years. The actual duration of a mortgage loan is, however, much shorter than 30 years; closer to 5 years in the subprime market. Most borrowers refinance and prepay (or default) long before the 30 year mark. By ignoring the possibility of prepayment (and default) the current APR disclosure fails to reflect the true total cost of the loan. The distortion was especially large during the recent subprime expansion, when for many loans the prepayment option constituted a substantial value component. When a borrower expects to prepay a deferred-cost loan by the end of the low-rate introductory period, it makes little sense for this borrower to rely on an APR that presumes continued payments at the high post-introductory rate.

Since the APR disclosure often came too late and did not reflect the true cost of credit, borrowers stopped relying on the APR as the main tool for comparison shopping among loan products. And as the APR lost the trust of borrowers, it also lost the ability to serve as an effective antidote to imperfect rationality. Recent reforms and existing reform proposals address some of the shortcomings of the APR disclosure. The timing-of-disclosure problem was addressed and partially solved by the FRB's new mortgage regulations²¹ and by the recently enacted Housing and Economic Recovery Act.²² I commend these reforms, but argue that more should be done. The underinclusiveness problem was recently addressed by Elizabeth Renuart and Diane Thompson, who propose a broader definition of a "finance charge" – one that that would cover all, or most, of the costs paid by borrowers.²³ The analysis in this Article supports the spirit of the Renuart-Thompson proposal, while simultaneously recognizing that a comprehensive cost-benefit analysis may justify keeping certain price dimensions outside the scope of the "finance charge" definition.

Recent reforms and existing reform proposals do not address the exclusion of the prepayment option (and the default option) from the APR definition. I explain how the APR calculation would have to be adjusted to incorporate the prepayment option. I acknowledge the costs of making these adjustments, and I urge policymakers to carefully

²¹ FRB Rule, *supra* note 6, at 44,524 ("The final rule requires creditors to provide transaction-specific mortgage loan disclosures such as the APR and payment schedule for all home-secured, closed-end loans no later than three business days after application, and before the consumer pays any fee except a reasonable fee for the review of the consumer's credit history.").

²² Housing and Economic Recovery Act of 2008, Pub.L. 110-289, Sec. 2502(a), 15 U.S.C. 1638(b)(2).

²³ See Elizabeth Renuart and Diane E. Thompson, *The Truth, The Whole Truth, and Nothing but the Truth: Fulfilling the Promise of Truth in Lending*, 25 Yale J. Reg. 181 (2008). Renuart and Thompson offer the most recent and most comprehensive proposal to create a more inclusive APR. But the recognition that the APR is underinclusive, and proposals to create a more inclusive APR, are not new. See HUD-Treasury Report, *supra* note 10, at 69 (proposing that the law be amended "to require that the full cost of credit be included in the APR."); William N. Eskridge, *One Hundred Years of Ineptitude: The Need for Mortgage Rules Consonant with the Economic and psychological Dynamics of the Home Sale and Loan Transaction*, 70 Va. L. Rev. 1083, 1166 et seq. (1984) (proposing a more inclusive APR more than 20 years ago).

weigh these costs against the potentially substantial benefits of an APR that accounts for the prepayment option. If borrowers ignored the traditional APR figure because it ignored the prepayment option, they should embrace an APR that incorporates that option. And, as the APR reclaims its rightful position at the forefront of the mortgage disclosure regime, borrowers, and society, will again benefit from the APR's unique ability to undo the adverse effects of imperfect rationality.

While this Article focuses on the subprime mortgage market, much of the analysis applies with equal force to the other segments of the residential mortgage market – the Alt-A segment and even to the Prime segment. There, too, highly complex, deferred-cost contracts began to appear in increasing numbers, alongside the traditional FRM. In fact, the most extreme forms of cost-deferral, the Interest-Only and Payment-Option mortgages were more common in the Alt-A and Prime segments. Moreover, it was in the Alt-A and Prime segments where introductory rates were substantially below the fully-indexed, market rate.²⁴ While the crisis began with subprime, it did not end there. Defaults and foreclosures are already appearing in substantial numbers also in the Alt-A and even Prime markets.²⁵

The Article proceeds as follows. Part I provides some background on the subprime mortgage market. Part II describes the central design features of subprime mortgage contracts. Part III evaluates the rational choice explanations for the identified contractual design features, emphasizing the limits of these rational choice theories. Part IV develops an alternative, behavioral economics theory that fills the explanatory gap left by the rational choice accounts. Part V describes the welfare costs of the identified contractual design features. Part VI considers policy implications.

I. THE SUBPRIME MORTGAGE MARKET

A. Defining Subprime

What is a subprime mortgage? In theory, subprime loans are sold to riskier borrowers.²⁶ While low-risk borrowers get low-price, specifically, low interest rate prime loans, high-risk borrowers get high-price, specifically, high interest rate subprime loans.²⁷ But this definition establishes a misleading dichotomy. The risk associated with different

²⁴ See Christopher L. Cagan, *Mortgage Payment Reset: The Issue and the Impact*, 2 (First American CoreLogic, Mar. 19, 2007).

²⁵ See Stan J. Liebowitz, *Anatomy of a Train Wreck: Causes of the Mortgage Meltdown*, p. 3 (August 7, 2008) (available at SSRN: <http://ssrn.com/abstract=1211822>) (ARM defaults and foreclosures are as prevalent in the prime market, as they are in the subprime market.); Gorton, *supra* note 13, at 21 (“Problems in the Alt-A market are still mostly in the future, and it is likely that this market will also shut down.”)

²⁶ The “in theory” qualifier is used, since many low-risk borrowers end-up with high-price, subprime loans. See *infra* Part III.A.

²⁷ An important legal antecedent to the subprime market was the Depository Institutions Deregulation and Monetary Control Act of 1980 that preempted state interest caps and allowed lenders to charge higher interest rates. See Zywicki and Adamson, *supra* note 10.

borrowers varies along a continuum, and, accordingly, loan prices vary along a continuum. Still, it is helpful to focus on a subset of high-risk, high-price loans, even if the line that divides this category of loans from the neighboring, lower-risk, lower-price category is both arbitrary and blurry. The mortgage industry itself follows this rough categorization. And so do policymakers. The recent credit crisis is dubbed the subprime mortgage crisis, and legislators and regulators are working to fix the problems in the subprime market.

While the boundaries of the subprime segment are arbitrary and blurry, the industry, researchers and regulators have been using more-or-less common definitions of subprime. According to one rough division, borrowers with FICO scores – a common measure of creditworthiness – below 620 are considered subprime borrowers.²⁸ Of course, a borrower’s FICO score is only one of several factors determining risk level. Thus, industry participants consider additional risk factors, such as the loan-to-value ratio, when classifying a loan as subprime.²⁹ Moving from risk factors to price, a common subprime threshold is a loan APR that is three points (or more) above the treasury rate for a security of the same maturity; the three points threshold defines “higher-priced loans” under the Home Mortgage Disclosure Act (HMDA).³⁰ In its new subprime mortgage regulations the FRB adopted a slightly different definition of “higher-priced mortgage loans,” setting the threshold APR at 1.5 points above the “average prime offer rate.”³¹

B. Subprime Mortgage Loans: The Numbers

The subprime mortgage market has grown substantially over the past few years (an increase ending in 2006). In 2001, about 1,360,000 first lien subprime loans were originated; while, in 2006, that number was approximately 4,150,000 million and represented over 20 percent of total loan-origination volume.³² According to the CBO,

²⁸ See, e.g., Kristopher Gerardi, Adam Hale Shapiro, and Paul S. Willen, *Subprime Outcomes: Risky Mortgages, Homeownership Experiences, and Foreclosures* (Federal Reserve Bank of Boston, Working Paper No. 07-15, p. 5, 2007) [hereinafter *Subprime Outcomes*] (“In the United States, a subprime borrower today typically refers to an individual with a FICO score below 620, who has become delinquent on some form of debt repayment in the previous 12 to 24 months, or who has even filed for bankruptcy in the last few years.”); Credit Suisse Report, *Mortgage Liquidity du Jour: Underestimated No More*, 13 (Mar. 12, 2007) (quoting the 620 figure).

²⁹ *Id.* In 2006, the average FICO score of a borrower on a first lien subprime loan was 654.7. See Demyanyk and Van Hemert, *supra* note 1, at 7, tbl. 1. This data reflects the trend of making subprime loans to high FICO score borrowers who exhibit risk factors other than an impaired credit history, e.g., borrowers who do not wish to produce a downpayment (zero-down borrowers), borrowers who do not wish to fully disclose their income and financial wealth (no-doc and low-doc borrowers), and borrowers seeking a high LTV loan. See *Subprime Outcomes*, *supra* note 28, at 6-7.

³⁰ See Michael LaCour-Little, *Economic Factors Affecting Home Mortgage Disclosure Act Reporting*, (Social Science Research Network, Working Paper, p. 3, 2007) (available at <http://ssrn.com/abstract=992815>) [hereinafter LaCour-Little, *Economic Factors*].

³¹ FRB Rule, *supra* note 6, at 44,531-32 (“The definition of “higher-priced mortgage loans” appears in §226.35(a).” The average prime offer rate is derived from the Freddie Mac Primary Mortgage Market Survey(R)).

³² See Demyanyk and Van Hemert, *supra* note 1, at 6 (FN 6), 7 (Table 1) (The authors’ data includes 624,000 loans in 2001 and 2,646,000 loans in 2006. These data cover approximately 85 percent of

“[b]y the end of 2006, the outstanding value of subprime mortgages totaled more than \$1 trillion and accounted for about 13 percent of all home mortgages.”³³ The Alt-A market – covering “medium risk” loans between subprime and prime – also experienced significant growth, expanding from 2 percent of total originations in 2003 to 13 percent of originations in 2006.³⁴

The average size of a subprime loan has also increased. In 2006, the average size of a first lien subprime loan was \$259,000, up from \$151,000 in 2001.³⁵ In terms of loan purpose, in 2006, 45.4 percent of first lien subprime loans were purchase loans, and 54.6 percent were refinance loans.³⁶ The average subprime borrower had a debt-to-income ratio of approximately 40 percent and a FICO score of 654.7.³⁷ The median subprime borrower had a FICO score of 620.³⁸ The median Alt-A borrower had a FICO score of 705.³⁹

securitized subprime loans. In 2001, 54 percent of subprime loans were securitized, implying a total of $624,000 / (0.85 * 0.54) = 1,359,477$. In 2006, 75 percent of subprime loans were securitized, implying a total of $2,646,000 / (0.85 * 0.75) = 4,150,588$; Chris Mayer, Karen Pence and Shane M. Sherlund, *The Rise of Mortgage Defaults: Facts and Myths*, Working Paper (2008) (LP data shows a rise in subprime originations from 1.1 million in 2003 to 1.9 million in 2005); CBO Testimony, *supra* note 1 (“The share of subprime mortgages, which are extended to borrowers who have low credit scores, rose rapidly after 2002, constituting 21 percent of all home mortgage originations (in dollar terms) in 2005 and 2006.”); Zywicki and Adamson, *supra* note 10 (The share of subprime originations fluctuated from 10% in 1995, to 15% in 1997, to 8% in 2002 to 20% in 2005-06.); CRL, *Snapshot*, *supra* note 1, (subprime originations accounted for 28% of total loan volume in 2006). Focusing on purchase loans, subprime originations have also grown substantially. See Mayer et al, *supra* note 32, at 22 (“[In LP data] [t]he share of subprime originations for home purchases grew from 30 percent in 2003 to 42 percent in 2006.”); Credit Suisse Report, *supra* note 28, at 4 (the share of subprime purchase loans has grown to approximately 20% in 2006).

³³ CBO Testimony, *supra* note 1.

³⁴ FRB Rule, *supra* note 6, at 44,533. See also Mayer et al, *supra* note 32 (LP data shows a rise in Alt-A originations 304,000 in 2003 to 1.1 million in 2005; Approximating that the share of non-prime, i.e., both subprime and Alt-A, originations was 8% in 2003, 24% in 2005 and 22% in 2006.).

³⁵ See Demyanyk and Van Hemert, *supra* note 1, at 7, tbl. 1.

³⁶ See Demyanyk and Van Hemert, *supra* note 1, at 7, tbl. 1. Of the 54.6 percent of refinance loans, 44.8 percent were refinance/cash-out loans, and 9.8 were refinance/no-cash-out loans. *Id.* And at the peak of the subprime expansion, in 2004, only 42.0 percent of first lien subprime loans were purchase loans, and 57.9 percent were refinance loans. See Demyanyk and Van Hemert, *supra* note 1, at 7, Table I (including both cash out and no cash out loans in the refinance percentage). See also MBA, *The Residential Mortgage Market and Its Economic Context in 2007*, 24 (2007); LaCour-Little, *Economic Factors*, *supra* note 30, at 17 (a little more than half of the loans in 2004-05 were refinancing loans); Chang Yah & Frank E. Nothaft, *Demystifying the Refi-Share Mystery*, 29 JOURNAL OF REAL ESTATE RESEARCH 511 (2007). The importance of this distinction is highlighted by the finding that the average number of mortgages per-borrower, per-property is close to three. See *Subprime Outcomes*, *supra* note 28, at 4-5, 14 (Gerardi et al emphasize the importance of distinguishing subprime loans made for initial purchase from subprime refinances of existing mortgages; they find that “the average number of mortgages over the life of completed homeownerships is 2.7.”)

³⁷ See Demyanyk and Van Hemert, *supra* note 1, at 7, tbl. 1.

³⁸ See Mayer et al, *supra* note 32 (“The median borrower in the subprime pools has a FICO around 620.”)

³⁹ See Mayer et al, *supra* note 32 (“[T]he median borrower in the Alt-A pools has a FICO score around 705.”)

C. Market Structure

1. Participants

Traditionally a single entity, commonly the neighborhood bank, was the only party, other than the borrower, in the mortgage transaction. This bank would originate the loan, provide the funds for the loan, and service the loan. In the modern mortgage market the different roles – origination, financing and servicing – are often performed by different entities.⁴⁰ I focus on the parties involved in origination and financing, since they exert the most influence on the design of the mortgage contract.⁴¹

In the subprime (and Alt-A) market, mortgages were originated mainly by depository institutions, i.e., banks or bank subsidiaries and affiliates, and by mortgage companies,⁴² with the bulk of loan volume originated by mortgage companies.⁴³ Another important group of participants in the mortgage origination process is the brokers: “Mortgage brokers act as intermediaries between lenders and borrowers, and for a fee, help connect borrowers with various lenders that may provide a wider selection of mortgage products.”⁴⁴ In 2006, brokerages accounted for 58% of total origination activity.⁴⁵

⁴⁰ See Paulson, *supra* note 2 (“A mortgage loan is likely to be originated, serviced, and owned by three different entities. Originators often sell mortgages to securitizers who package them into mortgage-backed securities, which are then divided and sold again to a global network of investors.”)

⁴¹ On the role of servicers – see, e.g., Kurt Eggert, *Limiting Abuse and Opportunism by Mortgage Servicers*, 15 HOUSING POLICY DEBATE 753, 755 (2007) (available at SSRN: <http://ssrn.com/abstract=992095>).

⁴² *Calculated Risk: Assessing Non-Traditional Mortgage Products: Hearing before the Subcomm. On Housing and Transp. & the Subcomm. On Econ. Policy of the S. Comm. On Banking, Housing, and Urban Affairs*, 109th Cong., p. 7 (Sept. 19, 2006) (*Alternative Mortgage Products: Impact on Defaults Remains Unclear, but Disclosure of Risks to Borrowers Could Be Improved*, statement of Orice Williams, Director, GAO) (available at <http://banking.senate.gov/index.cfm?Fuseaction=Hearings.Detail&HearingID=239>, pagination from testimony not S. hearing) [hereinafter GAO, AMP Report] (“Borrowers arrange residential mortgages through either mortgage lenders or brokers. The funding for mortgages can come from federally or state- chartered banks, mortgage lending subsidiaries of these banks or financial holding companies, or independent mortgage lenders, which are neither banks nor affiliates of banks.”) Indirect originations also played an important role. See LaCour-Little, *Economic Factors*, *supra* note 30, at 17 (“A little less than one third of all loans were originated through indirect, wholesale channels, which include mortgage brokers, certain correspondent lending relationships, builder programs and the like.”)

⁴³ Robert B. Avery, Kenneth P. Brevoort, and Glenn B. Canner, *Opportunities and Issues in Using HMDA Data*, 29 JOURNAL OF REAL ESTATE RESEARCH 351, 353 (2007) (based on HMDA Reporting – “Depository institutions account for the bulk of the reporting institutions, but mortgage companies report the majority of the applications and loans. In 2005, for example, nearly 80% of the 8,850 reporting institutions were depository institutions but together they reported only 37% of all the lending-related activity. Mortgage companies accounted for 63% of all the reported lending; 70% of these institutions were independent and not related in any way to a depository institution.”)

⁴⁴ GAO, AMP Report, *supra* note 42, at 7. Brokers also play a more direct role via indirect originations. See LaCour-Little, *Economic Factors*, *supra* note 30, at 17.

⁴⁵ Wholesale Access, *New Broker Research Published*, Aug. 17, 2007, <http://www.wholesaleaccess.com/8-17-07-prs.shtml> (“[T]he average firm produced \$32.4 million (151 loans)...conforming loans accounted for 48% of brokers’ production volume; the most used wholesalers were Countrywide (for conventional loans) and New Century (for subprime loans).”).

Traditionally, depository institutions originated loans and funded them with the deposits they held. During the subprime expansion, origination volume shifted to mortgage companies with no independent means to fund the originated loans. These mortgage companies, and increasingly also depository institutions, sold the loans that they originated to Wall Street investment banks that pooled the loans, carved-up the expected cash flows, and converted these cash flows into bonds that were secured by the mortgages.⁴⁶ At the peak of the subprime expansion, most mortgages were financed through this process of securitization.⁴⁷ As a result, the “owners” of the loans are the investors who purchased shares in these Mortgage (or Asset) Backed Securities (MBSs or ABSs).

The loan originators have direct control over the design of the mortgage contract. The investment banks and their clients also influence the design of mortgage contracts, as the demand for MBSs, and thus the price that the investment banks are willing to pay the originators for the loans, depends on the contractual design.

2. Competition

The degree of competition in a market can affect the design of the products and contracts sold in this market. The loan origination market appears, at first blush, to be fairly competitive. In 2006, the top 15 subprime lenders divided among themselves 80.5 percent of the market, with no lender holding more than a 13 percent share.⁴⁸ And the Department of Housing and Urban Development’s (HUD) list of lenders who specialize in subprime lending was comprised of 210 lenders (although not all of these lenders offer loans nationally).⁴⁹ Barriers to entry in this industry have been substantially reduced with the growth in securitization, which enables entry by new, small lenders.⁵⁰ And the

⁴⁶ See, e.g., Kathleen C. Engel and Patricia M. McCoy, *Turning a Blind Eye: Wall Street Finance of Predatory Lending*, 75 *FORDHAM L. REV.* 2039, 2045 (2007).

⁴⁷ See Demyanyk and Van Hemert, *supra* note 1, at 5 (finding 60% securitization); Credit Suisse Report, *supra* note 28, at 11 (finding 75% securitization). For a good exposition to securitization – see Engel and McCoy, *supra* note 46, at 2045-48; Bethel, Ferrell and Hu, *supra* note 11.

⁴⁸ See Credit Suisse Report, *supra* note 28, at 22 (the market shares of the top subprime lenders in 2006 were: Wells Fargo 13.0%, HSBC Finance 8.3%, New Century 8.1%, Countrywide Financial 6.3%, CitiMortgage 5.9%, WMC Mortgage 5.2%, Fremont Investment 5.0%, Ameriquest 4.6%, Option One 4.5%, First Franklin 4.3%, Washington Mutual 4.2%, Residential Funding 3.4%, Aegis Mortgage 2.7%, American General 2.4%, Accredited Lenders 2.3%. In total the top 15 lenders commanded 80.5% of the market.) Similar numbers are reported by other sources. See ROBERT S. LAZICH (ED.), *MARKET SHARE REPORTER*, Vol. 2, pp. 704-705 (2008) (the top 10 lenders commanded less than 58.8% of the market, with no single lender controlling more than 8.3% of the market; based on a conservative combination of the two sources cited in Market Share Reporter). The 2005 figures are similar. See ROBERT S. LAZICH (ED.), *MARKET SHARE REPORTER*, Vol. 2, p. 719 (2007) (the top 10 lenders commanded less than 51% of the market, with no single lender controlling more than 9% of the market). These numbers represent the outcome of a consolidation process.

⁴⁹ See www.huduser.org/datasets/manu.html (describing the 2005 list). And many other lenders, while not specializing in subprime lending, also offer subprime loans. See Avery, Brevoort, and Canner, *supra* note 42 (there were 8,850 HMDA reporting institutions in 2005).

⁵⁰ See Engel and McCoy, *supra* note 46, at 2041 (“[S]ecuritization funds small, thinly capitalized lenders and brokers, thus allowing them to enter the subprime market. These originators are more prone to commit

internet has enhanced competition by reducing shopping costs.⁵¹ The FRB, at least, characterized this market as competitive.⁵²

Nevertheless, because many consumers engage in limited shopping, several observers have expressed concerns about the level of competition in the subprime market.⁵³ The increasing complexity of mortgage products renders comparison shopping more difficult and limits the efficacy of the shopping that does occur.⁵⁴ In fact, limited shopping may be a rational response to its reduced efficacy. The result is imperfect information and imperfect competition.⁵⁵ HUD's proposed amendments to its Real-Estate Settlement Procedures Act (RESPA) regulations are motivated by the need to enhance competition in the mortgage market. And two recent studies, one by the GAO and another by the FTC and the DOJ, have expressed concerns about the level of competition in the real estate brokerage industry, which, as explained above, plays an important role in the loan origination process.⁵⁶

loan abuses because they are less heavily regulated, have reduced reputational risk, and operate with low capital, helping to make them judgment-proof.”)

⁵¹ See, e.g., www.lendingtree.com, listing over 250 affiliated lenders (www.lendingtree.com/stm3/lenders/scorecard.asp), although clearly not all of these lenders offer subprime loans and those who do might not offer loans nationally.

⁵² Federal Reserve Board, Truth in Lending, 73 Fed. Reg. 1672, 1674 (proposed Jan. 9, 2008) (to be codified at 12 C.F.R. pt. 226) [hereinafter FRB Proposed Rule] (“Underwriting standards loosened in large parts of the mortgage market in recent years as lenders—particularly nondepository institutions, many of which have since ceased to exist—competed more aggressively for market share.”)

⁵³ See, e.g., Marsha J. Courchane, et al, *Subprime Borrowers: Mortgage Transition and Outcomes*, 29(4) JOURNAL OF REAL ESTATE FIN. AND ECON. 365, 371-72 (2004) (finding, based on a survey study, that subprime borrowers search less and are less informed).

⁵⁴ See Willis, *supra* note 4, at 726-727. The limits of advertising in the subprime market further increase the cost of comparison shopping. FRB Rule, *supra* note 6, at 44,524 (“price information for the subprime market is not widely and readily available to consumers. A consumer reading a newspaper, telephoning brokers or lenders, or searching the Internet can easily obtain current prime interest rate quotes for free. In contrast, subprime rates, which can vary significantly based on the individual borrower's risk profile, are not broadly advertised and are usually obtainable only after application and paying a fee.”).

⁵⁵ See Eskridge, *supra* note 23, at 1111 fn. 96, 1112 et seq., 1142-43, 1146-1148 (especially p. 1146, bottom) (1984) (imperfect information, largely driven by limited shopping, has led to monopolistic competition, rather than perfect competition); Willis, *supra* note 4, at 749 (2006) (arguing that lack of sufficient disclosure and low levels of financial literacy among borrowers make shopping extremely difficult).

⁵⁶ See GAO, Real Estate Brokerage: Factors that May Affect Price Competition (Report, GAO-05-947, Aug. 2005); FTC and DOJ, *Competition in the Real Estate Brokerage Industry: A Report by the Federal Trade Commission and the Department of Justice* (April 2007) (available at <http://www.ftc.gov/opa/2007/05/realestate.shtm>) There are about 98,000 brokerage firms, which employ around 2.5 million real estate licensees. The majority, 60%, of these firms have fewer than five agents and operate locally, and only about 5% had more than 50 agents. Indeed, competition among brokers is primarily local, and, while on the national level, in 1994, the top ten firms account for only 9.1% of the market share, at the local level top firms often control much larger market shares. For example, in Des Moines Iowa, a single firm accounts for over half of all residential real estate transactions. *Id.* at 31-32. The primary barrier to entry in the brokerage market is the licensing process (which is more stringent for brokers than it is for agents). *Id.* at 33. Competition is, however, limited by cooperative participation in multiple listings services (MLS), which are typically operated by local groups affiliated with the National Association of Realtors. Access to the MLS is limited to members, who will use the database to list homes for sale on behalf of sellers and to search for homes on behalf of buyers. *Id.* at 10. While the MLS limits both access and competition it also reduces costs for brokers and customers. *Id.* at 12-14. Competition is

As noted above, contractual design is not determined solely by the loan originator, and, thus, competition, or lack thereof, in other markets may have played an important role. In particular, securitization enhanced competition in the loan origination market, but simultaneously transferred some control over contractual design away from the originators and into the hands of securitizers. The securitization market appears to have been relatively competitive. In 2007, the top 10 securitizers – Lehman Brothers, Bear Stearns, Morgan Stanley, JP Morgan, Credit Suisse, Banc of America Securities, Deutsche Bank, Royal Bank of Scotland Group, Merrill Lynch, and Goldman Sachs – controlled 73.4 percent of the market, with no single bank controlling more than 10.8 percent of the market.⁵⁷

D. Regulatory Scheme

The regulatory authority over mortgage lending is divided between the federal and state levels and among several regulators at the federal level.⁵⁸ Federal banking agencies – the Federal Reserve Board (FRB), the Office of the Comptroller of the Currency (OCC), the Office of Thrift Supervision (OTS), the Federal Deposit Insurance Corporation (FDIC) and the National Credit Union Administration (NCUA) – regulate depository institutions. The Federal Trade Commission Improvements Act of 1980 authorized the Federal Reserve to identify unfair or deceptive acts or practices by banks and to issue regulations prohibiting them.⁵⁹ Moreover, the federal banking agencies can use Section 8 of the Federal Deposit Insurance Act to prevent unfair or deceptive acts or practices under Section 5 of the Federal Trade Commission Act, whether or not there is an FRB regulation defining the particular act or practice as unfair or deceptive.⁶⁰ Focusing on high-priced mortgage loans, i.e., loans with an APR that is three points (or more) above the treasury rate for a security of the same maturity, the Home Ownership and Equity Protection Act (HOEPA) grants the FRB broad powers to police unfair or deceptive lending practices.⁶¹ The FRB also promulgates disclosure regulations under the Truth-in-

also limited by state law. Ten states ban rebates, which are often a key tool in price competition. *Id.* at 49. Several states also have minimum-service laws, which limit the extent to which brokers can compete by offering a range of service packages. *Id.* at 53. Lastly, competition is restricted by licensing requirements on for-sale-by-owner websites. *Id.* at 62. *See also* Eskridge, *supra* note 23, at 1148-49; Magura, Matthew, "How Rebate Bans, Discriminatory MLS Listing Policies, and Minimum Service Requirements Can Reduce Competition for Real Estate Brokerage Services and Why it Matters" (May 2007). Available at SSRN: <http://ssrn.com/abstract=997137>.

⁵⁷ See Bethel, Ferrell and Hu, *supra* note 11, at 73, tbl. 2.

⁵⁸ The history of mortgage lending regulation in the U.S. is ably summarized in Eskridge, *supra* note 23.

⁵⁹ 15 U.S.C. §§ 57-b-1 to b-4 (2000).

⁶⁰ *See* Advisory Letter from OCC to CEOs of All Nat'l Banks and Nat'l Bank Operating Subsidiaries, *Guidance on Unfair or Deceptive Acts or Practices*, AL 2002-3 (Mar. 22, 2002), (*available at* <http://www.occ.treas.gov/ftp/advisory/2002-3.doc>). *See also* Julie L. Williams & Michael S. Bylsma, *On the Same Page: Federal Banking Agency Enforcement of the FTC Act to Address Unfair and Deceptive Practices by Banks*, 58 BUS. LAW. 1243, 1244 (2003).

⁶¹ *See* FRB Rule, *supra* note 6, at 44,527. *See also* Willis, *supra* note 4, at 744 et seq; Raphael W. Bostic, Kathleen C. Engel, Patricia A. McCoy, Anthony Pennington-Cross, & Susan M. Wachter, *State and Local Anti-Predatory Lending Laws: The Effect of Legal Enforcement Mechanisms* (Social Science Research Network, Working Paper, Aug. 7, 2007) (*available at* <http://ssrn.com/abstract=1005423>) [hereinafter

Lending Act (TILA). Additional disclosure regulations are promulgated by the Department of Housing and Urban Development (HUD) under the Real Estate Settlement Procedures Act (RESPA), which governs the loan closing process.⁶²

Non-depository institutions, i.e., non-banks, including mortgage companies, brokers, and advertisers fall under the jurisdiction of the Federal Trade Commission (FTC). The FTC described its own authority as follows: “The FTC enforces a number of federal laws governing home equity lending, including [TILA] and [HOEPA], which amended TILA to address certain practices for high-cost home equity loans. The Commission also enforces Section 5 of the Federal Trade Commission Act (“FTC Act”), which more generally prohibits unfair and deceptive acts and practices in the marketplace.”⁶³

At the state level, mini-FTC statutes prohibit unfair and deceptive acts and practices. And mini-HOEPA statutes, as well as other statutes, ban or restrict specific practices, e.g., prepayment penalties and balloon clauses.⁶⁴ There is substantial variation in the scope and enforcement of state-level laws.⁶⁵ Because some states clearly go further than federal regulators in their attempts to protect borrowers,⁶⁶ there have been heated preemption battles, especially with the OCC and other federal banking agencies. State law is being increasingly preempted by federal law.⁶⁷

Bostic, Engel and McCoy] (describing, in Section 2, the federal Home Ownership Equity Protection Act of 1994 (HOEPA)).

⁶² See RESPA – Real Estate Settlement Procedures Act (*available at http://www.hud.gov/offices/hsg/sfh/res/respa_hm.cfm*). RESPA applies to all “federally related mortgage loans,” which is somewhat broader than loans originated by depository institutions. See 24 CFR 3500.5.

⁶³ Federal Trade Commission Comment on Home Equity Lending Market, Public Hearing Notice, 71 Fed. Reg. 26,513, (May 5, 2006), (Sept. 14, 2006), www.federalreserve.gov/SECRS/2006/November/20061121/OP-1253/OP-1253_53_1.pdf [hereinafter FTC Comment].

⁶⁴ See Bostic, Engel and McCoy, *supra* note 61 (describing, in Section 2, the mini-HOEPA statutes and older anti-predatory lending laws restricting the use of prepayment penalties and balloon clauses).

⁶⁵ See Bostic, Engel and McCoy, *supra* note 61; CRL *State Legislative Scorecard: Predatory Mortgage Lending*, CENTER FOR RESPONSIBLE LENDING, <http://www.responsiblelending.org/issues/mortgage/statelaws.html> (last visited Feb. 24, 2008); Anthony Pennington-Cross, and Giang Ho, *The Termination of Subprime Hybrid and Fixed Rate Mortgages*, (Federal Reserve Bank of St. Louis, Working Paper Series 2006-042A, 8-9, 2006).

⁶⁶ See Bar-Gill & Warren, *supra* note 17. See also Eggert, *supra* note 40, at 774 (many states have implemented regulations that are more stringent than the regulations promulgated by HUD under RESPA).

⁶⁷ See Christopher Lewis Peterson, *Preemption, Agency Cost Theory, and Predatory Lending by Banking Agents: Are Federal Regulators Biting Off More Than They Can Chew?* 56 AM. U. L. REV. 515 (2007); Julia P. Forester, *Still Mortgaging the American Dream: Predatory Lending, Preemption, and Federally-Supported Lenders*, 74 U. CIN. L. REV. 1303 (2006). See also Bar-Gill & Warren, *supra* note 17. Despite the increasing federal preemption on the substantive law dimension, state agencies enforce the state or federal law on lenders and brokers that fall outside the jurisdiction of the federal banking agencies. See GAO, AMP Report, *supra* note 42, at 9-10 (“State regulators oversee independent lenders and mortgage brokers and do so by generally requiring business licenses that mandate meeting net worth, funding, and liquidity thresholds. They may also mandate certain experience, education, and operational requirements to engage in mortgage activities. Other common requirements for licensees may include maintaining records for certain periods, individual preclosure testing, posting surety bonds, and participating in continuing education activities. States may also examine independent lenders and mortgage brokers to ensure compliance with licensing requirements, review their lending and brokerage functions for state-specific and federal regulatory compliance, and look for unfair or unethical business practices. When such practices

E. Summary

The subprime mortgage market experienced significant growth between 2000 and 2006. This rapid growth stopped in 2006, and in 2007, when the subprime crisis erupted, the market basically shut down.⁶⁸ Still, the proposed analysis is more than an historic account of a market that was. First, while few new subprime loans are being originated, many subprime loans are still outstanding. The proposed analysis hopes to contribute to an assessment of the welfare costs that are and will be generated by this stock of loans. Second, the analysis suggests policy reforms that can prevent a second subprime crisis, when subprime lending resumes. Third, the proposed analysis is relevant to the still operating Alt-A and prime markets, as loan contracts in these markets share certain design features with subprime contracts. Finally, an analysis of the subprime market holds general lessons concerning the interaction between market forces and borrower psychology – lessons applicable to other consumer credit markets and even to non-credit market.

II. THE SUBPRIME MORTGAGE CONTRACT

The traditional, prime mortgage contract is a relatively simple, fixed-rate, 30-year loan for 80 percent, or less, of the home price (i.e., a downpayment of at least 20 percent was required).⁶⁹ The typical subprime mortgage contract is very different from this traditional benchmark. In this Part, I describe the two main design features that distinguish the common subprime mortgage contract from the traditional prime FRM: deferred costs and a high level of complexity.

A. Deferred Costs

The common subprime loan defers costs via three contractual design features: small downpayments and high LTVs, escalating payments, and prepayment penalties.

arise, or are brought to states' attention through consumer complaints, regulators and State Attorneys General may pursue actions that include licensure suspension or revocation, monetary fines, and lawsuits.”)

⁶⁸ See, e.g., Chairman Ben S. Bernanke, *The Economic Outlook*, Testimony Before the Committee on the Budget, U.S. House of Representatives, January 17, 2008 (available at <http://www.federalreserve.gov/newsevents/testimony/bernanke20080117a.htm>) (noting the “virtual shutdown of the subprime mortgage market”)

⁶⁹ See, e.g., FTC Comment, *supra* note 63, at 5 (describing the traditional mortgage contract). See also Kristopher Gerardi, Harvey S. Rosen and Paul Willen, *Do Households Benefit from Financial Deregulation and Innovation? The Case of the Mortgage Market*, NBER Working Paper 12967, p. 1 (2007) (available at <http://www.nber.org/papers/w12967>) (“Gone are the days when most households got a cookie-cutter, 30-year, fixed-rate, level-payment mortgage....”); GAO Consumer Protection Reprt, *supra* note 16, at (“Because subprime loans involve a greater variety and complexity of risks, they are not the uniformly priced commodities that prime loans generally are.”); Willis, *supra* note 4, at 715-718 (describing the traditional mortgage which dominated the market until the end of the 20th century).

1. Small Downpayments and High LTVs

The downpayment, while not a component of the loan contract, is a component of the payment stream that home buyers face. This payment stream consists of a “time zero” payment, the downpayment, followed by the payment schedule specified in the loan contract. This broader, payment-stream perspective is helpful, first, because from the buyer’s perspective it makes little difference if a payment is made to the seller or to the lender, and, second, because in many cases a close (formal or informal) relationship between the seller and the lender allows payment-shifting between these two parties.⁷⁰

One way to defer the costs associated with a home purchase is to reduce the downpayment. Indeed, the size of the average downpayment declined during the subprime expansion. Traditionally, a home buyer was required to make a downpayment equal to (at least) 20 percent of the purchase price.⁷¹ In 2005 and 2006 the median subprime home buyer put no money down, borrowing 100 percent of the purchase price of the house.⁷² Downpayments were a bit higher in the Alt-A market, with a median value of 5 percent in 2006.⁷³

The flip-side of the downpayment is the LTV ratio. In a purchase loan, a 10 percent downpayment is equivalent to a 90 percent LTV. But the LTV measure is more general and it applies also to refinance loans. A higher LTV means lower cost (or higher benefit in the case of a cash-out refinance loan) in the present and higher cost in the future. While the traditional mortgage has a LTV ratio of (at most) 80 percent, over 40 percent

⁷⁰ See Eskridge, *supra* note 23.

⁷¹ See, e.g., FTC Comment, *supra* note 63, at 5 (describing the traditional mortgage contract).

⁷² See Mayer et al, *supra* note 32, tbl. 2B. See also FTC Comment, *supra* note 63, at 10, fn.45 (In 2005, over 40% of first-time home-buyers did not make any downpayment at all); Amy Hoak, *100% More Difficult: First-Time Homebuyers Struggle to Find Down-Payment Money*, MARKETWATCH (Mar. 9, 2008), <http://www.marketwatch.com/news/story/first-time-home-buyers-struggle-find/story.aspx?guid=%7B4BF19BC0-C4EE-4107-ACFC-F6524E878D5A%7D>) (For the period between July 2006 and June 2007, the National Association of Realtors estimated that 45 percent of first-time homebuyers opted for 100 percent financing.); *Subprime Outcomes*, *supra* note 28, at 44, Table 2 (using the HUD list definition of subprime and Massachusetts data, Gerardi et al. find that the average LTV of an initial-purchase subprime loan rose from 0.76 in 1988 to 0.84 in 2007, and that the median LTV rose from 0.80 in 1988 to 0.90 in 2007.)

⁷³ Mayer et al, *supra* note 32, tbl. 2B.

of subprime loans originated in 2006 had combined LTVs exceeding 90 percent.⁷⁴ LTVs were somewhat lower in the Alt-A market.⁷⁵

2. Escalating Payments

The traditional FRM features a constant payment stream throughout the loan period. In contrast, the typical subprime and Alt-A loans stipulate monthly payments that increase in magnitude over the loan period. In 2006, only 26.1 percent of first lien subprime loans were FRMs.⁷⁶ The vast majority of loans were ARMs or, to be precise, Hybrid mortgages with an initial fixed rate period followed by an adjustable rate period. According to the FRB: “Approximately three-fourths of originations in securitized subprime “pools” from 2004 to 2006 were adjustable-rate mortgages (ARMs) [or Hybrids] with two- or three-year “teaser” rates followed by substantial increases in the rate and payment (so-called “2–28” and “3–27” mortgages).”⁷⁷ In 2006, the average initial rate was 7.2 percent, while the average long-term rate, calculated as the sum of the relevant index (most commonly the 6 months LIBOR) and the contractually specified margin, was 10.2 percent.⁷⁸ The expected increase in the monthly payment at the end of

⁷⁴ See Ben S. Bernanke, Speech: Reducing Preventable Mortgage Foreclosures, The Independent Community Bankers of America Annual Convention, Orlando, Florida, March 4, 2008 (available at www.federalreserve.gov/newsevents/speech/bernanke20080304a.htm) [Hereinafter Bernanke 3/4/08 Speech] (based on information about loans in securitized pools from First American LoanPerformance). The relevant measure is the *combined* LTV, which includes both the first and second lien mortgages. The first lien mortgage often has an LTV of 80 percent, but the borrower then takes a second lien mortgage, a piggyback loan, which further increases the combined LTV. If the first lien mortgage has an LTV above 80 percent, the borrower is generally required to purchase Private Mortgage Insurance (PMI) to protect the lender from default losses. The insurance premium for the PMI is often financed through a second mortgage further increasing the LTV. See HUD, *PMI Act Information*, <http://www.hud.gov/offices/hsg/sfh/res/respapmi.cfm> (last visited Feb. 25, 2008).

⁷⁵ Mayer et al, *supra* note 32, tbl. 2B (“Alt-A refinancings had a reported CLTV of about 74 to 78 percent over the sample period.” These are likely underestimates due to unaccounted “silent” seconds.)

⁷⁶ See Demyanyk and Van Hemert, *supra* note, 1 at 7, tbl. 1 (counting only non-IO, non-ballon FRMs). See also Anthony Pennington-Cross & Giang Ho, *The Termination of Subprime Hybrid and Fixed Rate Mortgages*, (Federal Reserve Bank of St. Louis, Working Paper Series 2006-042A, 8-9, 2006) (finding, based on LoanPerformance Asset Backed Securities loan-level database (i.e., only the securitized portion of the subprime market), that of the loans originated between 1998 and 2005, 33 percent were FRMs and 67 percent were ARMs).

⁷⁷ FRB Rule, *supra* note 6, at 44,540. Many ARMs, including prime ARMs, have a teaser rate in effect until the first rate adjustment, when the ARM rate jumps to the fully-indexed (i.e., index plus margin) level. See Joe Peek, *A Call to ARMs: Adjustable Rate Mortgages in the 1980s*, March/April 1990 New England Economic Review 47, 54 (1990).

⁷⁸ See Demyanyk and Van Hemert, *supra* note 1, at 7, tbl. 1 (reporting the average initial rate, 7.2 percent, and the average margin, 4.9 percent. The average long-term rate is the sum of the margin and the index. The average value of the most popular index, the 6 month LIBOR, was 5.3 percent in 2006 (<https://www.efanniemae.com/sf/refmaterials/libor/index.jsp>; http://www.mortgage-x.com/general/indexes/fnma_libor_history.asp)). See also Mayer et al, *supra* note 32, fig. 5 (From 2003 to 2007 the initial (teaser) rate on subprime hybrids “has been relatively constant, ranging from 7.5 to 8.5 percent.” The fully-indexed rate was lower than the initial rate in 2003 and early 2004 when short-term interest rates were low. In 2005, the fully-indexed rate was nearly 350 basis points above the initial rate. In 2006 and early 2007 the fully indexed rate was closer to 300 basis points above the initial rate.)

the low-rate introductory period was substantial.⁷⁹ Monthly payments escalated even more steeply in Alt-A (and prime) mortgages, where teaser rates were set further below the market rate.⁸⁰ These contracts stipulated an increase of over 100 percent, or \$1500 on average, in the monthly payment at the end of the introductory period.⁸¹ According to one estimate, rate resets have been adding a total of about \$42 billion to borrowers' annual mortgage payments.⁸²

The escalating-payments feature was most pronounced in Interest-Only (I/O) mortgages and Payment-Option (or, simply, Option) mortgages.⁸³ Under an I/O mortgage the borrower pays only interest during the introductory period, generally one to ten years, and begins paying the principal only after the introductory period ends. The most popular I/O mortgages are hybrid loans, in which the introductory interest rate is fixed and the post-introductory interest rate is variable.⁸⁴ In 2006, approximately 20 percent of subprime originations and over 40 percent of Alt-A originations were I/O mortgages.⁸⁵

An even more extreme escalating-payments contract is the Option ARM. As described by the FTC:

“Option ARMs...generally offer borrowers four choices about how much they will pay each month during the loan’s introductory period. Borrowers may pay: (1) a minimum payment amount that is smaller than the amount of interest accruing on the principal; (2) the amount of interest accruing on the loan principal; (3) the amount of principal and interest due to fully amortize the loan on a 15-year payment schedule; or (4) the amount of principal and interest due to fully amortize the loan on a 30-year payment schedule. Option

⁷⁹ The actual payment shock experienced on 2005 and 2006 2–28 mortgages turned out to be less severe, thanks to relatively low market interest rates, and correspondingly low index values, in 2007 and 2008, when the interest rates on these loans reset. Still, the average monthly payment increased by more than 10 percent at reset. See Bernanke 3/4/08 Speech, *supra* note 74 (stating that even with the currently low LIBOR a typical reset would raise the monthly payment by more than 10 percent); Paul Willen, Would More Disclosure of Loan Terms Have Helped? Presentation at FTC Workshop, May 29, 2008 (finding that payment shock for a typical subprime borrower in 2007 was 15%). And recent increases in the market interest rate are pushing monthly payments on these mortgages even higher. In any event, contractual design is determined by the ex ante expected payment shock at origination, not by the ex post actual payment shock realized two years later. An industry study, assessing in December 2006 subprime ARMs that were originated between 2004 and 2006, calculated an average monthly payment increase of \$400. See Cagan, *supra* note 24.

⁸⁰ See Cagan, *supra* note 24. See also Mayer et al, *supra* note 32 (describing initial rates of 2 percent, “about 4 percentage points lower than the fully indexed rate (the rate that would prevail under the contract without the teaser).”)

⁸¹ *Id.*

⁸² See Cagan, *supra* note 24 (the \$42 billion figure covers the entire residential mortgage market, not only the subprime and Alt-A segments, but ARMs and resets were common mainly in these two segments).

⁸³ I/Os are also “option loans” in the sense that the borrower has an option to pay only interest instead of the fully amortized payment.

⁸⁴ See FTC Comment, *supra* note 63, at 7.

⁸⁵ For subprime – see Credit Suisse Report, *supra* note 28, at 28, Exhibit 21 (subprime). See also Mayer et al, *supra* note 32 (over a longer period of time, the percentage of I/O mortgages in subprime pools was 10 percent). For Alt-A – see Mayer et al, *supra* note 32.

ARMs vary in the length of the introductory periods they offer. Some, especially in the subprime market, have introductory periods of only one year, six months, or even one month. When the loan's introductory term expires, the loan is recast, amortizing to repay principal and the variable interest rate over the remaining term of the loan."⁸⁶

While I/O mortgages are zero amortization loans, Option ARMs imply negative amortization, by allowing below-interest monthly payments. Accordingly, at the end of the introductory period, or even earlier, a borrower might end-up owing more than the value of the home. This might happen even when home prices are steady or rising, but, of course, it is more likely to happen when home prices are falling.⁸⁷ Option ARMs were rare in the subprime market, but quite popular in the Alt-A market. In 2006, more than 25 percent of Alt-A loans were Option ARMs.⁸⁸ Overall, in the Alt-A market in 2006, a large majority of originations were nontraditional mortgage products, allowing borrowers to defer principal, or both principal and interest.⁸⁹ These deferrals led to substantial increases, exceeding 100 percent in some cases, in the monthly payment at the end of the introductory period.⁹⁰

3. Prepayment Penalties

Another deferred-cost component, common in subprime and Alt-A contracts, is the prepayment penalty – a penalty imposed on a borrower who repays the loan before the maturity date. About 70 percent of subprime loans and about 40 percent of Alt-A loans included a prepayment penalty.⁹¹ The penalty amount is usually expressed as a percent

⁸⁶ FTC Comment, *supra* note 63, at 7.

⁸⁷ See Cagan, *supra* note 24, at tbl. 30 (finding that in December 2006 22.4% of subprime ARMs originated between 2004-2006 had zero or negative equity; another 5 percent drop in house prices, which happened after December 2006, increases this figure to 36%.]

⁸⁸ Mayer et al, *supra* note 32. See also Credit Suisse Report, *supra* note 28, at 26 (based on non-agency MBS data: In 2006, Option ARMs comprised approximately 0.5 percent of the subprime market and 30 percent of the Alt-A market).

⁸⁹ FRB Rule, *supra* note 6, at 44,541 (78 percent of Alt-A originations were either I/O or Option mortgages). Looking more broadly at the entire residential mortgage market, the General Accounting Office found that “[f]rom 2003 through 2005, AMP originations, comprising mostly interest-only and payment-option adjustable-rate mortgages, grew from less than 10 percent of residential mortgage originations to about 30 percent.” GAO, AMP Report, *supra* note 42, at Abstract. And the MBA noted that “Interest only (IO) loans, with both adjustable- and fixed-rates, and payment option loans that allow negative amortization, have become a very important part of the [residential mortgage] market.” MBA, *supra* note 36, at 3.

⁹⁰ FTC Comment, *supra* note 63, at 8-9; GAO, AMP Report, *supra* note 42, at 14 (describing an example with a 128 percent increase in the monthly payment at the end of the 5-year payment option period). Under Option ARMs the payment increase might occur before the end of the introductory period. The loan contracts allow for negative amortization but set a maximum allowable negative amortization cap of 110 or 115 percent. When this cap is reached, and this can happen before the end of the introductory period, monthly mortgage payments will increase. See LaCour-Little, *Economic Factors* note 30, at 8; FTC Comment, *supra* note 63, at 8-9.

⁹¹ See Mayer et al, *supra* note 32. See also Demyanyk and Van Hemert, *supra* note, 1 at 7, tbl. 1 (In 2006, 61.6 percent of first lien subprime loans included a prepayment penalty.) Prepayment penalties are most common in Hybrid loans: 70 percent of Hybrids have prepayment penalties, as compared to 40 percent of FRMs with prepayment penalties. See Pennington-Cross and Ho, *supra* note 76, at 11-12.

of outstanding balance, up to 5 percent,⁹² or as the sum of a specified number of months, commonly 6 months, worth of interest payments. This is a significant amount. For example, a 3 percent penalty on a \$200,000 balance amounts to \$6,000. The economic importance of prepayment penalties to lenders is undeniable. They generate substantial revenues. For example, Countrywide's revenues from prepayment penalties amounted to \$268 million in 2006.⁹³

Prepayment penalties can be viewed as a necessary supplement to the escalating payments feature. If borrowers prepay before the end of the low-rate introductory period and thus avoid the high post-reset rates, then the escalating payments feature becomes moot. Prepayment penalties make it more difficult for borrowers to evade the escalating payments.⁹⁴ Prepayment penalties surely played this supporting role in some escalating-payments contracts. But in many other escalating payments contracts this prepayment-deterrence role was more minor. Prepayment penalties are generally limited in time, i.e., the prepaying borrower will only pay a penalty if she prepays within the specified period.⁹⁵ And in many contracts the prepayment penalty period expired before the end of the low-rate introductory period.⁹⁶ Of course, prepayment penalty periods stretching beyond the end of the introductory period are not necessary to sustain an escalating payments contract. There are other reasons why a borrower may decide to keep making the escalating payments even if prepayment is not subject to a contractual penalty.

Prepayment penalties are also an independent deferred cost component, regardless of their role supporting the escalating-payments feature. First, to the extent that it fails to deter prepayment, the prepayment penalty is a significant cost that is deferred until the time of prepayment. Second, this long-term cost is associated with a reduction in the short-term cost of the loan. Specifically, loans with prepayment penalties have lower interest rates and thus lower monthly payments.⁹⁷ Prepayment penalties thus produce the temporal shift characteristic of deferred-cost contracts: pay less now, pay more later.

⁹² See Michael D. Larson, *Mortgage Lenders Want a Commitment – and They're Willing to Pay You for It*, BANKRATE.COM (Aug. 26, 1999) <http://www.bankrate.com/brm/news/mtg/19990826.asp>. (One contractual design specifies a penalty of 3 percent of the outstanding balance for prepayment in the first year, a 2 percent penalty for prepayment in the second year and a 1 percent penalty for prepayment in the third year.)

⁹³ Gretchen Morgenson, *Inside the Countrywide Lending Spree*, N.Y. TIMES, Aug. 26, 2007, § 3. See also Eric Stein, *Quantifying the Economic Costs of Predatory Lending*, 7-9 (Coalition for Responsible Lending, 2001), <http://www.responsiblelending.org/pdfs/Quant10-01.pdf> (estimating prepayment penalty revenues at \$2.3 billion each year).

⁹⁴ See CBO Testimony, *supra* note 1 (explaining how prepayment penalties “protected lenders from the potential churning of mortgages with very low initial rates.”); Zywicki and Adamson, *supra* note 10 (Since subprime borrowers often financed closing costs and had low introductory rates, lenders needed prepayment penalties to recoup their upfront cost.)

⁹⁵ Michael LaCour-Little, *Prepayment Penalties in Residential Mortgage Contracts: A Cost-Benefit Analysis*, 19 Housing Policy Debate __ (2008) [hereinafter LaCour-Little, *Prepayment Penalties*].

⁹⁶ See Mayer et al, *supra* note 32 (“Only 7 percent of subprime short-term hybrids had a prepayment penalty that expired after the reset, and that ratio declined over time as short-term ARMs became more common.”)

⁹⁷ See Christopher Mayer, Tomasz Piskorski and Alexei Tchisty, *The Inefficiency of Refinancing: Why Prepayment Penalties are Good for Risky Borrowers*, Working Paper (2008); LaCour-Little, *Prepayment Penalties*, *supra* note 95; Gregory Elliehausen, Michael E. Staten, & Jevgenijs Steinbuks, *The Effect of Prepayment Penalties on the Pricing of Subprime Mortgages*, 60 J. ECON. & BUS. 33 (2008).

B. Complexity

In addition to a variety of features that defer costs, subprime and Alt-A mortgages are also characterized by a high level of complexity. The complexity of these loan contracts is the product of a proliferation of fees and other price dimensions combined with elaborate rules governing the application of these multiple prices.⁹⁸ Beyond multidimensional pricing, the prepayment option, and the (implied) default option, increase the complexity of valuing these mortgage products. Finally, since complexity should be measured at the market level, and not at the contract level, the existence of numerous complex products exponentially increases the complexity of the choice problem that a borrower faces.

1. Interest Rates

The traditional FRM has a single interest rate that implies a constant monthly payment. The typical subprime mortgage, the 2-28 hybrid, has an initial rate, which applies for the first two years of the loan. After the 2-year introductory period expires, the loan becomes an ARM with an interest rate calculated as the sum of a specified index and a preset margin – a calculation that is repeated at the end of each adjustment period. To make things even more complex, the loan contract commonly specifies caps that can limit the magnitudes of both the periodic and total rate adjustment.⁹⁹

Other products are even more complex. As detailed above, Option ARMs commonly specify four different options for each monthly payment. And these payment options are not predetermined sums. Nontrivial calculations are necessary to figure out what the options are. Moreover, these contracts, while allowing negative amortization, typically cap the level of permissible negative amortization, recasting the loan, even before the end of the introductory period, if this cap is reached.

2. Fees

Beyond the multiple interest rates, the typical subprime and Alt-A loan boasts a long list of fees. These fees can be divided into two categories: origination fees and post-origination fees. Origination fees are paid at closing, i.e., at the consummation of the credit transaction. Before closing a loan contract the lender obtains information about the

⁹⁸ See GAO Consumer Protection Report, *supra* note 16, at 6, 21 (emphasizing “the complexity of mortgage transactions” and the “greater variety and complexity of risks” associated with subprime loans, as compared to prime loans); Zywicki and Adamson, *supra* note 10, at 48 (Subprime loans are more complex than prime loans. As a result, it is more likely that a subprime borrower will misunderstand her loan terms.); James M. Lacko & Janis K. Pappalardo, *Improving Consumer Mortgage Disclosures: An Empirical Assessment of Current and Prototype Disclosure Forms*, p. ES-11 (FTC Bureau of Economics, Staff Report, June 2007) (stating that prime borrowers have difficulty answering questions about their loans; difficulty increases as loan becomes more complex); Renuart and Thompson, *supra* note 23, at 196 (“The lender-created complexity of mortgage loans now exceeds what most consumers, even highly educated consumers, are capable of comprehending.”)

⁹⁹ See Peek, *supra* note 77.

risk that it is about to undertake. Specifically, the lender performs credit checks and obtains appraisals. The lender also commissions various inspections, examinations and certifications, including pest inspection, title examination, flood certification, and tax certification (for information about the borrower's outstanding tax obligations).¹⁰⁰ Lenders charge the borrower separate fees for each of these information acquisition services. For example, LandSafe, Countrywide's closing services subsidiary, charges a \$36 fee for the credit check, a \$36 fee for flood certification, and a \$60 fee for the tax certification.¹⁰¹ In 2006, Countrywide's appraisal fees revenues totaled \$137 million and its credit report fees revenues totaled \$74 million.¹⁰²

Separate fees are charged for analyzing the acquired information. These include escrow analysis fees – to cover the cost of determining the appropriate balance for the escrow account and borrowers' monthly escrow payments, and underwriting analysis fees – to cover the costs of analyzing a borrower's creditworthiness.¹⁰³ Yet more fees are charged for insuring against the identified risks. These include premiums for credit insurance, title insurance and private mortgage insurance (PMI).¹⁰⁴

Also at closing the lender charges fees for administrative services associated with the loan origination process, such as preparing documents, notarizing documents, and sending emails, faxes and courier mail.¹⁰⁵ For example, some Countrywide loans included fees of \$45 to ship documents overnight and \$100 to e-mail documents.¹⁰⁶ And then there are the "general" fees – for loan origination, loan processing, signing documents, and closing the loan.¹⁰⁷ Some subprime lenders charge up to fifteen different origination fees, and these fees can add up to thousands of dollars or up to 20 percent of the loan amount.¹⁰⁸ The Department of Housing and Urban Development (HUD)

¹⁰⁰ Elizabeth Renuart, *An Overview of the Predatory Mortgage Lending Process*, 15 HOUSING POL'Y DEBATE 467, 493 (2004).

¹⁰¹ Morgenson, *supra* note 92. "It's a big business: During the last 12 months, Countrywide did 3.5 million flood certifications, conducted 10.8 million credit checks and 1.3 million appraisals, its filings show." *Id.*

¹⁰² Morgenson, *supra* note 92.

¹⁰³ Fannie Mae, *Glossary*, <http://www.fanniemae.com/homebuyers/glossary/index.jhtml?p=Resources&s=Glossary>, (last visited Mar. 1, 2008). Also, see list of other buyer costs at <http://www.fanniemae.com/homebuyers/glossary/otherbuyer costs.jhtml?p=Resources&s=Glossary>.

¹⁰⁴ Renuart, *supra* note 100, at 493. On PMI – see Willis, *supra* note 4, at 725. According to one, now dated, estimate financed PMI costs borrowers \$2.1 billion each year. See Stein, *supra* note 92.

¹⁰⁵ Renuart, *supra* note 100, at 493.

¹⁰⁶ Morgenson, *supra* note 93.

¹⁰⁷ Renuart, *supra* note 100, at 493.

¹⁰⁸ See Willis, *supra* note 4, at 786. See also HUD-Treasury Report, *supra* note 10, at 21 (Origination fees reached 10% of the loan amount "far exceed[ing] what would be expected or justified based on economic grounds.") According to the Department of Housing and Urban Development, borrowers are paying excess fees averaging \$700 per mortgage. See HUD News Release 08-033, March 14, 2008 (available at <http://www.hud.gov/news/release.cfm?content=pr08-033.cfm>). According to Michael Kratzer, president of FeeDisclosure.com, a Web site intended to help consumers reduce fees on mortgages, of the estimated \$50 billion in transaction fees paid by mortgage borrowers (not only in the subprime and Alt-A markets), \$17 billion consist of junk fees, like \$100 e-mail charges, \$75 document preparation fees and \$25 FedEx charges. See Gretchen Morgenson, *Clicking the Way to Mortgage Savings*, New York Times, December 23, 2007. Kratzer estimates that "junk fees" have risen 50 percent in recent years. See Gretchen Morgenson, *Given a Shovel, Americans Dig Deeper Into Debt*, New York Times, July 20, 2008.

estimates that borrowers These fees are often financed into the loan amount and form the basis for additional interest charges.¹⁰⁹

In addition to the multiple fees charged at closing, the loan contract specifies a series of future, contingent fees, including late fees, foreclosure fees, prepayment penalties, and dispute-resolution or arbitration fees.¹¹⁰ Again, these fees can be substantial. Prepayment penalties and foreclosure fees can amount to thousands of dollars.¹¹¹ Late fees are typically 5 percent of the late payment.¹¹²

3. Prepayment and Default

Mortgage contracts in the United States commonly allow the borrower to prepay the loan before it matures. The exercise price of this prepayment option can be either zero, when there is no prepayment penalty, or, positive, when a prepayment penalty is included in the contract. The prepayment option may seem straightforward at first glance, but it adds a substantial dose of complexity to the mortgage contract. To accurately value the contract, the borrower must estimate the likelihood and timing of prepayment, which depend on a host of future market conditions and personal circumstances. Even with these estimates, calculating the optimal timing for prepayment is non-trivial. A commonly used rule-of-thumb would have borrowers prepay when the expected saving from refinancing to a lower interest loan exceeds the transaction costs associated with terminating one loan and originating another (including the prepayment penalty). But this rule-of-thumb turns out to be a very poor approximation of the optimal prepayment decision. The reason is that the rule ignores the option value of rejecting the current refinancing offer, even when expected benefits exceed transaction cost, and waiting for even better refinancing opportunities in the future.

Accounting for this option value complicates the optimal prepayment decision. In fact, the optimal prepayment problem is so complex that it can only be solved by high-powered computers implementing sophisticated numeric algorithms.¹¹³ In addition to the explicit prepayment option every mortgage contract includes an implicit default option. The borrower can always walk away from the mortgage. Of course, exercising the default option has a price, including lost equity, a damaged credit rating and the risk of losing other assets (if the loan is not a no-recourse loan). As with the prepayment option, valuing the default option is a complex task.

¹⁰⁹ See Willis, *supra* note 4, at 725. According to one, now dated, estimate exorbitant fees – defined as fees exceeding 5 percent of the loan amount and fees reflecting no tangible benefit to borrowers – costs borrowers \$1.8 billion each year. See Stein, *supra* note 92.

¹¹⁰ See Willis, *supra* note 4, at 725.

¹¹¹ See *supra* Part II.A.2.

¹¹² Morgenson, *supra* note 93. (In 2006, Countrywide’s revenues from late charges amounted to \$285 million).

¹¹³ See Sumit Agarwal, John C. Driscoll, & David Laibson, *Optimal Mortgage Refinancing: A Closed Form Solution* (NBER, Working Paper 13487, 2007) [hereinafter Agarwal et al, *Optimal Mortgage Refinancing*]. Recently, Agarwal et al. have shown that the optimal prepayment decision can be approximated using an implementable formula. *Id.*

4. A Complex Array of Complex Products

A typical subprime or Alt-A contract is multidimensional and complex. But complexity should not be evaluated at the single-contract level. From a functional perspective, it is more informative to evaluate the complexity of the decision that a borrower faces. Borrower must choose among numerous mortgage products. To make an informed choice a borrower must read and understand numerous complex contracts. This process would be challenging even if the competing contracts shared the same dimensions and varied only with respect to the values assigned to each dimension. But, in the subprime and Alt-A markets, the borrower must compare different complex contracts, each with its own set of multidimensional prices and its own rules for determining when the different prices apply. Consider a borrower facing a 2-28 hybrid and an Option ARM. The 2-28 has an introductory period and an initial rate. The Option ARM has a different introductory period during which four different payment options are available. The 2-28 specifies an index and a margin for the post-introductory period with certain caps on rate adjustments. The Option ARM specifies a different index, a different margin and different adjustment caps. The complexity of this choice decision is evident. And in reality the borrower must choose between more than two products.¹¹⁴

C. Summary

In this Part, I described several contractual design features of common subprime and Alt-A mortgages.¹¹⁵ It should be noted that these design features are not an innovation of the subprime expansion. For example, relatively complex ARMs with a deferred-cost structure, created by lower initial rates and higher long-term rates, have been offered in the prime market since the early 1980s.¹¹⁶ While cost deferral and high levels of complexity are not unique to subprime, these design features have been enhanced in subprime and Alt-A contracts. Since complex, deferred-cost loans have been around for a while, they cannot be the only, and they are probably not even the main, cause of the subprime expansion and the ensuing subprime crisis. But, as I argue below, they did play

¹¹⁴ See WILLIAM C. APGAR & CHRISTOPHER E. HERBERT, U.S. DEP'T OF HOUSING AND URBAN DEV., *SUBPRIME LENDING AND ALTERNATIVE FINANCIAL SERVICE PROVIDERS: A LITERATURE REVIEW AND EMPIRICAL ANALYSIS*, § 2.2.3, at 1-15 (2006) (describing “the bewildering array of mortgage products available.”)

¹¹⁵ I do not purport to cover all the design features that appear in the wide variety of subprime mortgages. For example, I did not discuss low-doc and no-doc loans. Contrary to the traditional mortgage transaction, many subprime mortgages are based on little to no documentation of income and assets. In 2006, 55.3 percent of first-lien subprime loans were no-doc or low-doc loans. See Demyanyk and Van Hemert, *supra* note 1, at 7, Table 1. See also Credit Suisse Report, *supra* note 28, at 4 (“Roughly 50% of all subprime borrowers in the past two years [i.e., 2005-2006] have provided limited documentation regarding their incomes.”) “While many believe that buyers choose to provide limited or no documentation for convenience rather than necessity, a study by the Mortgage Asset Research institute sampling 100 stated income (low/no documentation) loans found that 60% of borrowers had “exaggerated” their income by more than 50%.” See *Id.* at 5.

¹¹⁶ See Peek, *supra* note 77, at 50, 54. See also Zywicki and Adamson, *supra* note 10 (explaining how legal reform in the early 1980s, specifically the Alternative Mortgage Transaction Parity Act of 1982, lifted severe restrictions on the design of mortgage contracts). Moreover, deferred-cost loans are common in other countries, e.g., interest-only mortgages are standard in the United Kingdom; and in other sectors, e.g., corporate bonds are designed as interest-only loans.

an important role in the rise and fall of the subprime market. It should also be noted that subprime and Alt-A contracts are continuing to evolve. Specifically, in response to the subprime crisis and the enhanced regulatory attention that followed in its wake, lenders are redesigning their contracts and eliminating some of the features described in this Part.¹¹⁷

III. RATIONAL CHOICE THEORIES AND THEIR LIMITS

Why were subprime mortgage contracts designed to defer costs? Why was the total cost of the loan divided into so many different interest rates and fees? I begin, in this Part, by critically evaluating the standard rational choice explanations for these contractual design features. To anticipate my conclusion, the rational choice theories explain some of the observed practices in the subprime market, but there is much that they cannot explain. This explanatory gap will be filled, in Part IV, by a behavioral economics theory.

A. Deferred Costs

1. Affordability

Perhaps the most common justification for deferred-cost contracts is affordability. If a borrower cannot afford to make a substantial downpayment, then she will take a mortgage with a high LTV. If a borrower currently cannot afford to make high monthly payments, then she will take a mortgage with low initial monthly payments.¹¹⁸ Deferred-

¹¹⁷ See Credit Suisse Report, *supra* note 28, at Abstract (“Major lenders such as Countrywide, Option One and Wells Fargo have already announced plans to discontinue certain high CLTV and stated income loan programs.”); Morgenson, *supra* note 93 (on February 23, 2007 Countrywide stopped offering no-doc loans for more than 95% of a home’s appraised value and on March 16, 2007 it eliminated piggyback loans).

¹¹⁸ See Mayer et al, *supra* note 32 (“Subprime loans tend to be affordability loans that emphasize helping credit-constrained borrowers become homeowners.”); GAO, AMP Report, *supra* note 42, at Abstract (“Federally and state-regulated banks and independent mortgage lenders and brokers market AMPs [mostly I/O and Payment Option loans], which have been used for years as a financial management tool by wealthy and financially sophisticated borrowers. In recent years, however, AMPs have been marketed as an “affordability” product to allow borrowers to purchase homes they otherwise might not be able to afford with a conventional fixed-rate mortgage.”); Kurt Eggert, *The Subprime Crisis and What To Do About It: Mandating Loan Modifications*, Working Paper (2008) (arguing that products designed for wealthier borrowers were offered as affordability products to subprime borrowers.) Affordability concerns were especially acute in areas where rapidly rising home prices forced borrowers to take larger loans, and larger loans, if they were traditional FRMs, implied larger downpayments and higher monthly payments. See Credit Suisse Report, *supra* note 28, at 29 (“We have long been of the opinion that the current housing downturn is as much a function of deteriorating affordability as an issue of over supply from fleeing investors and aggressive homebuilders (See our July 2004 report titled “It’s All About the Monthly Payment”). In order to mitigate the record price increases seen throughout the majority of the country in the first half of this decade, homebuyers became increasingly dependant on exotic mortgage products intended to reduce down payments and monthly payments.”); MBA, *supra* note 36, at 23 (“IOs in particular allowed borrowers to afford homes in a booming market.”); Kathy Hung & Charles Tu, *An Examination of House of Housing Price Appreciation in California and the Impact of Alternative Mortgage Instruments* 13 (2007), available at <http://ssrn.com/abstract=965068> (finding that, in California, increased use of ARMs led to greater housing affordability and high housing price appreciation during the housing boom in the first half of this decade.)

cost contracts create short-term affordability. Indeed, by most accounts deferred-cost contracts were designed to secure short-term affordability. But short-term affordability is not a rational choice explanation. If affordability is to offer a rational choice explanation for cost deferral, it must be long-term affordability that is considered: the borrower must be able to service the loan both now and in the future. And while deferred-cost contracts clearly enhance short-term affordability, it is by no means clear that they enhance long-term affordability. Paying less now means paying more later. Smaller downpayments (higher LTVs) and lower initial payments imply higher monthly payments in the future. Affordability, in the long-term, can rationally explain deferred-cost contracts only if the borrower's available income is expected to increase as fast as (or faster than) the escalating mortgage payments.¹¹⁹

In this spirit, the FRB advises borrowers that “[d]espite the risks of these loans, an I-O mortgage payment or a payment-option ARM might be right for you if...you have modest current income but are reasonably certain that your income will go up in the future (for example, if you're finishing your degree or training program).”¹²⁰ But how many borrowers fit this description? Notice that the FRB is not talking about standard, gradual pay raises. Those would not match the substantial increase in the monthly mortgage payment at the end of the introductory period that many subprime and Alt-A contracts stipulate. The FRB is referring to students and trainees. Indeed, 2-28 hybrids, and even I-O and Option mortgages, may be beneficial for a 2nd year law student who anticipates a sharp increase in income after graduation. These students and trainees are good candidates for escalating payment contracts, yet there are too few of them to explain a significant fraction of the approximately 3 million hybrid loans originated per year at the height of the subprime market.¹²¹

¹¹⁹ The failure to adopt this long-term affordability perspective has been the subject of criticism. In particular, lenders have been criticized for qualifying borrowers who can make only the low short-term payments but not the high long-term payments. See CBO Testimony, *supra* note 1 (“Some subprime lenders...established borrowers’ qualification for mortgages on the basis of initially low teaser rates.”) The FRB addresses this concern in its recently adopted TILA amendments. See FRB Rule, *supra* note 6, at 44,539 (“TILA Section 129(h), 15 U.S.C. 1639(h), and Regulation Z § 226.34(a)(4) prohibit a pattern or practice of extending credit subject to § 226.32 (HOEPA loans) based on consumers’ collateral without regard to their repayment ability. The regulation creates a presumption of a violation where a creditor has a pattern or practice of failing to verify and document repayment ability.”). Some have blamed the government for the lowering of underwriting standards. See Liebowitz, *supra* note 25, at Sec. I (arguing that policymakers, eager to expand homeownership, especially in lower-income and minority segments, facilitated, even mandated (through threats of Community Reinvestment Act challenges), lower underwriting standards).

¹²⁰ See FRB, *Interest-Only Mortgage Payments and Payment-Option ARMs – Are They for You?*, http://www.federalreserve.gov/pubs/mortgage_interestonly/#right (last visited Feb. 25, 2008) [hereinafter FRB, *Interest Only*]. See also FTC Comment, *supra* note 63, at 8 (noting the advantage of alternative mortgage products for “upwardly mobile” borrowers). Empirical evidence confirms that younger households with a college education, and thus better future-income prospects, were more likely to opt for innovative mortgage products with low initial interest rates. See Mark S. Doms & John Krainer, *Innovations in Mortgage Markets and Increased Spending on Housing 2* (Federal Reserve Bank of San Francisco, Working Paper 2007-05, 2007, available at <http://www.frbsf.org/publications/economics/papers/2007/wp07-05bk.pdf>).

¹²¹ The 4 million estimate is based on the 4,150,000 first-lien subprime loans originated in 2006 (see *supra* Part I.B.) multiplied by the 75 percent of hybrid ARMs among subprime loans (see *supra* Part II.A.2).

While borrowers with rising incomes are the natural candidates for escalating-payments contracts, borrowers with variable incomes may also find some of these contractual designs beneficial. The FRB advises that a borrower with volatile income, who can afford to make only small monthly payments in low-income periods, may rationally prefer a loan contract that requires lower monthly payments.¹²² But the typical loan does not offer the low-payment option for more than two years. Accordingly, the income of the target borrower should be volatile only temporarily and then stabilize. Moreover, a rational borrower with volatile income should have no problem making fixed-magnitude mortgage payments. All she needs to do is save some of her earnings from the high-income periods. As with rising-income borrowers, the number of variable-income borrowers who would benefit from deferred-cost loans seems small relative to the number of loans with these design features.

The (long-term) affordability explanation covers a small fraction of deferred-cost originations. This assessment is consistent with the evidence of especially high foreclosure rates on homes financed by deferred-cost loans.¹²³ If deferred-cost loans were designed to address short-term liquidity problems, then defaults and foreclosures should be rare. But perhaps there is another, more plausible version of the affordability explanation. Thus far, long-term affordability was assumed to imply an ability to make the high future payments, e.g., from rising income. A less-literal interpretation of affordability may include an expectation to avoid, rather than make, the high future payments, specifically by refinancing the loan before the low-rate introductory period ends.¹²⁴

A borrower could expect to obtain a new mortgage with lower monthly payments if (1) the borrower's credit score improves (by regularly making the low payments during the

¹²² See FRB, *Interest Only*, *supra* note 106 (advising borrowers that I/O loans and Option ARMs may be suitable for them if they “have irregular income (such as commissions or seasonal earnings) and want the flexibility of making I-O or option-ARM minimum payments during low-income periods and larger payments during higher-income periods.”) See also FTC Comment, *supra* note 63, at 8 (noting the advantage of alternative mortgage products for borrowers with variable income).

¹²³ See, e.g., Paulson, *supra* note 2 (“As I mentioned earlier, mortgage defaults and foreclosures are rising. While the delinquency rate today is near the 2001 rate, there are over seven times more subprime mortgages today than there were in 2001. At the end of the second quarter of this year, more than 900,000 subprime loans were at least 30 days delinquent. Foreclosures are also up significantly – increasing about 50 percent from 2000 to 2006. Foreclosures on subprime loans are up over 200 percent in that same period. Current trends suggest there will be just over 1 million foreclosure starts this year - of which 620,000 are subprime.”) Recall that most of the 620,000 subprime foreclosures that Secretary Paulson anticipates the underlying loan contract was a deferred-cost contract. See *infra* Part V.C.

¹²⁴ See FTC Comment, *supra* note 63, at 8 (“borrowers who are confident that they will sell or refinance their home for an equal or increased value before the introductory period of the loan expires may benefit from alternative loan options.”); FRB Proposed Rule, *supra* note 52, at 1687-88 (“Consumers may also benefit from loans with payments that could increase after an initial period of reduced payments if they have a realistic chance of refinancing, before the payment burden increases substantially, into lower-rate loans that were more affordable on a longer-term basis. This benefit is, however, quite uncertain, and it is accompanied by substantial risk....”)

introductory period),¹²⁵ (2) market interest rate falls, or (3) house prices increase (implying a lower LTV for the new mortgage). The question then is how many borrowers rationally expected that such positive realizations will enable them to refinance their deferred-cost mortgage and avoid the high long-term costs. From an ex post perspective, it is clear that the subprime crisis and the ensuing tightening of credit eliminated the refinancing option for many borrowers.¹²⁶ And the FRB infers that even from an ex ante perspective, which is the relevant perspective for judging the affordability explanation, many borrowers could not have rationally expected to face attractive refinancing options:

“[E]vidence from recent events is consistent with a conclusion that a widespread practice of making subprime loans with built-in payment shock after a relatively short period on the basis of assuming consumers will accumulate sufficient equity and improve their credit scores enough to refinance before the shock sets in can cause consumers more injury than benefit.”¹²⁷, ¹²⁸

The possibility of refinancing and prepayment, together with short-term affordability concerns, can also explain the prevalence of prepayment penalties – a specific deferred price dimension. The prepayment option benefits borrowers. And borrowers must pay for this benefit. One way to pay for the prepayment option is through a higher (initial) interest rate.¹²⁹ Short-term affordability concerns render this ex ante payment unattractive. The alternative is to pay for the prepayment option ex post with a prepayment penalty. Put differently, the prepayment penalty, which can be viewed as the exercise price of the prepayment option, reduces the value of the option to the borrower but also reduces the cost that this option imposes on the lender. This explains the lower interest rates on loans with prepayment penalties.¹³⁰ While this explanation for the

¹²⁵ Mayer et al, *supra* note 32 (“Industry participants claim that teaser mortgages were never designed as long-term mortgage products. Instead, the two- or three-year period was designed for consumers with tarnished credit to improve their credit score by making regular payments.”)

¹²⁶ Prepayment to avoid high post-reset rates was common before the subprime crisis hit and the credit crunch set in. See Anthony Pennington-Cross & Giang Ho, *The Termination of Subprime Hybrid and Fixed Rate Mortgages*, (Federal Reserve Bank of St. Louis, Working Paper Series 2006-042A, 8-9, 2006) (finding, based on LP data, that hybrid mortgages tend to prepay quickly around the first mortgage reset date); Shane M. Sherlund, *An Outlook for Subprime Mortgages*, Working Paper (2008) (finding that “prepayments jump during reset periods”).

¹²⁷ FRB Proposed Rule, *supra* note 52, at 1687-88.

¹²⁸ The possibility of refinancing and prepayment provides another explanation for deferred-cost contracts. Assuming that low-risk borrowers will be the first to get attractive refinance offers and prepay, the lender expects her pool of borrowers to become more and more risky over time. The increasing risk justifies increasing interest rates. See Mayer et al., *supra* note 96. Similar reasoning explains the prevalence of prepayment penalties: Assume that ex ante all borrowers are identical and at some point each borrower experiences a credit shock that places the borrower in either the low-risk group or the high-risk group. Borrowers can pay for the prepayment option ex ante, through higher initial rates, before learning which risk group they will belong to. Or the high risk borrowers can pay for the prepayment option that the low-risk borrowers exercise through higher long-term rates. A third alternative would have the low-risk borrowers who exercise the prepayment option pay for it through prepayment penalties. This third option provides valuable insurance against a bad realization of the credit shock. *Id.*

¹²⁹ Arguably this is the situation in the prime market, where prepayment penalties are less common.

¹³⁰ See *supra* Section II.A.3.

prevalence of prepayment penalties is persuasive, it is likely incomplete. This explanation implies that prepayment penalties replace higher interest rates. But there is evidence that the amounts paid in penalties ex post exceed the foregone interest payments that were not paid ex ante.¹³¹

2. Speculation

An alternative, rational choice explanation portrays the deferred-cost mortgage as an investment vehicle designed to facilitate speculation on real estate prices.¹³² This explanation applies to the substantial portion – 10 percent in the subprime market and 25 percent in the Alt-A market – of loans that were originated on investment properties.¹³³ But it may also apply to loans originated on owner-occupied properties. The speculator purchases a house with a deferred-cost mortgage and begins making the initial, low monthly payments. If real estate prices go up, the speculator will sell the house and pocket the difference between the lower buy price and the higher sell price, or the speculator will refinance the loan using the increased equity to obtain lower long-term rates. And if real estate prices go down, the speculator will simply default on the mortgage. The speculator enjoys the upside benefit, while the lender bears the downside cost. And this attractive prospect is purchased at the bargain price of the low, initial payments on a deferred-cost mortgage; the high, long-term costs are avoided.^{134, 135}

Speculation, with the help of deferred-cost loans, is not really a risk-free prospect. The speculator does not *simply* default on the mortgage. Default is costly. First, in jurisdictions where the lender has recourse to the borrower's assets, default places these assets at risk. It should be noted, however, that a large number of states, including

¹³¹ See LaCour-Little, *Prepayment Penalties*, *supra* note 95 (comparing 2/28 ARMs with lower initial rates and prepayment penalties to 2/28 ARMs with higher initial rates and without prepayment penalties and finding that “the total interest rate savings is significantly less than the amount of the expected prepayment penalty.”) Other studies find that adding a prepayment penalties leads to no reduction in ex ante interest rates, and is, in fact, associated with higher ex ante interest rates. See Engel and McCoy, *supra* note 46, at 2060.

¹³² I focus on the effects of home price trends, and expectations about home price trends. A similar argument can be made about market interest rates and expectations about market interest rates.

¹³³ Mayer et al, *supra* note 32 (reporting the shares of loans originated on investment properties in the subprime and Alt-A markets).

¹³⁴ This strategy was nicely articulated by Professor Todd Sinai: “There’s a whole lot of people who would’ve been stuck as renters without these exotic loan products. Now it’s like they can do their renting from the bank, and if house values go up, they become the owner. If they go down, you have the choice to give the house back to the bank. You aren’t any worse off than renting, and you got a chance to do extremely well. If it’s heads I win, tails the bank loses, it’s worth the gamble.” See John Leland, *Facing Default, Some Walk Out on New Homes*, N.Y. TIMES, Feb. 29, 2008, at A1 (quoting professor Sinai). Professor Sinai focuses on purchase loans. *Id.* Indeed, the evidence suggests that “much of the boom in subprime and Alt-A lending and defaults has been in purchase mortgages.” Mayer et al, *supra* note 32, at 22. Nevertheless, it should be noted that the speculation explanation applies to refinance loans as well.

¹³⁵ Adopting the ‘heads - borrower wins, tails - lender loses’ strategy is rational for borrowers, but not for lenders. The speculation explanation is incomplete absent an account of lenders’ incentives. Why did lenders play along? Agency problems – within lending institutions and among the different parties in the securitization process – provide one set of answers. See *supra* notes 10-13 and accompanying text. Another set of answers recognizes that lenders enjoyed a substantial portion of the upside benefit. In many cases, an increase in house prices led to refinancing by the same lender. See Gorton, *supra* note 13, at 4-5.

subprime hot-spots like California, Colorado, Nevada and Arizona, have no-recourse laws.¹³⁶ And even in states without no-recourse laws, filing an action for deficiency is often not cost-effective for the lender, and thus the loan becomes a de-facto no-recourse loan.¹³⁷ A second cost of default is foregone equity, although this cost too is often small due to high initial LTVs and even higher LTVs at the time of default (recall that default is triggered by falling house prices). A third cost of default is the damage to the borrower's credit rating and the increased future cost of credit that a damaged credit rating implies. Finally, default implies foreclosure and relocation – both costly prospects. While there is no consensus estimate for the cost of default and foreclosure, for many borrowers this cost will amount to tens of thousands of dollars.¹³⁸ But despite the cost of default, the downside risk is still dominated by the upside benefit as long as the probability of a positive realization is sufficiently high. In other words, if house prices are expected to rise high enough fast enough, then speculation is rational, even if the costs incurred in the unlikely event of default are substantial.¹³⁹

The question, therefore, is whether such expectations of continuing rapid increase in house prices were rational for borrowers to hold. An initial observation is that during the subprime expansion home prices were high relative to underlying fundamentals.¹⁴⁰ As noted by the CBO: “[F]or a time, the expectation of higher prices became a self-fulfilling prophecy that bore little relation to the underlying determinants of demand, such as demographic forces, construction costs, and the growth of household income.”¹⁴¹ But

¹³⁶ See Michael T. Madison, Jeffrey R. Dwyer, & Steven W. Bender, 2 THE LAW OF REAL ESTATE FINANCING §12:69 (Dec. 2007), available in Westlaw REFINLAW § 12:69. A full list of state laws is available at <http://www.foreclosurelaw.org/>. See also Zywicki and Adamson, *supra* note 10 (“It is difficult to estimate exactly how many states have antideficiency laws as foreclosure rules vary a great deal from state to state, but an approximation may be about 15-20 states including many larger states.”)

¹³⁷ See Zywicki and Adamson, *supra* note 10, at 28.

¹³⁸ See Ellen Schloemer, Wei Lee, Keith Ernst, & Kathleen Keest, *Losing Ground: Foreclosures in the Subprime Market and Their Costs to Homeowners* 16 (Center for Responsible Lending, Dec. 2006) (estimating, based on a dataset including loans originated between 1998 and 2006 on owner-occupied homes, that 2.2 million will lose their homes to foreclosure, and they will lose a total of \$164 billion, which translates into approximately \$75,000 per-borrower; this estimate assumes that borrowers hold relatively high equity levels, and is therefore probably excessive); Bernanke 3/4/08 Speech, *supra* note 74 (“A recent estimate [of foreclosure-related costs] based on subprime mortgages foreclosed in the fourth quarter of 2007 indicated that total losses exceeded 50 percent of the principal balance, with legal, sales, and maintenance expenses alone amounting to more than 10 percent of the principal.”)

¹³⁹ The upside benefit is also not as straightforward as implied in the initial description. Sale and refinancing involve transaction costs and, in many cases, also prepayment penalties. Moreover, even with increasing house prices a borrower may be left with low or negative equity, the result of high initial LTVs and slow, zero or even negative amortization, severely reducing sale and refinancing options. But, again, this only means that a rational speculator must have expected a substantial increase in house prices – an increase sufficient to outweigh the costs and difficulties of sale and refinancing.

¹⁴⁰ Robert J. Shiller, *Understanding Recent Trends in House Prices and Homeownership*, (NBER, Discussion Paper, No. 13553, 4-5, 2007).

¹⁴¹ CBO Testimony, *supra* note 1. One indicator, cited by both Shiller and the CBO, that housing prices were high relative to underlying fundamentals, particularly in 2005-2006, was the ratio of housing prices to rents. See Shiller, *supra* note 139, at 4-5; CBO, *supra* note 2. On the limits of this indicator – see Peter R. Orszag, *Housing Price – Rental Ratios*, CBO, Director's Blog, Dec. 21st, 2007 (available at <http://cboblog.cbo.gov/?p=52L>); Jonathan McCarthy & Richard W. Peach, *Are Home Prices the Next 'Bubble'?* 10(3) FED. RESERVE BANK OF N.Y. ECONC. POL'Y REV. 1 (Dec. 2004).

expectations that deviate from long-term fundamentals are not necessarily irrational. A rational borrower may recognize that home prices must fall eventually, but expect that the correction will not occur before he exits the market. And this expectation, while it proved to be erroneous for many subprime and Alt-A borrowers ex post, may well have been rational ex ante.

There were surely some rational speculators in the subprime and Alt-A markets, who rode the real estate bubble armed with accurate ex ante estimates (that turned out to be false ex post) about the timing of the bubble's inevitable end.¹⁴² And there were also other borrowers-speculators with optimistic expectations about future house prices that were not rationally formed. Specifically, the irrational borrowers extrapolate from past price trends: if home prices increased by 10 percent over the past year, these traders will expect that home prices will increase by 10 percent also over the next year. Indeed, in an influential study, Karl Case and Robert Shiller, found that many home buyers overestimate the correlation between past trends and future price movements or, put differently, backward-looking tendencies drive expectations of future price growth (beyond what could plausibly be justified in a rational expectations model).¹⁴³ The subprime and Alt-A markets experienced both rational and irrational speculation.¹⁴⁴ The relative proportion of these two species of speculators remains an open question.

¹⁴² Rational speculation is more plausibly attributed to the Wall Street banks who securitized and sold the MBSs and for their sophisticated clients who purchased these MBSs may have been rational speculators. And there is reason to believe that even these sophisticated parties were making irrational assessments. See CBO Testimony, *supra* note 1 ("the rating agencies appear to have miscalculated the risks of some securities backed by subprime loans, and they may have unduly emphasized the unusual period of appreciating prices.")

¹⁴³ See Karl E. Case & Robert J. Shiller, *The Behavior of Home Buyers in Boom and Post Boom Markets*, 1988 N.E. ECON. REVIEW 29-46 (1988); Karl E. Case & Robert J. Shiller, *Is There a Bubble in the Housing Market?* 2 BROOKINGS PAPERS ON ECONOMIC ACTIVITY 299 (2004); Robert J. Shiller, *Speculative Prices and Popular Models*, 4(2) J. ECON. PERSP. 55, 58-61 (1990). Moreover, Case and Shiller found that many home buyers believe that home prices cannot decline. *Id.* Case and Shiller repeated their study for the recent housing bubble, obtaining similar results. See Karl E. Case & Robert J. Shiller, *Home Buyer Survey Results 1988-2006*, (unpublished paper, Yale University, 2006). See also Shiller, *supra* note 139, at 11. These survey results are also supported by evidence of borrower behavior. In particular, homebuyers extend themselves more, via higher LTVs and higher payment-to-income ratios, when buying a home in markets with high historical appreciation rates. See Christopher Mayer and Todd Sinai, *Housing and Behavioral Finance*, Presentation, September 2007. In addition, Christopher Mayer and Todd Sinai find that "the lagged five-year average of house price growth is positively associated with increases in the price-rent ratio." See Christopher Mayer and Todd Sinai, *Housing and Behavioral Finance*, Working Paper, September 25, 2007, p. 22. On the other hand, contrary to the Case-Shiller survey results, Mayer and Sinai find that the prior year's house price growth does not affect the price-rent ratio. *Id.* at 23. Mayer and Pence find that "[a] one standard deviation increase in house price appreciation in [2004] is associated with a 39 percent increase in subprime loans [in 2005]." See Mayer, Christopher J. and Pence, Karen M., "Subprime Mortgages: What, Where, and to Whom?" p. 13 (June 2008). NBER Working Paper No. W14083 Available at SSRN: <http://ssrn.com/abstract=1149330>. Since it is a lagged appreciation variable that is correlated with the increase in subprime originations, this findings is consistent with a behavioral story that demand for subprime loans was driven by expectations of future house price appreciation based on extrapolation from past trends.

¹⁴⁴ This is consistent with a leading economic theory of bubbles, which posits the existence of both rational and irrational traders. See Andrei Shleifer & Lawrence H. Summers, *The Noise Trader Approach to Finance*, 4(2) J. ECON. PERSP. 19, 28-29 (1990); Bradford J. De Long, Andrei Shleifer, Lawrence H. Summers, & Robert J. Waldmann, *Positive Feedback Investment Strategies and Destabilizing Rational*

B. Complexity

1. Interest Rates

Mortgage loans, like any other long term credit product, are subject to interest rate risk – the risk that market interest rates will change over the life of the loan, departing, often substantially, from the interest rates that prevailed at the time of origination. In a rational choice framework, ARMs, with their complex formulas for setting interest rates, are designed to optimally allocate interest rate risk between the lender and the borrower. An FRM allocates all interest rate risk to the lender. A pure ARM, with an interest rate that closely tracks a market index, provides the other polar allocation, imposing all the interest rate risk on the borrower. And the more complex, and more common, ARMs, with caps that limit interest rate adjustments, enable a range of risk allocations between these two extremes.

ARMs were initially developed, in the early 1980s, to protect lenders from the interest rate risk that they bore under the traditional FRM.¹⁴⁵ In a time when loan originators held mortgages on their balance sheets, shifting the risk to the borrower was an important means for shedding the risk. This explanation for ARMs is, however, less powerful in the era of securitization. Originators no longer bear interest rate risk, or bear much less of it. And the securitizers spread this risk among multiple investors, who are, as a general matter, better situated to bear this risk than the typical borrower.

2. Fees

As explained in Part II, many different services and many different costs are associated with the mortgage transaction. In the past, most of these costs were folded into the loan's interest rate. Now lenders (and their affiliates: mortgage settlement/closing companies and servicers) charge separate fees for each service rendered or cost incurred. There are two rational choice, efficiency-based explanations for the proliferation of fees.

First, to the extent that some services are optional, setting separate prices for these services allows for more efficient tailoring of the product to the needs and preferences of different borrowers. This explanation is plausible for some services and fees but not for others. Specifically, it is not plausible for the many non-optional services that all borrowers purchase, e.g., credit check, document preparation, appraisals, etc'. Moreover, evidence of “[w]ild variation” in fees charged for largely standardized services is inconsistent with a claim that borrowers pay the cost of optional services that they request.¹⁴⁶

Speculation, 45(2) J. FIN. 379 (1990); Bradford J. De Long, Andrei Shleifer, Lawrence H. Summers, & Robert J. Waldmann, *Noise Trader Risk in Financial Markets*, 98 J. POL. ECON. 703 (1990). See also ROBERT J. SHILLER, *IRRATIONAL EXUBERANCE* (Princeton University Press 2nd ed. 2005) (developing a market-psychological theory of bubbles).

¹⁴⁵ See Peek, *supra* note 77.

¹⁴⁶ See Mark D. Shroder, *The Value of the Sunshine Cure: The Efficacy of the Real Estate Settlement Procedures Act Disclosure Strategy*, 9(1) *Cityscape: A Journal of Policy Development and Research* 73, 84

The second rational-choice explanation describes the proliferation of fees in subprime mortgage contracts as reflecting a desirable shift to risk-based pricing. For example, if the costs of delinquency and foreclosure proceedings are folded into the interest rate, then non-defaulting borrowers will pay for the delinquency and foreclosures of defaulting borrowers. Separate late fees and foreclosure fees eliminate this cross-subsidization. Again, this explanation is plausible for certain fees, but not for others.

3. Prepayment and Default

The (implied) default option is an inevitable component of any loan product. I thus focus on the prepayment option, which while ubiquitous in mortgage contracts in the United States, is virtually non-existent in most other countries.¹⁴⁷ The prepayment option serves two main goals. First, by allowing borrowers who improve their credit rating to refinance into a lower-rate loan, the prepayment option allows individuals to consider homeownership earlier. Second, the prepayment option protects borrowers from the risk of paying a mortgage interest rate that is substantially above the current market rate. These benefits, however, should be weighed against the difficulty of valuing a mortgage with a prepayment option.

4. A Complex Array of Complex Products

The decision problem faced by a potential borrower is made difficult by the complexity of the typical subprime and Alt-A mortgage and even more difficult by the need to choose among multiple complex mortgage products. The standard efficiency explanation for the large variety of products available in many markets is consumer heterogeneity. In the mortgage market, different borrowers have different preferences and face different constraints. A mortgage design that is ideal for one borrower could be terrible for another borrower. With more products to choose from, each borrower would be able to choose the mortgage that is best for her. This explanation, however, assumes that informed choice is possible, despite the high level of complexity of the choice problem.¹⁴⁸

C. Summary

Efficiency-based, rational choice theories can explain many, though not all, of the contractual design features observed in the subprime and Alt-A markets. Moreover, even for the design features that can be explained within a rational choice framework, the rational choice theories have only limited reach. The rational choice theories explain the

(2007) (for example, the cost of obtaining a credit report, “a standard national, largely automated, service” is typically about \$50, yet credit report fees range from \$25 to \$100.)

¹⁴⁷ Richard K. Green and Susan M. Wachter, *The American Mortgage in Historical and International Context*, 19 J. ECON. PERSP. 93, 101 (2005).

¹⁴⁸ A more sophisticated rational choice explanation recognizes that complexity – of a single product and of the array of offered products – increases the cost of shopping. And when shopping costs more, the rational borrower will shop less. Since shopping creates a positive externality, there is a risk that the market will produce an inefficiently high level of complexity.

demand structure of rational borrowers and the contractual design response to this demand. But, as shown below, not all borrowers, and especially not all subprime and Alt-A borrowers, were financially sophisticated, rational borrowers.¹⁴⁹ The rational choice theories leave an explanatory gap. I now turn to the task of filling this gap.¹⁵⁰

IV. A BEHAVIORAL ECONOMICS THEORY

The subprime mortgage contract is a product of the interaction between the forces of supply and demand in the subprime mortgage market. When lenders respond to a demand for financing that is influenced by borrower psychology the resulting loan contract will feature deferred costs and a high level of complexity.¹⁵¹

A. Deferred Costs

The behavioral economics explanation for deferred-cost contracts is based on evidence that future costs are often underestimated. When future costs are underestimated, contracts with deferred-cost features become more attractive to borrowers, and thus to lenders.¹⁵² Consider a simplified loan contract with two price dimensions: a short-term price, P_{ST} , and a long-term price, P_{LT} . Assume that the optimal mortgage contract sets $P_{ST} = 5$ and $P_{LT} = 5$, as these prices provide optimal incentives and minimize total costs. If borrowers are rational, lenders will offer this optimal contract. Now assume that borrowers underestimate future costs. For concreteness, assume that borrowers perceive the long-term payments to be one-half of the actual long-term payments: $\hat{P}_{LT} = \frac{1}{2} \cdot P_{LT}$. With such misperception, lenders will no longer offer the optimal contract. To see this,

¹⁴⁹ See *infra* Section IV.C.

¹⁵⁰ In theory, the demand generated by rational borrowers, even if they are a minority, could determine the contractual design of all mortgage contracts, including those offered to imperfectly rational borrowers. Compare: Alan Schwartz & Louis L. Wilde, *Intervening in Markets on the Basis of Imperfect Information: A Legal and Economic Analysis*, 127 U. PA. L. REV. 630 (1979). This theory assumes that lenders cannot, or cannot efficiently, discriminate between the two groups of borrowers and offer different contracts to the different groups. This assumption is unrealistic in the subprime and Alt-A mortgage markets. Note that to exercise such discrimination lenders need not identify in advance the rational borrowers and the imperfectly rational borrowers. Instead, lenders only need to offer two sets of contracts – one attractive to rational borrowers and the other attractive to imperfectly rational borrowers – and let the borrowers self-select. See Bar-Gill and Warren, *supra* note 17.

¹⁵¹ For a good early behavioral analysis of mortgage market imperfections – see Eskridge, *supra* note 23, at 1112-1118 (arguing that the high stress involved in the home-buying and mortgage-borrowing process leads many buyers/borrowers to acquire insufficient information and to make suboptimal choices). Eskridge also discusses the influence of agents/brokers whose interests are not aligned with the buyer's, arguing that these agents/brokers take advantage of buyers' imperfect information and imperfect rationality. See *id.* at 1118-1123.

¹⁵² CBO has recently suggested that “[t]he rise in defaults of subprime mortgages may also reflect the fact that some borrowers lacked a complete understanding of the complex terms of their mortgages and assumed mortgages that they would have trouble repaying. (Certain ARMs may have been among the more difficult mortgages for first-time borrowers to understand. Many of those mortgages made in recent years included teaser rates, which may have confused some borrowers about the eventual size of their mortgage payments when their mortgage rates were reset.)” CBO Testimony, *supra* note 1.

compare the optimal contract, the (5,5) contract, with an inefficient, deferred-cost contract setting $P_{ST}=3$ and $P_{LT}=8$, the (3,8) contract. Assume that under both contracts the lender just covers the total cost of making the loan. (The total cost is higher under the inefficient, deferred-cost contract: $8 + 3 > 5 + 5$.) Total payments under the optimal contract, as perceived by the imperfectly rational borrowers, would be $\hat{P}(5,5)=5+\frac{1}{2}\cdot 5=7.5$.¹⁵³ Perceived total payments under the inefficient, deferred-cost contract would be $\hat{P}(3,8)=3+\frac{1}{2}\cdot 8=7$. Borrowers would prefer, and thus lenders will offer, the inefficient, deferred-cost contract.¹⁵⁴

There are several reasons to expect systematic underestimation of future costs. Myopia is one such reason.¹⁵⁵ High LTV contracts are attractive to myopic borrowers, who place excessive weight on the short-term benefits of a low downpayment (or a large cash-out in a refinance loan) and insufficient weight on the long-term consequences of a high LTV, such as higher interest payments and greater difficulty to refinance. Escalating-payments contracts are similarly attractive to myopic borrowers, who place excessive weight on the initial low payments and insufficient weight on the future high payments.¹⁵⁶ Myopia will also lead borrowers to discount the costs associated with a prepayment penalty – the penalty itself or the cost of delayed prepayment.

Another bias that is responsible for the underestimation of future costs is optimism. Borrowers might be optimistic about their future income. They might also optimistically underestimate the probability that an adverse contingency, such as job loss, accident, or

¹⁵³ Time discounting is ignored for simplicity.

¹⁵⁴ Cf. Paiella, Monica and Pozzolo, Alberto F., "Choosing Between Fixed and Adjustable Rate Mortgages" (2007) (available at SSRN: <http://ssrn.com/abstract=976346>) (finding, based on the Bank of Italy's Survey of Household Income and Wealth, that "ARM holders do not fully take into account the risk of a rise of the reference interest rates. On the other hand, lenders price quite expensively this risk and borrowers end up paying a high price for the benefit of low initial payments."); David Miles, *The U.K. Mortgage Market: Taking a Longer-Term View, Interim Report: Information, Incentives, and Pricing* (2003). Available at http://www.hm-treasury.gov.uk/consultations_and_legislation/miles_review/consult_miles_index.cfm (borrowers tend to focus disproportionately on the initial rather than the long-term cost of a loan.)

¹⁵⁵ An especially troubling manifestation of myopia is the problem of insufficient saving for retirement. See Deborah M. Weiss, *Paternalistic Pension Policy: Psychological Evidence and Economic Theory*, 58 U. CHI. L. REV. 1275, 1275 (1991) ("Left to their own devices, many people will not save enough for their old age."); Brigitte C. Madrian & Dennis Shea, *The Power of Suggestion: Inertia in 401(k) Participation and Savings Behavior*, 116 Q.J. ECON. 1149, 1150 (2001) (documenting the problem of insufficient saving for retirement).

¹⁵⁶ See Rick Brooks & Ruth Simon, *Housing Debacle Traps Even Very Credit-Worthy*, WALL ST. J., at A1, Dec. 3, 2007 ("During the housing boom, the lower introductory rate on adjustable-rate mortgages made them feel closer in cost to regular loans to many subprime borrowers, but those rates can jump after two or three years. Brokers had extra incentives to sell those loans, which have terms that often are confusing to borrowers.") The term "payment shock," used to describe the experience of a borrower who has seen his interest rate reset and his monthly payment increase, implies less-than-perfect understanding of this contractual design feature. The term "payment shock" is used, e.g., by the FRB and the FTC. See FTC Comment, *supra* note 63, at 9. See The Federal Reserve Board, *Are They For You? Interest Only Mortgage Payments and Payment Option ARMS*, http://www.federalreserve.gov/pubs/mortgage_interestonly/ (last visited Mar. 16, 2008); see The Federal Reserve Board, *Consumer Handbook on Adjustable Rate Mortgages*, http://www.federalreserve.gov/pubs/arms/arms_english.htm (last visited Mar. 16, 2008).

illness, will bring about financial hardship.¹⁵⁷ As a result, borrowers might overestimate their ability to service a loan with high, deferred costs. In addition, borrowers might overestimate their ability to refinance the loan at an attractive rate and by doing so to avoid the high, long-term costs associated with a deferred-cost loan. Such overestimation may result from optimism about future home prices, about future interest rates, and about the borrower's future credit score.

Some borrowers were myopic and optimistic. Moreover, some lenders and brokers reinforced borrowers' myopia and optimism.¹⁵⁸ These biases provide an alternative, behavioral explanation for the prevalence of cost deferral. Myopia and optimism explain why short-term affordability, rather than rational long-term affordability, took center stage in the subprime and Alt-A markets.¹⁵⁹ These biases, and especially optimism about future house prices, also add an important dose of reality to the speculation explanation.¹⁶⁰

B. Complexity

The typical subprime and Alt-A mortgage contract is complex. It specifies numerous interest rates, fees and penalties, the magnitude and applicability of which may be contingent on unknown future events. A rational borrower will navigate this complexity with ease. She will accurately assess the probability of triggering each rate, fee and penalty and she will accurately calculate the expected magnitude of each rate, fee and penalty. Accordingly, each price dimension will be afforded the appropriate weight in the overall evaluation of the mortgage product.

The imperfectly rational borrower is incapable of such an accurate assessment. He is unable to calculate prices that are not directly specified. Even if he could perform this

¹⁵⁷ See generally Neil D. Weinstein, Unrealistic Optimism About Future Life Events, 39 J. PERSONALITY AND SOC. PSYCH. 806 (1980); Ola Svenson, *Are We All Less Risky and More Skillful than Our Fellow Drivers?*, 47 ACTA PSYCHOLOGICA 143 (1981). See also *In re Eashai*, 87 F.3d 1082, 1090 (9th Cir. 1996) ("We recognize the fragility of human nature. "Human experience tells us debtors can be unreasonably optimistic despite their financial circumstances." (quoting *In re Cox*, 182 B.R. 626, 635 (Bankr. D. Mass. 1995))); TERESA A. SULLIVAN, ELIZABETH WARREN & JAY LAWRENCE WESTBROOK, *THE FRAGILE MIDDLE CLASS: AMERICANS IN DEBT* 114 (2000) ("The recently unemployed, hopeful that they will be back at work in a matter of days or weeks, may not be prepared to tell the children there will be no new soccer shoes this season or no back-to-school clothes.").

¹⁵⁸ FRB Rule, *supra* note 6, at 44,542 ("In addition, originators may sometimes encourage borrowers to be excessively optimistic about their ability to refinance should they be unable to sustain repayment. For example, they sometimes offer reassurances that interest rates will remain low and house prices will increase; borrowers may be swayed by such reassurances because they believe the sources are experts."). See also Gretchen Morgenson, *Countrywide Subpoenaed by Illinois*, New York Times, December 13, 2007 (Illinois AG sued a Chicago mortgage broker and is investigating Countrywide Financial, the broker's primary lender, for abusive lending practices, specifically pushing borrowers into payment-option ARMs by emphasizing the low short-term payments and deemphasizing the high long-term costs.)

¹⁵⁹ See *supra* Section III.A.1.

¹⁶⁰ See *supra* Section III.A.2. Cf. Nagel, Stefan and Greenwood, Robin Marc, "Inexperienced Investors and Bubbles" (June 9, 2008). AFA 2008 New Orleans Meetings Paper Available at SSRN: <http://ssrn.com/abstract=963050> (less experienced investment managers were more likely to exhibit irrational trend-chasing behavior).

calculation, he would be unable to simultaneously consider ten or fifteen (or even more) price dimensions. And even if he could recall all the price dimensions, he would be unable to calculate the impact of these prices on the total cost of the loan. While the rational borrower is unfazed by complexity, the imperfectly rational borrower might be misled by complexity.

The imperfectly rational borrower deals with complexity by ignoring it. He simplifies his decision problem by ignoring non-salient price dimensions.¹⁶¹ And he approximates, rather than calculates, the impact of the salient dimensions that cannot be ignored. In particular, limited attention and limited memory might result in the exclusion of certain price dimensions from consideration.¹⁶² And a limited processing ability might prevent borrowers from accurately aggregating the different price components into a single total expected price that would serve as the basis for choosing the optimal loan.¹⁶³

Increased complexity may be attractive to lenders, as it allows them to hide the true cost of the loan in a multidimensional pricing maze. A lender who understands the imperfectly rational response to complexity can use complexity to her advantage – to create an appearance of a lower total price without actually lowering the price. For example, if the tax certification fee and the late payment fee are not salient to borrowers, lenders will raise the magnitude of these price dimensions. Increasing these prices will not hurt demand. On the contrary, it will enable the lender to attract borrowers by reducing more salient price dimensions.¹⁶⁴ This strategy depends on the existence of non-salient price dimension. When the number of price dimensions goes up, the number of non-salient price dimensions can also be expected to go up. Lenders thus have a strong incentive to increase complexity and multidimensionality.

¹⁶¹ See Richard H. Thaler, *Mental Accounting Matters*, 12 J. BEHAVIORAL DECISION MAKING 183, 194 (1999) (finding that small disaggregated fees are ignored).

¹⁶² Cf. FRB Rule, *supra* note 6, at 44,525-26.

¹⁶³ CBO has recently suggested that “[t]he rise in defaults of subprime mortgages may also reflect the fact that some borrowers lacked a complete understanding of the complex terms of their mortgages and assumed mortgages that they would have trouble repaying. (Certain ARMs may have been among the more difficult mortgages for first-time borrowers to understand.)” CBO Testimony, *supra* note 1. See also GAO, AMP Report, *supra* note 42, at Abstract (“Regulators and others are concerned that borrowers may not be well-informed about the risks of AMPs, due to their complexity and because promotional materials by some lenders and brokers do not provide balanced information on AMPs benefits and risks.”); FTC Comment, *supra* note 63, at 14 (“for loans with more complexity – such as nontraditional mortgages – consumers face further challenges in understanding all significant terms and costs.”). For over 5 years HUD has been working on reforming the home buying process, specifically through increased transparency regarding closing costs. See HUD, *RESPA Reform*, <http://www.hud.gov/respareform/> (last visited Feb. 25, 2008) (“Buying a home today is too complicated, confusing and costly. Every year, Americans spend approximately \$55 billion on closing costs they don't fully understand.... The *Real Estate Settlement Procedures Act* was enacted in 1974 to provide consumers advance disclosures of settlement charges and to prohibit illegal kickbacks and excessive fees in the homebuying process. Nevertheless, consumers increasingly complain that when they go through this process, they don't understand the charges and often pay more than they thought they agreed to. In addition, homebuyers are severely limited in shopping for settlement services that could significantly lower their costs.”)

¹⁶⁴ See Bar-Gill, *Consumer Contracts*, *supra* note 17. See also Willis, *supra* note 4, at 725-726 (describing how “a lender can creatively manipulate each component of the price of a loan to affect a desired predicted return.”)

Lenders also have a strong incentive to increase the complexity of salient price dimensions, like the options in an Option ARM and the adjusting interest rate in a 2-28 hybrid with adjustment caps. The borrower who is unable to calculate these prices will try to approximate them. Complexity is attractive to lenders as long as the borrower's approximation is an underestimation.¹⁶⁵

Finally, complexity can be expected to increase as borrowers learn to effectively incorporate more price dimensions into their decision. If lenders significantly increase the magnitude of a non-salient price dimension, borrowers will eventually learn to focus on this price dimension and it will become salient. Lenders will have to find another non-salient price dimension. And when they run out of non-salient prices in the existing contractual design, they can create new ones by adding more interest rates, fees or penalties. Similarly, borrowers will eventually learn to accurately estimate even prices that, while salient, are indirectly defined using complex formulae and whose impact depends on a host of unknown future realizations. When this happens, lenders will have an incentive to increase even further the complexity of these, or other, prices.¹⁶⁶

C. Heterogeneity in Cognitive Ability

The limits of the rational choice theories, explored in Part III, opened the door to the consideration of an alternative, behavioral economics theory. I have argued that such a theory, by integrating psychology and economics, can explain the contractual design features observed in the subprime and Alt-A mortgage markets. But the two theoretical approaches – the neoclassical, rational choice approach and the behavioral approach – are not mutually exclusive. The rational choice theories explain the behavior of the more sophisticated borrowers and the market's response, specifically the contractual design response, to the demand generated by these borrowers. And the behavioral economics theory explains the demand generated by less sophisticated borrowers and how lenders designed their contracts in response to this demand.

In a companion piece, co-authored with Sumit Agarwal, Gene Armomin, Zahi Ben-David and Sewin Chen, I investigate empirically the relative importance of the rational choice theory and the behavioral economics theory in explaining the contractual design of subprime and Alt-A mortgage contracts. Pending the results of this ongoing study, the relative domain of the two competing theoretical approaches can be indirectly assessed using evidence on the cognitive abilities of borrowers. Available evidence suggests that

¹⁶⁵ See Brian Buck and Karen Pence, *Do Homeowners Know Their House Values and Mortgage Terms?* 2 (Fed. Reserve Bd. Working Paper, 2006) (ARM borrowers "appear to underestimate the amount ... their interest rates can change.")

¹⁶⁶ A series of recent papers in industrial organization argue that firms introduce spurious complexity into tariff structures, and by doing so inhibit competition and reduce welfare. *See, e.g.*, Ran Spiegler, *Competition over Agents with Boundedly Rational Expectations*, 1 THEORETICAL ECONOMICS 207 (2006); Glenn Ellison, *A Model of Add-On Pricing*, 120 QUAR. J. ECON. 585 (2005); Glenn Ellison & Sara Fisher Ellison, *Search, Obfuscation, and Price Elasticities on the Internet* (MIT and NBER, Discussion Paper, 2004); Xavier Gabaix & David Laibson, *Shrouded Attributes, Consumer Myopia, and Information Suppression in Competitive Markets*, 121 QUAR. J. ECON. 505 (2006).

imperfect rationality is pervasive in the residential mortgage market and especially in the subprime market.¹⁶⁷ A recent study, by Sumit Agarwal, Gene Amromin, Itzhak Ben-David, Souphala Chomsisengphet and Douglas Evanoff, found that mandated financial counseling is correlated with less risky ARM contracts, specifically with higher short-term teaser rates and lower long-term rates.¹⁶⁸ These counseling sessions likely respond not only to an information deficit among borrowers, but also to a cognitive deficit.

Survey studies and consumer testing conducted by the FRB and the FTC found that borrowers do not understand mortgage terms.¹⁶⁹ Also, the FTC, in testing the efficacy of proposed disclosures, identified substantial framing effects: different disclosure forms containing the same information led to different choices – a result that would not be expected if borrowers were perfectly rational.¹⁷⁰

Other studies have documented specific mistakes that borrowers consistently make. A recent study by Sumit Agarwal, John Driscoll, Xavier Gabaix and David Laibson identified persistent mistakes in loan applications that increased the APR by an average of 125 basis points.¹⁷¹ Another study, by Susan Woodward, identified systemic mistakes leading to excessive broker fees of up to \$1,500.¹⁷² And numerous studies have documented borrowers' failure to make optimal refinancing decisions: Many consumers fail to exercise options to refinance their mortgages, and thereby end up with rates that

¹⁶⁷ See Howard Lax et al., *Subprime Lending: An Investigation of Economic Efficiency*, 15 Housing Pol'y Debate 533, 544-546 (2004) (subprime borrowers tend to be less well-educated and less sophisticated about the mortgage market.)

¹⁶⁸ Sumit Agarwal, et al, *The Effects of Mandated Financial Counseling on Household Mortgage Decisions: Evidence from a Natural Experiment*, Fisher College of Business Working Paper No. 2008-03-019, p. 24 (2008) (available at SSRN: <http://ssrn.com/abstract=1285603>). This study also finds that the mandated financial counseling led to a decline in the demand for credit. Id. See also Annamaria Lusardi, *Household Saving Behavior: The Role of Literacy, Information and Financial Education Programs*, written for the conference "Implications of Behavioral Economics for Economic Policy" held at the Federal Reserve Bank of Boston on September 27-28, 2007 (arguing that households enter into risky financial contracts due to lack of financial education); ROBERT SHILLER, *THE SUBPRIME SOLUTION: HOW TODAY'S GLOBAL FINANCIAL CRISIS HAPPENED AND WHAT TO DO ABOUT IT* (2008) (same).

¹⁶⁹ Buck and Pence, *supra* note 165; Lacko and Pappalardo, *supra* note 98 (showing that many borrowers do not understand mortgage terms and demonstrating the limits of mortgage disclosures; specifically, the FTC found that many borrowers "did not understand important costs and terms of their own recently obtained mortgages. Many had loans that were significantly more costly than they believed, or contained significant restrictions, such as prepayment penalties, of which they were unaware."); GAO, AMP Report, *supra* note 42, at 2, 50-51 ("Because AMPs are complex products and advertising and mortgage disclosures may not completely or effectively explain their terms and risks, regulatory officials and others believe that some borrowers may not fully understand the risks of AMPs."; "As lenders and brokers increasingly market AMPs to a wider spectrum of borrowers, more borrowers may struggle to fully understand the terms and risks of these products.")

¹⁷⁰ See J. M. LACKO & J. K. PAPPALARDO, BUREAU OF ECON., FED. TRADE COMM'N, *THE EFFECT OF MORTGAGE BROKER COMPENSATION DISCLOSURES ON CONSUMERS AND COMPETITION: A CONTROLLED EXPERIMENT ES-7* (2004).

¹⁷¹ See Sumit Agarwal, John C. Driscoll, Xavier Gabaix, & David Laibson, *The Age of Reason: Financial Decisions over the Lifecycle*, 11-13 (MIT Dep't of Econ., Working Paper No. 07-11, 2007) (available at <http://ssrn.com/abstract=973790>) [hereinafter Agarwal et al, *The Age of Reason*].

¹⁷² See Susan Woodward, *Consumer Confusion in the Mortgage Market*, Sand Hill Econometrics, Working Paper (2003) (available at www.sandhillecon.com/pdf/consumer_confusion.pdf) (cited in John Y. Campbell, *Household Finance*, 61 J. FIN. 1553, 1589 (2006)).

are substantially higher than the market rate. Other consumers refinance too early, failing to account for the possibility that interest rates will continue to decline.¹⁷³ According to one estimate, these refinancing mistakes can cost borrowers tens of thousands of dollars or up to 25% of the loan's value.¹⁷⁴

Evidence of rapid defaults, within 6 to 12 months of origination,¹⁷⁵ provides further support to the behavioral economics theory. At least some of these early defaulters "received loans that they either did not understand or were unqualified to repay and therefore were unable to pay for any appreciable length of time."¹⁷⁶ And, evidence that loan prices are affected by factors unrelated to the risk of non-payment provide indirect evidence of borrower mistakes: Both data and testimony by loan officers suggest that many borrowers who would qualify for prime loans ended up with higher-priced subprime mortgages – an indication of systematic mistakes.¹⁷⁷ Evidence that borrowers

¹⁷³ See Agarwal et al., *Optimal Mortgage Refinancing*, *supra* note 113, at 3 (surveying evidence that borrowers fail to make optimal refinancing decisions); LaCour-Little, *Prepayment Penalties*, *supra* note 95 (describing the "apparent irrationality on the part of mortgage borrowers, who fail to default to the extent predicted when house prices fall and fail to prepay to the extent predicted when interest rates fall."); Campbell, *supra* note 171, at 1579, 1581, 1590. See also Robert Van Order et al, *The Performance of Low Income and Minority Mortgages* (Ross School of Business, Paper 1083, 2007, available at <http://ssrn.com/abstract=1003444>). Similar mistakes have been identified in the UK. See Campbell, *supra* note 171, at 1588; David Miles, *The U.K. Mortgage Market: Taking a Longer-Term View, Interim Report: Information, Incentives, and Pricing* (HM Treasury, London, 2003) (cited in Campbell, *supra* note 171, at 1588). Others have argued that apparently irrational refinancing patterns can be explained within a rational choice framework that allows for heterogeneous transaction costs and accounts for relocation and liquidity motives. See Richard Stanton, *Rational Prepayment and the Valuation of Mortgage-Backed Securities*, 8(3) REVIEW OF FINANCIAL STUDIES 677, 681, 706 (1995) (arguing that heterogeneous transaction costs and exogenous factors such as divorce and sudden unemployment can explain seemingly irrational refinancing behavior); Michael LaCour-Little, *Another Look at the Role of Borrower Characteristics in Predicting Mortgage Prepayments*, 10(1) JOURNAL OF HOUSING RESEARCH 45, 47 (1999) (emphasizing the role of transaction costs, and relocation and liquidity motives). The problem of deriving the optimal time for prepayment is a complex one, and it can only be solved numerically with the help of high-powered computers. Recently, Agarwal et al. have shown that the optimal prepayment decision can be approximated using an implementable formula. See Agarwal et al., *Optimal Mortgage Refinancing*, *supra* note 113, at 5.

¹⁷⁴ See Agarwal et al, *Optimal Mortgage Refinancing*, *supra* note 113, at 25, 28 ("[M]arket data... shows that many households did refinance too close to the NPV break-even rule during the last 15 years"; Following the NPV rule, instead of the optimal refinancing rule, leads to substantial expected losses: \$26,479 on a \$100,000 mortgage, \$49,066 on a \$250,000 mortgage, \$86,955 on a \$500,000 mortgage, \$163,235 on a \$1,000,000 mortgage.)

¹⁷⁵ See Mayer et al, *supra* note 32 (2 percent for loans originated in 2006:Q1 and 4 percent for loans originated in 2007:Q1 defaulted within 6 months of origination; 10 percent for loans originated in 2006:Q1 and 15 percent for loans originated in 2007:Q1 defaulted within 12 months of origination).

¹⁷⁶ See Mayer et al, *supra* note 32. Other early defaulters were rational speculators, who stopped paying when house prices stopped rising. *Id.*

¹⁷⁷ See Lew Sichelman, *Community Group Claims CitiFinancial Still Predatory*, ORIGINATION NEWS, Jan. 2002, at 25 (In 2002, researchers at Citibank concluded that at least 40 percent of those who were sold high interest rate, subprime mortgages would have qualified for prime-rate loans.); James H. Carr & Lopa Kolluri, *Predatory Lending: An Overview*, in FINANCIAL SERVICES IN DISTRESSED COMMUNITIES: ISSUES AND ANSWERS 31, 37 (Fannie Mae Found. ed., 2001) (Freddie Mac and Fannie Mae estimate that between 35% and 50% of borrowers in the subprime market could qualify for prime market loans). See also Willis, *supra* note 4, at 730; Morgenson, *supra* note 92 (In December 2006, in an agreement with the NY State

who consider two or more price dimensions when shopping for a loan end up paying more for the loan than borrowers who consider only a single price dimension¹⁷⁸ provides further support for the behavioral explanation.

It seems that few people dispute the fact that at least some borrowers did not enter into their subprime mortgage contracts with a full understanding of the costs and benefits associated with these contracts. The Federal Reserve, in justifying its new mortgage regulations, referred to borrowers who “unwittingly accept[ed] loans” with terms that they did not fully understand.¹⁷⁹ And the Congressional Budget Office concluded that “[t]he rise in defaults of subprime mortgages may also reflect the fact that some borrowers lacked a complete understanding of the complex terms of their mortgages and assumed mortgages that they would have trouble repaying.”¹⁸⁰

A clarification is on order. In theory, an incomplete understanding of complex contracts is consistent with rational choice theory. Facing a complex mortgage contract, a rational borrower would have to spend time reading the contract and deciphering its meaning. If the cost of attaining perfect information and perfect understanding of the contract is large, the rational borrower would stop short of this theoretical ideal. In fact, imperfect rationality can be viewed as yet another cost of attaining more information and better understanding. When this cost component is added, the total cost of becoming informed goes up and thus the borrower will end up with less information and a less complete understanding of the contract. The observed levels of misunderstanding suggest that many borrowers were incurring this added cost of imperfect rationality.¹⁸¹

But imperfect rationality is not simply another cost component. A rational borrower, who decides not to invest in reading and deciphering certain contractual provisions in the mortgage contract, will not assume that these provisions are favorable to her. In fact, she will recognize that unread provisions will generally be pro-lender. In contrast, an imperfectly rational borrower will completely ignore the unread or forgotten terms or naively assume that they are favorable to him. Accordingly, a complex, unread term or a hidden fee would lead an imperfectly rational borrower, but not a rational borrower, to underestimate the total cost of the loan. And, as a result, the incentive to increase

Attorney General, Countrywide agreed “to compensate black and Latino borrowers to whom it had improperly given high-cost loans in 2004.”)

¹⁷⁸ SUSAN WOODWARD, CONSUMER CONFUSION IN THE MORTGAGE MARKET 2 (2003), available at http://www.sandhillecon.com/pdf/consumer_confusion.pdf.

¹⁷⁹ See FRB Rule, *supra* note 6, at 44,525-26 (“Consumers who do not fully understand such terms and features, however, are less able to appreciate their risks, which can be significant. For example, the payment may increase sharply and a prepayment penalty may hinder the consumer from refinancing to avoid the payment increase. Thus, consumers may unwittingly accept loans that they will have difficulty repaying.”).

¹⁸⁰ See CBO Testimony, *supra* note 1. (“The rise in defaults of subprime mortgages may also reflect the fact that some borrowers lacked a complete understanding of the complex terms of their mortgages and assumed mortgages that they would have trouble repaying.”) See also GAO Consumer Protection Report, *supra* note 16, at 14 (describing borrowers “who lack sophistication about financial matters, are not highly educated, or suffer physical or mental infirmities.”)

¹⁸¹ See, e.g., Buck and Pence, *supra* note 165 (finding that many borrowers don’t even know that they have an ARM, rather than a FRM).

complexity and hide fees will be stronger in a market with imperfectly rational borrowers. The behavioral theory of contract design is an imperfect rationality theory, not an imperfect information theory.¹⁸²

D. Market Correction

Individuals are imperfectly informed and imperfectly rational. Yet most markets work reasonably well despite these imperfections. Several market correction mechanisms operate to minimize the effects of imperfect information and imperfect rationality. These correction forces are present also in the subprime and Alt-A mortgage markets. But, as I elaborate below, they are weaker in these markets. For this reason, borrower mistakes persisted in the subprime and Alt-A markets for a prolonged period of time, and the desirable changes that we are now seeing in lending practices began only after the subprime market collapsed.

1. On the Demand Side: Learning by Borrowers

Individuals make mistakes.¹⁸³ But individuals also learn from their mistakes, and learn not to repeat these mistakes. While learning is not absent from the mortgage market, it is slower. The reason is that the mortgage contracts that individuals sign over a lifetime are few and far apart.¹⁸⁴ Interpersonal learning can compensate for limited intrapersonal learning, as borrowers share mortgage-related experiences. But interpersonal learning is not always common enough and detailed enough to eliminate mistakes. More generally, the evidence shows that learning about financial decisions is incomplete.¹⁸⁵

¹⁸² Cf. Philip Bond et al., *Predatory Mortgage Lending*, FRB of Philadelphia Working Paper No. 08-24, p. 3 (2008) (available at <http://ssrn.com/abstract=1288094>) (demonstrating that “a realistic information asymmetry between borrowers and lenders is enough to generate predation [i.e., predatory mortgage lending] and can explain (at least qualitatively) when and where it occurs.”)

¹⁸³ Not all individuals make mistakes. In theory, even a minority of informed, sophisticated borrowers will induce sellers to offer welfare-maximizing products and contracts. See Alan Schwartz & Louis L. Wilde, *Intervening in Markets on the Basis of Imperfect Information: A Legal and Economic Analysis*, 127 U. PENN. L. REV. 630 (1979); Alan Schwartz & Louis L. Wilde, *Imperfect Information in Markets for Contract Terms: The Examples of Warranties and Security Interests*, 69 VA. L. REV. 1387 (1983); Alan Schwartz & Louis L. Wilde, *Product Quality and Imperfect Information*, 52 REV. ECON. STUD. 251, 251-52 (1985). The informed minority argument has only limited relevance in the subprime mortgage market where lenders can segment the market, offering different contracts to sophisticated and less-sophisticated borrowers. See Bar-Gill & Warren, *supra* note 17; Eskridge, *supra* note 23, at 1141-1143.

¹⁸⁴ See also Benartzi Schlomo & Richard Thaler, *Heuristics and Biases in Retirement Savings Behavior*, JOURNAL OF ECON. PERSPECTIVES, (forthcoming, available at <http://ssrn.com/abstract=958585>); FRB Proposed Rule, *supra* note 52, at 1675-76 (“Disclosures themselves, likely cannot provide this minimum understanding for transactions that are complex and that consumers engage in infrequently.”)

¹⁸⁵ Experimental evidence suggests that while learning is generally effective in minimizing mistakes, biases in relatively abstract domains like math and finance are more resilient. See Keith Stanovich, *The Fundamental Computational Biases of Human Cognition: Heuristics that (Sometimes) Impair Decision-Making and Problem Solving*, in THE PSYCHOLOGY OF PROBLEM SOLVING 291 (J.E. Davidson & R.J. Steinberg, eds., 2003); HEURISTICS AND BIASES: THE PSYCHOLOGY OF INTUITIVE JUDGMENT (Thomas Gilovich, Dale Griffin, & Daniel Kahneman, eds., 2002)). See also Agarwal et al., *The Age of Reason*, *supra* note 170; Victor Stango and Jonathan Zinman, *Exponential Growth Bias and Household Finance*, J. OF FIN (forthcoming) (documenting the “exponential growth biases,” which lead borrowers to underestimate both borrowing costs and returns to savings); Sumit Agarwal, Souphala Chomsisengphet,

In many markets effective learning occurs when individuals, aware of their limitations, seek expert advice. This mechanism also works imperfectly in the mortgage market. Borrowers commonly seek the advice of mortgage brokers who face an incentive structure that prevents them from being loyal agents of the borrower.¹⁸⁶ Moreover, the complexity of the subprime mortgage contract is such that even so-called experts often get it wrong. For example, a recent study by Sumit Agarwal, John C. Driscoll, and David Laibson has shown that available expert advice on refinancing ignores the option value of postponing the prepayment decision – an omission that can cost borrowers up to 25 percent of loan value.¹⁸⁷

2. On the Supply Side: Mistake Correction by Sellers and Reputation Effects

Competing sellers will often have an incentive to correct consumer mistakes, e.g., through advertising.¹⁸⁸ While these incentives are not always sufficient in competitive markets, they are even weaker in imperfectly competitive markets.¹⁸⁹ As explained above, ineffective shopping by borrowers inhibits competition in the subprime mortgage market.¹⁹⁰ In many markets seller reputation provides a powerful defense against the abuse of consumers. But, again, reputational forces are weaker in the subprime mortgage market. First, there is little repeat business, as a single borrower takes few mortgage loans and a relatively long time passes between loans. Second, lenders are relatively short-lived.¹⁹¹ A downside of the securitization innovation was the opening of the market to fly-by-night originators that had little reputation to lose and insufficient incentives to build a reputation.¹⁹²

Chunlin Liu & Nicholas Souleles, *Do Consumers Choose the Right Credit Contracts?* (Federal Reserve Bank of Chicago, Working Paper No. 2006-119, 2006).

¹⁸⁶ In the real estate brokerage market, there has been a recent shift, aided by legal changes, from seller agency to buyer agency. See Ronald Benton Brown, Joseph M. Grohman, and Manuel R. Valcarcel, *Real Estate Brokerage: Recent Changes in Relationships and a Proposed Cure*, 29 Creighton L. Rev. 29 (1995) (describing this shift); Christopher Curran and Joel Schrag, *Does It Matter Whom An Agent Serves? Evidence from Recent Changes in Real Estate Agency Law*, 43 J. L. & Econ. 265, 265-271 (describing the evolution and effects of a market for buyers' agents in Atlanta, following a 1994 change in Georgia's real-estate law). This shift could have a positive effect on the mortgage market as well.

¹⁸⁷ See Agarwal et al, *Optimal Mortgage Refinancing*, *supra* note 113, at 24-25 (“Most of the advice boils down to the following necessary condition for refinancing—only refinance if you can recoup the closing costs of refinancing in reduced interest payments.... None of the 15 books and 10 web sites in our sample discuss (or quantitatively analyze) the value of waiting due to the possibility that interest rates might continue to decline.”); Cf. Michael Haigh & Jonathan List, *Do Professional Traders Exhibit Myopic Loss Aversion? An Experimental Analysis*, LX(1) J. OF FIN. 523 (Feb. 2005) (documenting biased decisions by financial professionals despite ample opportunities for learning).

¹⁸⁸ See Bar-Gill, *Consumer Contracts*, *supra* note 17, at 758-761.

¹⁸⁹ *Id.*

¹⁹⁰ See *supra* Part I.

¹⁹¹ As evidenced by the number of loan originators that have gone out of business during the recent crisis. See Worth Civils & Mark Gongloff, *Subprime Shakeout*, WALL ST. J. ONLINE, <http://online.wsj.com/public/resources/documents/info-subprimeloans0706-sort.html> (listing 80 loan originators that closed or filed for bankruptcy between November 2006 and September 2007).

¹⁹² See Engel and McCoy, *supra* note 46, at 2041 (“[S]ecuritization funds small, thinly capitalized lenders and brokers, thus allowing them to enter the subprime market. These originators are more prone to commit loan abuses because they are less heavily regulated, have reduced reputational risk, and operate with low

V. WELFARE IMPLICATIONS

What are the costs of the identified contractual designs, especially when understood as a response to borrowers' imperfect rationality? First, complex, multidimensional contracts hinder competition in the subprime mortgage market. Second, complex and deferred-cost contracts distort the remaining, weakened forces of competition, leading to excessively high prices on more salient price dimensions and excessively low prices on less salient price dimensions. Third, these contractual design features increase the likelihood of default and foreclosure, with all the ensuing costs—to borrowers, lenders, communities and the economy at large. Fourth, the identified contractual designs raise distributional concerns, as they impose disproportionate burdens on weaker, often minority borrowers. I address these welfare costs in turn.

A. Hindered Competition

Perhaps the largest cost associated with excessively complex contracts comes from the inhibited competition that they foster.¹⁹³ As described above, complexity prevents the effective comparison shopping that is necessary for vigorous competition. The market power gained by lenders clearly helps lenders at the expense of borrower. But the limited competition also imposes a welfare cost in the form of allocative inefficiency: borrowers are not matched with the most-efficient lender.

The limits of competition in the subprime mortgage market are reflected in evidence of above-cost pricing. In particular, borrowers are paying excessive origination fees – origination fees that exceed the actual costs that these fees allegedly cover by hundreds, or even thousands, of dollars.¹⁹⁴ Borrowers are also paying excessive interest rates, i.e.,

capital, helping to make them judgment-proof.”) So, while securitization reduces entry barriers and thus enhances competition, it is not clear that this enhanced competition is welfare-enhancing.

¹⁹³ See Paulson, *supra* note 2 (“Homebuyers today have more choices than ever before in finding a mortgage that best suits their circumstances. Yet, comparing the attractiveness of one mortgage product to another can be difficult.”); Zywicki and Adamson, *supra* note 10, at 62-63 (Standardization and transparency provide for easy comparison shopping and foster competition in the prime market. Not so in the subprime market, where lack of standardization and complexity impede upon comparison shopping and hinder competition.); Willis, *supra* note 4, at 726 (describing the increased complexity of mortgage products, and arguing that borrowers face a “bewildering array” of home loan product) (citing Jinkook Lee & Jeanne M. Hogarth, *The Price of Money: Consumers' Understanding of APRs and Contract Interest Rates*, 18 J. PUB. POL'Y & MARKETING 66, 67 (1999)); Engel and McCoy, *supra* note 46, at 2080; Susan Block-Lieb & Edward Janger, 84 TEX. L. REV. 1481, 1530, 1539-40 (2006). Since borrowers cannot value the different loan options, they are susceptible to skewed advertising, which selectively emphasizes certain dimensions of the loan contract. See FTC Comment, *supra* note 63 at 3-4 (description of FTC enforcement actions, taken when lenders' and brokers' advertisements and oral sales pitches were inconsistent with the offered contracts). The success of such advertising proves the imperfect information and/or imperfect rationality of borrowers.

¹⁹⁴ See Susan Woodward, *A Study of Closing Costs for FHS Mortgages* (Urban Institute 2008) (finding that complexity and multidimensionality of origination fees prevent effective shopping, hinder competition and lead to inflated prices; the Woodward study analyzes more than 7500 unsubsidized FHA 30-year fixed-rate home purchase loans with a 7 percent coupon rate closed in may and June of 2001 (not the typical subprime

interest rates that are higher than what the borrower's risk profile justifies.¹⁹⁵ The most extreme case is that of borrowers that would qualify for lower-cost conventional loans, but are nonetheless obtaining high-cost subprime mortgages.¹⁹⁶ It is the higher profit margin in the subprime market that induced lenders to steer borrowers into subprime loans.¹⁹⁷ This problem was explicitly recognized by the FRB: "[A]n atmosphere of relaxed standards may increase the incidence of abusive lending practices by attracting less scrupulous originators into the market, while at the same time bringing more

loans, but loans than often target similarly higher-risk borrowers)); According to the Department of Housing and Urban Development, See HUD News Release 08-033, March 14, 2008 (available at <http://www.hud.gov/news/release.cfm?content=pr08-033.cfm>) (estimating that borrowers are paying excess fees averaging \$700 per mortgage, and that these excess fees can be eliminated by improved disclosure that would enhance competition).

¹⁹⁵ See Howard Lax, Michael Manti, Paul Recia, & Peter Zorn, *Subprime Lending: An Investigation of Economic Efficiency*, 15(3) HOUSING POLICY DEBATE 533 (2000) (Subprime interest rates cannot be justified by risk); Engel and McCoy, *supra* note 46 at 2058; Stein, *supra* note 92 (estimating the cost to borrowers of excess interest at \$2.9 billion).

¹⁹⁶ See Press Release, Fannie Mae 4 (Mar. 2, 2000) (on file with author) (up to half of subprime borrowers would qualify for lower cost conventional loans); Freddie Mac, *Special Report on Automated Underwriting*, ch. 5 (Sep. 1996), <http://www.freddiemac.com/corporate/reports/moseley/chap5.htm> (10-35 percent of subprime borrowers would qualify for lower cost conventional loans); Freddie Mac, *Half of Subprime Loans Categorized as 'A' Quality*, INSIDE B&C LENDING (June 10, 1996) (a poll of 50 subprime lenders who estimate that half could have qualified for prime loans); Engel and McCoy, *supra* note 46, at 2058, fn.92; Bar-Gill & Warren, *supra* note 17; Brooks & Simon, *supra* note 137 ("The analysis also raises pointed questions about the practices of major mortgage lenders. Many borrowers whose credit scores might have qualified them for more conventional loans say they were pushed into risky subprime loans. They say lenders or brokers aggressively marketed the loans, offering easier and faster approvals -- and playing down or hiding the onerous price paid over the long haul in higher interest rates or stricter repayment terms.... The subprime sales pitch sometimes was fueled with faxes and emails from lenders to brokers touting easier qualification for borrowers and attractive payouts for mortgage brokers who brought in business. One of the biggest weapons: a compensation structure that rewarded brokers for persuading borrowers to take a loan with an interest rate higher than the borrower might have qualified for."); See Morgenson, *supra* note 92 ("On its way to becoming the nation's largest mortgage lender, the Countrywide Financial Corporation encouraged its sales force to court customers over the telephone with a seductive pitch that seldom varied. 'I want to be sure you are getting the best loan possible,' the sales representatives would say. But providing 'the best loan possible' to customers wasn't always the bank's main goal, say some former employees.... Countrywide's entire operation, from its computer system to its incentive pay structure and financing arrangements, is intended to wring maximum profits out of the mortgage lending boom no matter what it costs borrowers, according to interviews with former employees and brokers who worked in different units of the company and internal documents they provided. One document, for instance, shows that until last September the computer system in the company's subprime unit excluded borrowers' cash reserves, which had the effect of steering them away from lower-cost loans to those that were more expensive to homeowners and more profitable to Countrywide.")

¹⁹⁷ See Morgenson, *supra* note 92 (Internal Countrywide documents and testimonies of former employees reveal larger profit margins on subprime as compared to prime loans, and especially large margins on loans with high prepayment penalties and high go-to rates. As a result commission structure rewarded brokers and sales representatives who sold subprime loans (including to borrowers who qualified for Alt-A loans), loans with higher and longer prepayment penalties and loans with higher go-to rates.) The alternative hypothesis that the relative increase in subprime loans reflects an increase in borrower risk is rejected by the evidence. See LaCour-Little, *Economic Factors*, *supra* note 30, at 14 (showing empirically, through assessment of the two most common risk indicators—the FICO score and LTV—that borrower risk remained relatively stable).

vulnerable borrowers into the market. These abuses can lead consumers to pay more for their loans than their risk profiles warrant.”¹⁹⁸

B. Distorted Competition

Limited competition allows lenders to set above-cost prices and reap supra-competitive profits. But even if borrowers engaged in vigorous shopping, eliminating all supra-competitive profits, still there would be a welfare cost. The reason is that borrowers’ shopping, while vigorous, would be misguided. Consider again the stylized example of a mortgage contract with a two-dimensional price: a short-term introductory rate, P_{ST} , and a long-term rate, P_{LT} .¹⁹⁹ The two prices affect the two decisions a borrower must make: whether to get out of the loan at the end of the introductory period and whether to take the loan in the first place. An optimal contract will set the two prices to induce efficient decisions. If borrowers are rational, competition will produce the optimal contract. Not so if borrowers are imperfectly rational. In particular, I have shown that if borrowers underestimate the costs associated with the long-term rate, P_{LT} , competition will focus on the short-term rate, P_{ST} , resulting in an inefficient contract with an excessively low P_{ST} and an excessively high P_{LT} .²⁰⁰

There are two adverse welfare implications. First, the excessively high P_{LT} will inefficiently lead some borrowers to exit at the end of the introductory period. Second, and more important, the initial decision to take a loan will be distorted. While the actual total payments, $P_{ST}+P_{LT}$, will go up, to cover the increased cost generated by the inefficient contractual design, the total payments as perceived by the borrower will go down.²⁰¹ The result is excessive borrowing (and excessive home purchases).²⁰²

This analysis applies to all the examples of cost deferral discussed above: small downpayments and high LTVs, escalating payments, and prepayment penalties.²⁰³ The analysis also applies to the complexity examples, where one, or more, less salient or indirectly specified price dimensions are ignored or underestimated. (P_{LT} corresponds to the less salient, underestimated price dimension, and P_{ST} corresponds to the more salient price dimension.) In all of these cases, imperfect rationality results in price distortions, and these price distortions increase total costs and total payments, and skew both long-term and short-term decisions. Most importantly, these distortions, while increasing the

¹⁹⁸ FRB Proposed Rule, *supra* note 52, at 1675.

¹⁹⁹ See *supra* Section IV.A.

²⁰⁰ See *supra* Section IV.A.

²⁰¹ See *supra* Section IV.A.

²⁰² Excessive borrowing would result even absent a contractual design response, i.e., even under the optimal contract. The welfare cost is exacerbated by the contractual design response.

²⁰³ Focusing on prepayment penalties, several studies found empirical evidence for one of the welfare costs associated with distorted competition. See LaCour-Little, *Prepayment Penalties*, *supra* note 95 (finding that for the common 2/28 ARM “the total interest rate savings is significantly less than the amount of the expected prepayment penalty.”); Engel and McCoy, *supra* note 46, at 2060 (reviewing studies that found a positive correlation between prepayment penalties and *higher* interest rates).

actual cost, reduce the perceived cost of the loan and thus lead to an artificially inflated demand for mortgage financing,

C. Delinquency and Foreclosure

There is evidence that the identified contractual design features increase delinquency and foreclosure rates.²⁰⁴ Deferred-cost contracts are associated with higher rates of delinquency and foreclosure. Specifically, increased delinquency and foreclosure rates have been linked to high LTVs,²⁰⁵ escalating payments,²⁰⁶ and prepayment penalties.²⁰⁷

²⁰⁴ See, generally, EDWARD GRAMLICH, *SUBPRIME MORTGAGES: AMERICA'S LATEST BOOM AND BUST*, 66-67 (Urban Institute 2007) (arguing, based on Schloemer et al. 2006, that mortgage contract design is linked to borrower distress).

²⁰⁵ See *Subprime Outcomes*, *supra* note 28, at 4 (“Subprime lenders created a group of borrowers that were much more likely to default for at least two reasons. First, while they did not invent zero-equity borrowing, they did allow a much larger fraction of borrowers to start homeownership with no cushion against negative HPA [i.e., House Price Appreciation]. Second, subprime lenders allowed borrowers with a history of cash flow problems and with monthly payments that exceeded fifty percent of current income to enter homeownership. Under the best of circumstances, subprime borrowers are at least five times as likely to become delinquent as prime borrowers.”)

²⁰⁶ See Demyanyk and Van Hemert, *supra* note 1, at Table 3 (finding positive coefficients on ARM (vs. FRM), Hybrid (vs. FRM) in regressions that try to explain default and foreclosure rates). All types of mortgages originated in 2006 performed badly in terms of delinquency and foreclosure rates, not only the non-standard ARMs. But ARMs performed worse (and many ARMs are non-standard). See *Id.* at Figure 4. See also Mayer et al, *supra* note 32, circa figs. 3A, 3B (“[D]elinquencies have been particularly pronounced for variable-rate loans, a category that includes...hybrids.”; “The serious delinquency rate on variable-rate subprime mortgages rose from around 5.5 percent in mid-2005 to over 25 percent in February 2008.”; “[S]erious delinquency rate on variable-rate Alt-A mortgages increased from less than 0.5 percent in the middle of 2005 to nearly 9 percent by February 2008.”; “Delinquency rates on fixed-rate mortgages [both subprime and Alt-A], while higher than their mid-2005 levels, have not increased nearly as much (Figure 3B).”); Bernanke 3/4/08 Speech, *supra* note 74 (“The worst payment problems have been among subprime adjustable-rate mortgages.” Over 20 percent of subprime ARMs were seriously delinquent (90 days or more past due or in foreclosure) at the end of 2007.); Bernanke 1/10/08 Speech, *supra* note 9 (“Ample evidence suggests that responsible nonprime lending can be beneficial and safe for the borrower as well as profitable for the lender. For example, even as delinquencies on subprime ARMs have soared, loss rates on subprime mortgages with fixed interest rates, though somewhat higher recently, remain in their historical range.”) The high default rates of ARMs, as compared to FRMs, may be due to the comparatively poor risk attributes, in terms of average FICO score and CLTV, of these loans. See Mayer et al, *supra* note 32 (“The exceptionally high default rates of subprime ARMs may well be due to the very poor risk attributes of these loans, with an average FICO score of only 612 and a mean CLTV of 89%. By contrast, subprime FRMs have considerably higher FICO scores (627) and much lower CLTVs (80%).”) In other words, poor underwriting standards are to blame. Contractual design facilitated lower underwriting standards, e.g., as ARMs enabled lenders to quality borrowers based on the low, initial rate.

²⁰⁷ See Demyanyk and Van Hemert, *supra* note 1, at Table 3 (finding positive coefficients on Prepayment Penalty in regressions that try to explain default and foreclosure rates); Roberto G. Quercia, Michael A. Stegman, & Walter R. Davis, *The Impact of Predatory Loan Terms on Subprime Foreclosures: The Special Case of Prepayment Penalties and Balloon Payments* (Center for Community Capitalism, Kenan Institute for Private Enterprise, University of North Carolina at Chapel Hill, 25, Jan. 25, 2005, available at <http://www.ccc.unc.edu/documents/foreclosurepaper.pdf>) (finding based on LP data that – Lengthy (3 years or more) prepayment penalties increase foreclosure risk by about 20 percent; ARMs have a 50 percent higher foreclosure risk than FRMs). Others argue that prepayment penalties affect default and foreclosure only indirectly by enabling the lower initial interest rates that qualify riskier borrowers. See Mayer et al, *supra* note 32, at 28 (“Prepayment penalties appear unrelated to the growth in defaults.... However, to the

The FRB, in motivating its new mortgage regulations, acknowledged that “several riskier loan attributes,” including “high loan-to-value ratio[s]” and “payment shock on adjustable-rate mortgages,” “increased the risk of serious delinquency and foreclosure for subprime loans originated in 2005 through early 2007.”²⁰⁸ A study based on data from 2004 through 2006 estimates that about 12 percent of subprime loans will end-up in foreclosure as a result of large resets (in escalating payments contracts), coupled with insufficient equity to enable sale or refinance (due to high LTVs).²⁰⁹ The continuing deterioration in the housing and credit markets since December 2006, suggests that the 12 percent figure could well be an underestimate.²¹⁰

The welfare costs associated with foreclosure are substantial. The FRB Chairman, Ben Bernanke, estimated that, on average, total losses from foreclosure “exceeded 50 percent of the principal balance, with legal, sales, and maintenance expenses alone amounting to more than 10 percent of the principal.”²¹¹ An industry study that assumes foreclosure losses equal to 37.5 percent of a loan’s value, estimates total subprime foreclosure losses on loans originated between 2004 and 2006 at nearly \$29 billion.²¹² Substituting Bernanke’s 50 percent figure for the 37.5 percent assumption, the foreclosure losses estimate increases to \$38.7 billion. Of these \$38.7 billion, the 10 percent, or \$7.7 billion, transactions costs – the “legal, sales, and maintenance expenses” that Bernanke referred to – are clear welfare costs.²¹³ The remainder is partly a welfare cost and partly a

extent that prepayment penalties allowed riskier borrowers to qualify for mortgages, they might have been an indirect contributor to higher defaults.”)

²⁰⁸ FRB Proposed Rule, *supra* note 52, at 1674.

²⁰⁹ See Cagan, *supra* note 24, at 70 (focusing on ARMs originated between 2004 and 2006). Cagan’s estimates are sensitive to projections about house prices and the index (LIBOR) that determines the magnitude of the reset. His 12 percent foreclosure estimate is based on house prices and the index level in Dec. 2006. *Id.* Specifically, lower market interest rates mitigate the negative impact of a loan reset, while lower house prices exacerbate the negative impact of a loan reset.

²¹⁰ While resets on escalating-payments contracts are commonly blamed for triggering default and foreclosure, the evidence supporting this allegation is not conclusive. But even studies that fail to identify substantial adverse effects of resets in the current data, anticipate such effects going forward. See Mayer et al, *supra* note 32, at 28 (“Even though we find no evidence to date supporting the view that mortgage rate resets or interest-only/negative-amortization features lead to mortgage delinquencies, this might not necessarily be the case going forward. In an environment of stagnant to falling house prices and tightened underwriting standards, households facing increased mortgage payments due to a mortgage rate resets or interest-only expirations will find prepayment more difficult, thereby increasing the ultimate chances of default.”); Sherlund, *supra* note 126 (“House price appreciation seems to be the primary determinant of default and prepayment behavior. Borrowers with subprime mortgages could prepay when house price appreciation was high (almost regardless of the initial credit quality of the loan), but the prepayment option disappeared once house price appreciation waned. Combined with new, stricter underwriting, this left many borrowers with subprime mortgages unable to prepay or sell. Many are then faced with the decision of default. With this in mind, mortgage rate resets could have an effect on defaults going forward, even though they have had only limited effects in the past. Prepayment is much more difficult for many borrowers, so their ability and willingness to face mortgage rate reset is now the primary issue. Fortunately, short-term rates have declined recently, so these borrowers are not currently facing drastically higher mortgage payments.”)

²¹¹ Bernanke 3/4/08 Speech, *supra* note 74.

²¹² Cagan, *supra* note 24, at 69-71.

²¹³ See Paul S. Calem & Michael LaCour-Little, *Risk-Based Capital Requirements for Mortgage Loans* (FEDS, Working Paper 2001-60, 2001) (it costs 10 percent of unpaid balance to dispose of the foreclosed property and foreclosure transaction costs amount to 5 percent of unpaid balance).

welfare-neutral transfer. The transfer component is the “foreclosure discount,” the difference between the market price and the price received for a foreclosed property.²¹⁴ This price discount, while a loss to the lender and borrower, is a benefit to the buyer of the foreclosed property. The welfare cost component is the social loss incurred when a property is left vacant – until the foreclosure sale and often even after the foreclosure sale. In a declining real estate market, these vacancy periods are quite long. Another category of welfare costs, not included in the preceding estimates, are the negative externalities that foreclosures impose on neighborhoods and cities.²¹⁵ The FRB noted that “[w]hen foreclosures are clustered, they can injure entire communities by reducing property values in surrounding areas.”²¹⁶ Finally, to the extent that foreclosures contributed to the real estate slump and to the credit crunch, staggering macroeconomic costs should also be considered.

Focusing on borrowers, delinquency and foreclosure imply substantial hardship.²¹⁷ First, borrowers will face higher rates for other credit transactions and reduced access to credit. Second, borrowers will lose some or all of their accumulated home equity if the lender forecloses.²¹⁸ Finally, the borrower will have to bear the transaction costs of relocating to another house or apartment. Delinquency and foreclosure also impose costs on lenders. In particular, if the net proceeds from the foreclosure sale are smaller than the

²¹⁴ See Cagan, *supra* note 24, at 70 (foreclosed properties sell at a discount of up to 30 percent).

²¹⁵ See Engel and McCoy, *supra* note 46, at 2042, FN 12; *Subprime Outcomes*, *supra* note 28, at 1, fn.1 (citing D. Immergluck & G. Smith, *The Impact of Single-family Mortgage Foreclosures on Neighborhood Crime*, 21(6) *Housing Studies* 851 (2006); Vicki Been, *External Effects of Concentrated Mortgage Foreclosures: Evidence from New York City*, Testimony before the Committee on Oversight and Government Reform, Subcommittee on Domestic Policy, May 21, 2008 (reporting that in New York properties adjacent to recent foreclosure filings sell at a 1-8 – 3.7 percent discount); W. Apgar & M. Duda, *Collateral Damage: The Municipal Impact of Today’s Mortgage Foreclosure Boom* (Report for the Homeownership Preservation Foundation, 2005, available at <http://www.hpfonline.org/press/Apgar-Duda%20Study%20Final.pdf>)); FAMILY HOUSING FUND, *COST EFFECTIVENESS OF MORTGAGE FORECLOSURE PREVENTION* (1998) (noting foreclosure costs of around \$7,000 for borrowers, \$2000 for lenders, and an additional \$15000-\$60,000 on third parties); CRL, *Subprime Spillover: Foreclosures Cost Neighbors \$208 Billion* (2008) (available at <http://www.responsiblelending.org/issues/mortgage/research/subprime-spillover.html>); Stein, *supra* note 92, at 11-13 (detailing externalities such as decline in neighboring property values and increased crime rates) (citing U.S. Department of the Treasury and U.S. Department of Housing and Urban Development, *Report on Recommendations to Curb Predatory Home Mortgage Lending* 25 (June 20, 2000)).

²¹⁶ FRB Rule, *supra* note 6, at 44,524.

²¹⁷ FRB Rule, *supra* note 6, at 44,524 (“The consequences of default are severe for homeowners, who face the possibility of foreclosure, the loss of accumulated home equity, higher rates for other credit transactions, and reduced access to credit.”)

²¹⁸ Consider a borrower with 20 percent equity in her home and a loan balance equal to 80 percent the market value of the home. If the net proceeds from the foreclosure sale – the discounted sale price minus the transaction costs – are less than 80 percent of the market value, the borrower will lose all the equity that she has accumulated. Only if the net proceeds exceed 80 percent of the market value, the borrower retains part, not all, of the equity that she has accumulated. CRL projects a total equity loss of \$164 billion, between 1998 and 2006, or approximately \$75,000 per-borrower (given the 2.2 million foreclosures that CRL projects). See Schloemer & Li, *supra* note 113, at 16, 44-45; Ellen Schloemer, Wei Li, Keith Ernst, and Kathleen Keest, *Losing Ground: Foreclosures in the Subprime Market and Their Cost to Homeowners*, Center for Responsible Lending, December 2006. These projections are conservative on some dimensions, but liberal on others; specifically the projections presume that total equity exceeds the cost of foreclosure, but for many borrowers this may not be the case.

outstanding loan balance, the lender will suffer a loss. Lenders partially compensated for this risk by increasing the interest rate.²¹⁹ But much risk was not priced. The sheer magnitude of the ex post losses – as reflected in the hundreds of billions of dollars in subprime-related write-offs by financial institutions²²⁰ – suggest that the risks were not fully accounted for ex ante.

In measuring the social cost of foreclosure it is important to distinguish between costs born by borrowers and lenders on the one hand and costs born by third parties – neighbors, neighborhoods and cities – on the other hand. Focusing on borrowers and lenders, to the extent that the transacting parties were rational the ex post cost of foreclosure represents a bad realization of a mutually beneficial ex ante gamble. Accordingly, we need to worry only about the imperfectly rational parties, who did not secure a positive ex ante value. Now consider the costs born by third parties. These costs – negative externalities imposed by the loan contract – translate into a social cost, even when both contracting parties are fully rational.

D. Distributional Concerns

Contractual design can also have distributional effects. While wealthy borrowers were not generally part of the subprime and Alt-A markets, there was still substantial heterogeneity in the wealth of subprime and Alt-A borrowers. Given the complexity of these contracts wealthier borrowers who could afford to seek out expert advice were likely to do better than borrowers who could not afford such advice.²²¹ Moreover, the inverse correlation between borrower wealth and contractual complexity – as wealthier borrowers generally got simpler prime loans and poorer borrowers generally got more complicated subprime or Alt-A loans – raises another distributional concern.

Distributional concerns are also raised by evidence that “subprime mortgages [were] concentrated in locations with high proportions of black and Hispanic residents, even controlling for the income and credit scores of these Zip codes.”²²² Disparities in financial sophistication and in the ability to comparison-shop effectively, if only because minority borrowers had fewer options to compare, led to substantial price variations.²²³

²¹⁹ See Demyanyk and Van Hemert, *supra* note 1 (finding that high loan-to-value borrowers increasingly became high-risk borrowers over the past 5 years, in terms of elevated delinquency and foreclosure rates, and that lenders were aware of this and adjusted mortgage rates accordingly over time).

²²⁰ Bethel, Ferrell and Hu, *supra* note 11, at tbl. 2 (summarizing the tens of billions of dollars worth of subprime-related write-offs by banks; citing an estimate of \$150 billion in writedowns as of February 2008, and a forecast that this amount will more than double); Standard and Poor’s, Subprime Write-Downs Could Reach \$285 Billion, But Are Likely Past The Halfway Mark, March 13, 2008 (<http://www2.standardandpoors.com/portal/site/sp/en/us/page.article/4,5,5,1,1204834027864.html>).

²²¹ See Bar-Gill & Warren, *supra* note 17.

²²² Mayer and Pence, *supra* note 143, at 13.

²²³ See Michael S. Barr, Sendhil Mullainathan, and Eldar Shafir, *Behaviorally Informed Home Mortgage Regulation*, in Belsky and Retsinas (eds.), *Understanding Consumer Credit* (2009) (“low-income and minority buyers are the least likely to shop for alternate financing arrangements.” [p. 11; page number from SSRN version]); Jeanne M. Hogarth & Jinkook Lee, *Consumer Information for Home Mortgages: Who, What, How Much, and What Else?*, 9 FIN. SERVICES REV. 277, 283 (2000) (same). More generally, subprime borrowers are less likely to search for the best loan terms. See Marsha J. Courchane et al.,

A recent study found that Black borrowers paid an additional \$415 in fees and Latino borrowers paid an additional \$365 in fees.²²⁴ Variations were also found in non-price terms. Specifically, “black homeowners are significantly more likely to have prepayment penalties or balloon payments attached to their mortgages than non-black homeowners, even after controlling for age, income, gender, and creditworthiness.”²²⁵

Gender disparities have also been identified. Women suffer from a relatively poorer understanding of credit terms and are less likely to shop for credit.²²⁶ These findings imply that women will get inferior mortgage products. Socio-economic status also plays a role. Borrowers with less income and education are less likely to know their mortgage terms, implying greater underestimation of deferred or hidden costs and a lesser ability to effectively shop for better terms.²²⁷ Indeed, there is evidence that better-educated borrowers received better terms on their loans.²²⁸

Subprime Borrowers: Mortgage Transition and Outcomes, 29 *J. Real Estate Fin. & Econ.* 365 (2004) (reporting findings from a survey study). See also Zywicki and Adamson, *supra* note 10, at 48.

²²⁴ Susan Woodward, *A Study of Closing Costs for FHS Mortgages* (Urban Institute 2008).

²²⁵ Barr, Michael S. , Dokko, Jane K. and Keys, Benjamin J., "Who Gets Lost in the Subprime Mortgage Fallout? Homeowners in Low- and Moderate-Income Neighborhoods" (2008) (available at SSRN: <http://ssrn.com/abstract=1121215>).

²²⁶ See John Leland, *Baltimore Finds Subprime Crisis Snags Women*, N.Y. TIMES, Jan. 15, 2008, at A1 (citing several studies including the following: ALLEN J. FISHBEIN & PATRICK WOODALL, WOMEN ARE PRIME TARGETS FOR SUBPRIME LENDING: WOMEN ARE DISPROPORTIONATELY REPRESENTED IN HIGH-COST MORTGAGE MARKET, CONSUMER FEDERATION OF AMERICA (Dec. 2006), <http://www.consumerfed.org/pdfs/WomenPrimeTargetsStudy120606.pdf> (finding that women are more likely to receive subprime mortgages than men, and finding that disparity between men and women increases as income rises); NATIONAL COMMUNITY REINVESTMENT COALITION, HOMEOWNERSHIP AND WEALTH BUILDING IMPEDED: CONTINUING LENDING DISPARITIES FOR MINORITIES AND EMERGING OBSTACLES FOR MIDDLE-INCOME AND FEMALE BORROWERS OF ALL RACES 12 (Apr. 2006), <http://www.opportunityagenda.org/atf/cf/%7B2ACB2581-1559-47D6-8973-70CD23C286CB%7D/Subprime%20Lending%20Report.pdf> (finding that women received 37 percent of high-cost home loans in 2005, compared with just 28 percent of prime loans); The Consumers Union, *Women in the Subprime Market* (Oct. 2002), <http://www.consumersunion.org/finance/women-rpt1002.htm> (last visited Mar. 15, 2008) (attributing some of the disparity both to the instability in women’s credit status that results from divorce or family medical emergency and to the fact that women have less wealth than men); PRUDENTIAL FINANCIAL, *FINANCIAL EXPERIENCE AND BEHAVIORS AMONGST WOMEN* (2006), http://www.prudential.com/media/managed/2006WomenBrochure_FINAL.pdf (finding that two-thirds of women graded themselves at C or lower in their knowledge of financial services or products)). See also Annamaria Lusardi and Olivia S. Mitchell, *Planning and Financial Literacy: How Do Women Fare?*, (NBER, Working Paper No. W13750, 2008) (finding that older women display much lower levels of financial literacy than the older population as a whole).

²²⁷ Bucks and Pence, *supra* note 165, at 2, 26.

²²⁸ See Thomas P. Boehm & Alan Schlottmann, *Mortgage Pricing Differentials Across Hispanic, African-American, and White Households: Evidence From the American Housing Survey*, 9 *CITYSCAPE: A JOURNAL OF POL. DEV. AND RESEARCH* 93, 105 (2007) (finding a negative correlation between education and interest rates); Susan Woodward, *A Study of Closing Costs for FHS Mortgages* (Urban Institute 2008) (finding that offers made by brokers to borrowers without a college education are \$1100 higher on average); Lusardi, Annamaria, "Financial Literacy: An Essential Tool for Informed Consumer Choice?" (June 2008). NBER Working Paper No. W14084 Available at SSRN: <http://ssrn.com/abstract=1149331> (citing Danna Moore (2003) who shows that borrower with low literacy are more likely to take up high cost mortgages). Individuals with low education, women, African-Americans, and Hispanics display particularly low levels of literacy. Lusardi, *supra*.

VI. POLICY IMPLICATIONS

I argued that borrowers' imperfect rationality explains several contractual design features in the subprime mortgage market. I have also argued that the imperfect rationality of borrowers, especially when coupled with contracts designed in response to such imperfect rationality, produces substantial welfare costs. Since market forces have proven to be too slow to respond to these problems, legal intervention should be considered.²²⁹ I focus on disclosure regulation. I do so not because better disclosure can cure all the ills of the mortgage market but because disclosure regulation is the right place to start. First, optimally-designed disclosure, while not a perfect fix, can make a big difference.²³⁰ Second, disclosure can help less sophisticated borrowers without significantly restricting the choices available to more sophisticated borrowers.²³¹ Third, as a practical matter, disclosure has proven to be the most politically feasible form of regulation in consumer credit markets.²³²

A. The Great Promise of the APR Disclosure

Perhaps the most important reason to focus on disclosure regulation is that an existing disclosure mandate would seem to provide, at least in theory, an effective response to the behavioral market failure in the subprime and Alt-A mortgage markets. I am referring to the APR disclosure, which lenders must provide under the Truth in Lending Act.²³³ The APR, or Annual Percentage Rate, is a normalized measure of the total cost of credit. A lender is required to sum-up all the different prices and fees that the borrower is required

²²⁹ The FRB, when proposing its recently adopted TILA amendments, endorsed a similar approach: "The market has responded to the current problems with increasing attention to loan quality. Structural factors, or market imperfections, however, make it necessary to consider regulations to help prevent a recurrence of these problems. New regulation can also provide the market clear "rules of the road" at a time of uncertainty, so that responsible higher-priced lending, which serves a critical need, may continue." FRB Proposed Rule, *supra* note 52, at 1675.

²³⁰ See Lacko and Pappalardo, *supra* note 98 (showing that better-designed disclosure can make a significant difference).

²³¹ See Colin Camerer et al., *Asymmetric Paternalism*, 151 U. PENN. L. REV. (2003); Cass Sunstein & Richard Thaler, *Libertarian Paternalism*, 70 U. CHI. L. REV. 1159 (2003).

²³² See, generally, Bar-Gill, *Seduction*, *supra* note 17. Focusing on the mortgage market – since the abolition of usury laws, disclosure requirements have been the centerpiece of the regulatory scheme governing the mortgage market. See Eskridge, *supra* note 23 (describing the history of mortgage-contract regulation in the U.S., and specifically the shift from usury laws to disclosure regulation). And the legislative and regulatory reaction to the recent crisis has focused on disclosure. See FRB Rule, *supra* note 6; The Housing and Economic Recovery Act of 2008, Sec. 5. The Housing and Economic Recovery Act, as well as other legal responses to the crisis, include important loss-mitigation components that are unrelated to disclosure. But these are not rules that will govern the mortgage market going forward. Among forward-looking legal interventions, disclosure is dominant. The FRB regulations go beyond disclosure on several important dimensions – (1) requiring creditors to evaluate borrowers' ability to repay, (2) limiting the scope of permissible prepayment penalties; and (3) requiring creditors to establish escrow accounts for the payment of property taxes and premiums for specified insurance products. See FRB Rule, *supra* note 6.

²³³ Truth in Lending Act, Pub. L. No. 90-321, § 107, 82 Stat. 146, 149 (1968), 15 U.S.C. § 1606 (LexisNexis 2008) (defining the APR); Truth in Lending Act, Pub. L. No. 90-321, § 121-31, 82 Stat. 146, 152-57 (1968), 15 U.S.C. §§ 1631-49 (LexisNexis 2008) (requiring disclosure of the APR).

to pay under the loan contract into a single aggregate amount, the “finance charge,” and disclose this dollar amount. Then, to facilitate comparison shopping between different credit products, the lender is required to translate the finance charge, which is a dollar amount, into an annual percentage rate, and disclose that as well.²³⁴

The APR should serve as a powerful antidote to the effects of imperfect rationality. First, the APR would seem to offer an effective response to the complexity and multidimensionality of the subprime mortgage contract. Lenders are required to calculate the total costs associated with their loan product and disclose that total to the borrower. With this common metric at hand borrowers should be able to compare the total cost of two different complex loan contracts. By collecting all the rates and fees and folding them into a single aggregate price, the APR should render the limits on borrowers’ cognitive abilities – limited attention, limited memory and limited processing ability – irrelevant.²³⁵ Second, the APR should provide an effective remedy to the myopia and optimism that give rise to deferred-costs contracts. Since the APR is a composite of short-term and long-term interest rates,²³⁶ capturing both long-term costs and short-term benefits, it should reveal the false allure of deferred-costs contracts.

By overcoming, or bypassing, the imperfect rationality of borrowers, the APR disclosure should also discourage many of the contractual design features studied above. Consider complexity, and specifically proliferation of “junk” fees. Adding non-salient fees was beneficial to the lender, because imperfectly rational borrowers ignored them. But if these fees are included in the APR and borrowers shop for low APRs, then the incentive to pile-up more fees disappears.²³⁷ Similarly, cost deferral was an attractive strategy for lenders, because myopic and optimistic borrowers placed insufficient weight on the long-term costs. If borrowers look to the APR for guidance, and the APR calculation affords appropriate weights to both short-term and long-term costs, then lenders will have no incentive to defer costs.²³⁸

²³⁴ Renuart and Thompson, *supra* note 23, at 217 (“Congress designed the APR to be *the* single number that consumers should focus upon when shopping for credit.”)

²³⁵ See Renuart and Thompson, *supra* note 23, at 214 (arguing that a comprehensive, fee-inclusive APR will help imperfectly rational consumers who cannot aggregate the multiple fees on their own..)

²³⁶ 12 C.F.R. § 226.17, Official Staff Commentary § 226.17(c)(1)-(10).

²³⁷ See BOARD OF GOVERNORS OF THE FEDERAL RESERVE SYSTEM & THE DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT, JOINT REPORT TO THE CONGRESS CONCERNING REFORM TO THE TRUTH AND LENDING ACT AND THE REAL ESTATE SETTLEMENT PROCEDURES ACT 9 (1998), available at <http://www.federalreserve.gov/boarddocs/press/general/1998/19980717/default.htm> [hereinafter FRB/HUD REPORT] (“the APR concept deters hidden or ‘junk’ fees to the extent that the fees must be included in the APR calculation.”)

²³⁸ To clarify, it is not that lenders will be indifferent between deferring cost and not deferring cost or between adding non-salient fees and not adding such fees; lenders will have an affirmative reason not to defer costs and not to add “junk” fees. The reason is that any such deviation from the optimal contract design will increase the total cost of the loan, and thus the disclosed APR.

There is evidence that the APR disclosure can work. Many borrowers know to look for the APR and comparison-shop based on the APR disclosure.²³⁹ This has led to enhanced competition and reduced rates.²⁴⁰ There is even evidence that the APR succeeded in fighting imperfect rationality. Specifically, Victor Stango and Jonathan Zinman show that the most biased consumers, i.e., consumers who substantially underestimate the APR corresponding to a given payment stream, do not overpay for credit when borrowing in markets where TILA disclosures are made reliably, but pay 300-400 basis points more in interest compared to less-biased consumers in markets where TILA disclosures are not made reliably.²⁴¹

B. The Failure of the APR Disclosure

Despite the aforementioned achievements of the APR disclosure, there is broad consensus that the APR has not lived up to its great potential, and that the current disclosure regime has failed, especially in the subprime and Alt-A markets.²⁴² Why did

²³⁹ See Renuart and Thompson, *supra* note 23, at 189 (“TILA disclosures have been remarkably effective in educating consumers to pay attention to the APR as a key measure of the cost of credit.”); Jinkook Lee & Jean M. Hogarth, *The Price of Money: Consumers’ Understanding of APRs and Contract Interest Rates*, 18 J. Pub. Pol’y & Marketing 66, 74 (1999) (more than 70 percent of the population reports using the APR to shop for closed-end credit); Jinkook Lee & Jean M. Hogarth, *Consumer Information Search for Home Mortgages: Who, What, How Much, and What Else?*, 9 Fin. Services Rev. 277, 286 (2000) (seventy-eight percent of homeowners who refinanced their homes report comparison shopping on the basis of the APR). The “finance charge,” from which the APR is derived, can be viewed as an example of a life-cycle cost measure. Empirical evidence suggests that life-cycle cost disclosures affect consumer behavior. See Matthias Deutsch, *Life-cycle cost disclosure, consumer behavior, and business implications: Evidence from an online field experiment*, in T. Geerken, A. Tukker, C. Vezzoli & F. Ceschin (Eds.), *Sustainable Consumption and Production: Framework for action*, p. 391 (Conference of the Sustainable Consumption Research Exchange (SCORE!) Network (Vol. Refereed Sessions III-IV) (2008) (“Disclosing estimated life-cycle costs to shoppers makes them opt for washing machines with, on average, 0.83% less specific energy consumption and 0.74% less specific water consumption.”); Matthias Deutsch, *The effect of life-cycle cost disclosure on consumer behavior*, Dissertation, University of Maryland, College Park, Abstract (2007) (available at <http://hdl.handle.net/1903/6794>) (finding that shoppers who received LCC information chose cooling appliances and washing machines that used less energy).

²⁴⁰ Randall S. Kroszner, Speech, *Creating More Effective Consumer Disclosures*, George Washington University School of Business, Financial Services Research Program Policy Forum, Washington, D.C., May 23, 2007 (TILA disclosure requirements, and specifically the APR disclosure, “are generally believed to have improved competition and helped individual consumers.”; citing Board of Governors of the Federal Reserve System, *Annual Percentage Rate Demonstration Project* (1987) which found that in an environment in which interest rates typically vary among credit sources, widely disseminated information about APRs tends to reduce the average level and dispersion of interest rates for first mortgage loans.); S. REP. NO. 96-368, at 16 (1979), *as reprinted in* 1980 U.S.C.A.N. 236, 252 (TILA was credited with increasing consumer awareness of the annual percentage rate and a substantial reduction of the market share of creditors charging the highest rates.)

²⁴¹ Victor Stango & Jonathan Zinman, *Fuzzy Math, Disclosure Regulation, and Credit Market Outcomes*, p. 5 (Nov. 2007) (unpublished manuscript, available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1081635).

²⁴² The evidence showing the success of the APR is limited to the prime market. See *supra* note 226-227. See also Patricia A. McCoy, *Rethinking Disclosure in a World of Risk-Based Pricing*, 44 Harv. J. on Legis. 123, 126, 138-39 (2007) (There is robust competition in the prime market, and TILA disclosures effectively facilitate this competition.). On the general failure of the TILA disclosure regime in the non-prime segments – see, e.g., Paulson, *supra* note 2 (“We need simple, clear, and understandable mortgage disclosure. We must identify what information is most critical for borrowers to have so that they can make

the APR fail? Why did it not protect borrowers and ensure an efficient market? The answer lies in several defects that prevented the APR from living up to its great promise. First, the APR was often disclosed too late. Lenders were not required to disclose a binding APR, i.e., an APR that they cannot change after the disclosure, until consummation of the loan transaction (closing). In purchase loans, lenders were required to disclose a good-faith estimate of the APR three days after receiving a loan application. But lenders were not bound by this estimate, and thus borrowers could not rely on it when shopping for loans. Moreover, the estimated APR was provided only after a substantial application fee was paid, and so borrowers who were reluctant to pay numerous application fees could not use the estimated APR for comparison shopping. The situation was even worse with refinance loans, where lenders were not required to provide any disclosure before closing.²⁴³ Disclosing a binding APR only at closing discourages APR-based comparison shopping. Few borrowers would reach the closing stage and then, after finally learning the APR, refuse to sign the loan documents and start shopping again. (Note that to compare the APR on one loan with the APR on a competing loan the borrower would have to reach the closing stage with the second loan as well.)²⁴⁴

Second, while purporting to provide a total-cost-of-credit measure, the APR excludes numerous price dimensions, e.g., title insurance fees, title examination fees, property survey fees, appraisal fees, credit report fees, document preparation fees, notary fees, flood and pest inspection fees, seller's points, prepayment penalties and late fees.²⁴⁵ By excluding these price dimensions the APR underestimates the total cost of the loan. Moreover, this exclusion invites strategic pricing by lenders. When certain price dimensions are excluded from the APR lenders will benefit from shifting costs to these excluded dimensions.²⁴⁶ These problems undermine the effectiveness of the APR: Since

informed decisions. At closing, homebuyers get writer's cramp from initialing pages and pages of unintelligible and mostly unread boilerplate that appears to be designed to insulate the originator or lender from liability rather than to provide useful information to the borrower. We can and must do better.”); GAO, *Alternative Mortgage Products: Impact on Defaults Remains Unclear, but Disclosure of Risks to Borrowers Could Be Improved*, GAO-06-1021, p. 21 (Washington, D.C.: Sept. 19, 2006) (“[Current disclosure requirements] are not designed to address more complex products such as AMPs [= Alternative Mortgage Products, including I/O and Option loans.]”); Edward L. Rubin, *Legislative Methodology: Some Lessons from the Truth-in-Lending Act*, 80 Geo. L.J. 233, 236 (1991) (shopping for credit is limited to “upscale consumers who would manage perfectly well without the benefit of [the TILA disclosures]”).

²⁴³ See Patricia A. McCoy, *Rethinking Disclosure in a World of Risk-Based Pricing*, 44 Harv. J. on Legis. 123, 137-143 (2007); Willis, *supra* note 4, at 749-750; FTC Comment, *supra* note 63, at 11-12. The exception is HOEPA loans, where binding early disclosures are required. See McCoy, *Id.*

²⁴⁴ See McCoy, *supra* note 239; Willis, *supra* note 4, at 749-750; FTC Comment, *supra* note 63, at 11-12.

²⁴⁵ See OCC, *Truth in Lending – Comptroller’s Handbook, Finance Charge Chart*, 96 (2006) (available at www.occ.treas.gov/handbook/til.pdf) (APR does not include late fees, title insurance fees, title examination fees, property survey fees, appraisal fees, credit report fees, document preparation fees, notary fees, flood and pest inspection fees, and seller’s points); Willis, *supra* note 4, at 744, 747, 750 (APR includes origination fees and points, but not interest rate escalations, prepayment penalties, late fees, title insurance and application, appraisal, and document preparation fees); Eskridge, *supra* note 23, at 1166.

²⁴⁶ See Renuart and Thompson, *supra* note 23, at 185, 221 (“The Board’s “fee-by-fee” approach encourages all lenders to “game” the system by unbundling the cost of loan originations into an increasing number of fees that are excluded from the disclosed finance charges.”; “Absent mandatory, comprehensive, and simple pricing disclosures, lenders have perverse incentives to create complicated pricing structures,

the APR no longer measure the total cost of credit, borrowers are less likely to focus on the APR. And, borrowers who nevertheless use the APR for comparing loans may well end-up with a product that, while boasting a lower APR, costs more overall.

Third, the APR disclosure fails to account for the prepayment option²⁴⁷—an option that has critically affected the values of subprime and Alt-A loans in the recent mortgage-lending expansion. The prepayment option can have a substantial effect on a loan's value, even for traditional, prime loans.²⁴⁸ The effect on deferred-costs, subprime and Alt-A loans that were taken with intent to prepay before the end of the low-rate introductory period can be much larger. Consider a 2-28 hybrid for \$150,000, with a monthly payment of \$1,000 for the first two years, and a monthly payment of \$1500 for the remaining twenty-eight years. The APR on this loan, ignoring the prepayment option, is 10.74 percent. Assuming that before the 2-28 mortgage resets the borrower can refinance into a 30-year FRM with a \$1,000 monthly payment, the effective APR is 7.19 percent.²⁴⁹ The effect of an attractive prepayment option is substantial.

Moreover, since the prepayment option affects different contractual designs differently, an APR that ignores the prepayment option can skew the comparison among different loan products. The prepayment option might render the APR disclosure misleading even with simple loan contracts. Comparing two loans, Loan A and Loan B, the APR on Loan A can be lower, reflecting a lower total cost of credit absent prepayment. But with prepayment the total cost of Loan B may well be lower.²⁵⁰ And this problem is

including different rates on different balances, multitudinous fees, variable rates, and payment options. These products, by their design, obscure the true price of credit. Unsurprisingly, lenders have responded to the current regulatory environment by evolving ever more complex and profitable products.”); Zywicki and Adamson, *supra* note 10, at 63-64 (Regulation has focused on the most obvious, transparent and important terms, e.g., interest rates, points, and closing costs, causing substitution to less transparent terms, such as prepayment penalties and LTV ratios. This makes it more difficult for borrowers to understand loans, to accurately assess the total cost of the loan and to compare alternative loan products.)

²⁴⁷ See also HUD-Treasury Report, *supra* note 10, at 66 (noting that “the APR does not account for an early payoff.”)

²⁴⁸ See Agarwal et al, *Optimal Mortgage Refinancing*, *supra* note 113, at 28 (calculating a 25% impact for using the wrong rule to make prepayment decisions; the impact of ignoring the prepayment option altogether may well be larger).

²⁴⁹ The actual (no prepayment) and effective (with prepayment) APRs were calculated using APRWIN (Ver. 6.1.0).

²⁵⁰ The following example is illustrative: “To see how the APR can be misleading, suppose I give you the choice of borrowing the \$100,000 at either an 8% rate and the \$1,000 fee with the 360 payments of \$733.76, or a 8.125% rate and a fee of \$100 and 360 payments of \$742.50. The APR for the 8% rate and \$1,000 fee is 8.11%, and the APR for the 8.125% rate and \$100 fee is 8.14%. Most consumers would think that the 8% rate is a better deal because the APR is lower. However, this is only true provided you do not pay off the loan early. For example, if you were able to refinance and payoff the loan after 3 years, with the 8% rate you would have paid a total of \$27,415.36 (36 payments of \$733.76 plus the \$1,000 fee). With the 8.125% rate you would have paid \$26,830 (36 payments of \$742.50 plus \$100), so the 8% rate was actually \$585.36 more expensive, even though it had a lower APR.” See <http://www.reedmc.com/APR.htm>. More generally, by ignoring the prepayment option the APR underestimates the importance of origination fees (those that are included in the APR calculation) which accrue at closing; no such underestimation afflicts interest charges which accrue gradually over the life of the loan. See Renuart and Thompson, *supra* note 23. This may provide another explanation for the proliferation of origination fees.

exacerbated when complex contracts include a set of varying terms that interact differently with the prepayment option.²⁵¹

The term that most obviously affects the value of the prepayment option is the prepayment penalty. Many have expressed concerns about prepayment penalties, and the FRB's new mortgage regulations restrict their use in higher-priced loans.²⁵² The fear is that, since prepayment penalties are not incorporated into the APR, borrowers will underestimate their effect on the total cost of the loan.²⁵³ These concerns, while valid, address only one aspect of the problem. Those critical of prepayment penalties focus on the penalties that borrowers actually pay and on borrowers' underestimation of these payments. They ignore the effects of prepayment penalties on the value of the prepayment option. And prepayment penalties reduce the ex ante value of the prepayment option even when they are not paid ex post.

An APR that ignores the prepayment option will play a reduced role in the shopping decisions of perfectly rational borrowers. And it will play an even more minor role in the shopping decisions of imperfectly rational borrowers who overestimate the value of the prepayment option. Moreover, this flaw in the APR calculation enabled even honest brokers and loan officers to deflect borrowers' attention from the APR disclosure. For example, the APR on a deferred-cost loan could be much higher than the initial teaser rate. Loan originators wanted borrowers to focus on the low teaser rate and not on the high APR. These brokers and loan officers could truthfully tell borrowers that they are likely to prepay and exit long before the nominal 30-year loan period ends, and thus should pay little attention to an APR that assumes 30 years of loan payments.

The APR disclosure failed. Because the APR was often disclosed too late, borrowers could not use the APR to choose between different loan products. Moreover, the APR, by excluding numerous price dimensions and by ignoring the prepayment option, failed to live up to its declared purpose of providing an accurate total-cost-of-credit measure. As a result, borrowers abandoned the APR, and it ceased to be the focal point of comparison shopping in the subprime mortgage market. The resulting cost to borrowers

²⁵¹ Compare the value of the prepayment option on a FRM without a prepayment penalty to the value of the prepayment option on a negative amortization Option ARM with a CLTV of 100 percent and a substantial prepayment penalty.

²⁵² FRB Rule, *supra* note 6, at 44,551.

²⁵³ FRB Rule, *supra* note 6, at 44,525 (“Subprime loans are also far more likely to have prepayment penalties. Because the annual percentage rate (APR) does not reflect the price of the penalty, the consumer must both calculate the size of the penalty from a formula and assess the likelihood of moving or refinancing during the penalty period. In these and other ways, subprime products tend to be complex for consumers.”). See also FRB Proposed Rule, *supra* note 52, at 1675-76, 1693-94 (“The injuries prepayment penalties may cause consumers are particularly concerning because of serious questions as to whether borrowers knowingly accept the risk of such injuries. Current disclosures of prepayment penalties, including the disclosure of penalties in Regulation Z § 226.18(k), do not appear adequate to ensure transparency.”; “It is questionable whether consumers can accurately factor a contingent cost such as a prepayment penalty into the price of a loan.”) Moreover, a Federal Trade Commission report concluded, based on consumer testing, that even an improved disclosure of the prepayment penalty left a substantial portion of the prime and subprime consumers interviewed without a basic understanding of the penalty. Lacko and Pappalardo, *supra* note 98, at 110.

and to society more generally was substantial. As explained above, the APR has the potential of ameliorating the effects of imperfect rationality. But the APR can effectively respond to the imperfect rationality of borrowers only if imperfectly rational borrowers rely on the APR; and many borrowers did not.²⁵⁴

C. Fixing the APR Disclosure

Given the potential of the APR disclosure to compensate for the imperfect rationality of borrowers, it should be a priority for policymakers to fix the APR's problems. In fact, the timing problem has already been addressed, and partially solved, by recent legal reforms. In particular, the new FRB regulations require lenders to disclose an APR within three days after the loan application has been submitted, and before any fees are charged, for both purchase and refinance loans.²⁵⁵ And the recently enacted Housing and Economic Recovery Act requires lenders to disclose an updated APR three days before consummation of the loan transaction, in case the previously disclosed APR "is no longer accurate."²⁵⁶

These recent statutory and regulatory responses reduce the timing-of-disclosure problem, but they do not solve it. Two issues remain: First, lenders can still disclose a low APR after receiving an application and a higher APR later on.²⁵⁷ Borrowers will be wary of using the application-stage APR for comparison shopping, since this APR can change. And three days before closing, the time when an updated APR is provided, may already be too late for effective comparison shopping.²⁵⁸ Second, the enforcement of these improved timing-of-disclosure rules is imperfect. Specifically, TILA's civil liability section²⁵⁹ has been interpreted by several appellate courts as precluding statutory damages for timing-of-disclosure violations.²⁶⁰ The borrower would thus have to claim

²⁵⁴ See FRB Rule, *supra* note 6, at 44,525-26 ("A consumer may focus on loan attributes that have the most obvious and immediate consequence such as loan amount, down payment, initial monthly payment, initial interest rate, and up-front fees (though up-front fees may be more obscure when added to the loan amount, and "discount points" in particular may be difficult for consumers to understand). These consumers, therefore, may not focus on terms that may seem less immediately important to them such as future increases in payment amounts or interest rates, prepayment penalties, and negative amortization.... Consumers who do not fully understand such terms and features, however, are less able to appreciate their risks, which can be significant. For example, the payment may increase sharply and a prepayment penalty may hinder the consumer from refinancing to avoid the payment increase. Thus, consumers may unwittingly accept loans that they will have difficulty repaying.")

²⁵⁵ FRB Rule, *supra* note 6, at 44,590-92. See also Housing and Economic Recovery Act of 2008, Pub.L. 110-289, Sec. 2502(a), 15 U.S.C. 1638(b)(2).

²⁵⁶ Housing and Economic Recovery Act of 2008, Pub.L. 110-289, Sec. 2502(a), 15 U.S.C. 1638(b)(2).

²⁵⁷ See Kathleen C. Engel and Patricia M. McCoy, *A Tale of Three Markets: The Law and Economics of Predatory Lending*, 80 Tex. L. Rev. 1255, 1269 (2002) (Lenders face no liability for errors in the Good Faith Estimate (GFE), including in the GFE of the APR).

²⁵⁸ Moreover, it is not clear from the language of the statute that lenders cannot change the APR again between the time of the updated disclosure (3 days before closing) and consummation.

²⁵⁹ 15 U.S.C. § 1640.

²⁶⁰ See, e.g., *Baker v. Sunny Chevrolet, Inc.*, 349 F.3d 862 (6th Cir. 2003), *Brown v. Payday Check Advance, Inc.*, 202 F.3d 987 (7th Cir. 2000), *McDonald v. Checks-N-Advance, Inc.* (In re Ferrell), 358 B.R. 777 (BAP 9th Cir. 2006), *Dykstra v. Wayland Ford, Inc.*, 134 Fed. App'x 909 (6th Cir. 2005). Other

actual damages and prove detrimental reliance – a substantial barrier to recovery. While Congress and the FRB should be commended for reducing the timing-of-disclosure problem, still more can and should be done: disclosure of a binding APR should be required at an earlier time,²⁶¹ and the civil liability provisions of TILA should be strengthened.

The second problem, underinclusiveness, has not been addressed. The purpose of the APR was to provide a uniform total-cost-of-credit measure. The current APR excludes numerous price dimensions and thus fails to present the total cost of credit. The analysis in this Article lends further support to proposals, most recently by Elizabeth Renuart and Diane Thompson, to create a more inclusive APR.²⁶² Several price dimensions that are currently excluded from the APR definition can be easily added. Others can only be added at a cost. Specifically, adding the price of truly optional services to the APR would generate several APRs for a single mortgage, potentially confusing rather than assisting borrowers. Adding contingent prices, such as late fees and prepayment penalties, imposes a different cost. These prices can only be incorporated into the APR by estimating the average probability that the fee-triggering contingency would materialize. An APR based on this estimated average would be inaccurate for many borrowers. Of course, the current APR, which in effect assumes a zero probability of triggering these contingent fees, is similarly inaccurate for many borrowers. While a more inclusive APR is warranted, for some price dimensions the inclusion decision requires a careful cost-benefit analysis.

The third problem – the ignored prepayment option – also has not been addressed by policymakers. This problem has even escaped the attention of commentators. When borrowers expect, rationally or irrationally, to avoid high long-term costs by refinancing their mortgage, an APR that ignores the prepayment option will be ignored by borrowers. It is, therefore, useful to consider the possibility of incorporating the prepayment option into the APR calculation. To be sure, accounting for the possibility of prepayment is a non-trivial exercise. The likelihood and timing of prepayment would have to be estimated, and so would the expected terms of the refinance loan. These estimates would need to be based on projections of future house prices (for each Metropolitan Statistical Area) and interest rates. These future market conditions would then need to be combined with estimated borrower and loan characteristics, such as future FICO score, future

courts have adopted a more expansive interpretation of TILA's civil liability provisions. See, e.g., *Bragg v. Bill Heard Chevrolet*, 374 F.3d 1060 (11th Cir. 2004).

²⁶¹ Compare: HUD-Treasury Report, *supra* note 10, at 67 (proposing that originators be required to provide an accurate, within a prescribed tolerance, Good Faith Estimate (GFE) of, among other things, the APR). It should be recognized, however, that locking-in an APR at an earlier time would place greater interest rate risk on the lender and that this added risk would be, at least partially, passed-on to borrowers. Borrowers who need the APR as a focal point for comparison-shopping should be willing to accept these consequences. Cf. McCoy, *supra* note 239 (arguing that similar rate lock-ins are common in the prime market, even though lenders are not required to disclose a binding APR).

²⁶² Renuart and Thompson, *supra* note 23. See also HUD-Treasury Report, *supra* note 10, at 69 (proposing that the law be amended “to require that the full cost of credit be included in the APR.”); Eskridge, *supra* note 23, at 1166 et seq (proposing a more inclusive APR more than 20 years ago).

income and future LTV to estimate the refinancing options that would be available to the specific borrower.²⁶³

These estimates and projections would necessarily be based on a series of assumptions. While the use of assumptions is not new to disclosure regulation,²⁶⁴ it should be recognized that some degree of arbitrariness in the choice of assumptions is inevitable and that the chosen assumptions will not perfectly reflect the situation of all borrowers.²⁶⁵ But the difficulties of generating accurate projections should not be exaggerated. The mortgage industry already employs sophisticated valuation algorithms to arrive at projections that are tailored to specific home and loan characteristics.²⁶⁶ An APR disclosure that uses these projections, to account for the prepayment option, will thus reduce the information asymmetry between lenders and borrowers.²⁶⁷ And, more importantly, this disclosure could restore borrower confidence in the APR and thus harness the potential of the APR to counteract the effects of imperfect rationality.²⁶⁸

It is worth reminding that even an optimally designed APR will not be perfect. It is impossible to fully capture the multi-dimensionality of a mortgage loan in a one-dimensional metric.²⁶⁹ But this inevitable limitation does not deduct from the social value of the APR disclosure. Sophisticated borrowers who can deal with the complexity and multidimensionality will not rely solely on the APR. Those who rely solely, or

²⁶³ Estimating the future LTV is particularly complicated. This estimate would be based on the current LTV, the contractually specified payment stream, the prepayment penalty, which would need to be financed by the new loan, and the projected future house value.

²⁶⁴ Compare: Assumptions needed for calculating the total payment period for credit card debt under BAPCPA.

²⁶⁵ Sophisticated valuation algorithms can be used to more closely tailor predictions to specific homes and specific loans. Cf. Cagan, *supra* note 24, at 5 (describing the valuation algorithms).

²⁶⁶ Projections and forecasts are commonly used in the industry. See, e.g., Cagan, *supra* note 24; Sherlund, *supra* note 126 (“I draw house price, interest rate, and unemployment rate forecasts from Fannie Mae and Freddie Mac’s monthly economic outlooks (April 2008).”) Cf. William Miles, Boom-Bust Cycles and the Forecasting Performance of Linear and Non-Linear Models of House Prices, 36(3) *J. Real Estate Fin. & Econ.* __ (2008) (comparing the power of competing models to predict house prices). Futures markets can be used to help predict price trajectories. Valuation algorithms are also commonly used in the industry. See Cagan, *supra* note 24, at 5.

²⁶⁷ Did lenders really have superior information during the subprime expansion? The multibillion dollar losses that lenders have been incurring since the collapse of the subprime market suggest that their algorithms may well have been off mark. Still, it is hard to imagine that lenders, including the Wall Street firms that financed them, had the same information as the average subprime borrower. Moreover, at least some of these lenders made a knowing bet that turned out sour. How many borrowers made a *knowing* bet?

²⁶⁸ The proposed disclosure would also assist rational borrowers. Currently, these borrowers must calculate the value of the prepayment option (or the probability of facing an attractive prepayment option) on their own. This is a costly exercise. And some borrowers may decide to forgo the exercise. The proposed disclosure would save the calculation costs or, for those borrowers who would forgo the exercise, reduce uncertainty about the prepayment option.

²⁶⁹ See Michael S. Barr, Sendhil Mullainathan, and Eldar Shafir, *Behaviorally Informed Home Mortgage Regulation*, in Belsky and Retsinas (eds.), *Understanding Consumer Credit*, p. 9 [page numbers from SSRN version] (2009) (“The need for simplicity conflicts, however, with the goal of producing comprehensive disclosures that permit consumers to comparison shop based on the real price of multi-attribute loans.”)

mainly, on the APR will be the less-sophisticated borrowers who, absent the APR disclosure, would rely on an even less accurate proxy.²⁷⁰

CONCLUSION

Subprime and Alt-A mortgage contracts are complex, multidimensional contracts that often defer costs into the future. This contractual design can be explained as a market response to the imperfect rationality of borrowers. The welfare costs of this market failure are substantial: Competition is both hindered and distorted, resulting in allocative inefficiency. Default and foreclosure rates increase, imposing costs on borrowers, lenders, neighborhoods, cities and the economy at large. And distributional concerns are raised.

In this Article, I argued that the outcome in the subprime and Alt-A markets can be improved by revitalizing the APR disclosure. The APR, by providing a common total-cost-of-credit measure, can serve as an effective antidote to imperfect rationality. But the APR can serve this important role only if borrowers focus on the APR when choosing among different mortgage products. In the subprime and Alt-A markets borrowers have largely abandoned the APR. This can change. Borrowers will again rely on the APR if it is disclosed early enough, earlier than what recent reforms specify, and if it is redesigned to provide a comprehensive total-cost-of-credit measure. To this end Congress and the FRB should minimize the number of price dimensions that are excluded from the APR definition and consider incorporating the prepayment option into the APR calculation. These proposals, if successful in restoring borrower confidence in the APR, will allow the subprime and Alt-A markets to benefit from the APR's unique ability to combat imperfect rationality.

²⁷⁰ The limits of the APR, even when optimally designed, warrant consideration of supplementary approaches. For example, the FRB could sponsor a web-based, mortgage-search tool. This tool would ask the borrower for information relevant to loan underwriting and then provide a list of best options (from best lenders), where these best options, or at least some of them, would not necessarily be picked solely by the APR. Compare: John Lynch, Consumer Information Processing and Mortgage Disclosure, Presentation at FTC Workshop, May 29, 2008 (proposing “personalized screening agent website for best alternatives in region.”)