

DIGITAL ACCESS TO SCHOLARSHIP AT HARVARD
DASH.HARVARD.EDU

HARVARD LIBRARY


The Law, Economics and Psychology of Subprime Mortgage Contracts

Citation

Oren Bar-Gill, The Law, Economics and Psychology of Subprime Mortgage Contracts, 94 Cornell L. Rev. (2009)

Published version

http://scholarship.law.cornell.edu/clr/vol94/iss5/2/

Link

http://nrs.harvard.edu/urn-3:HUL.InstRepos:12786000

Terms of use

This article was downloaded from Harvard University's DASH repository, and is made available under the terms and conditions applicable to Open Access Policy Articles (OAP), as set forth at

https://harvardwiki.atlassian.net/wiki/external/NGY5NDE4ZjgzNTc5NDQzMGIzZWZhMGFlOWI2M2EwYTg

Accessibility

https://accessibility.huit.harvard.edu/digital-accessibility-policy

Share Your Story

The Harvard community has made this article openly available.
Please share how this access benefits you. Submit a story

Cornell Law Review

Volume 94
Issue 5 *July 2009*

Article 2

July 2009

The Law, Economics and Psychology of Subprime Mortgage Contracts

Oren Bar-Gill

Follow this and additional works at: http://scholarship.law.cornell.edu/clr

 Part of the Law Commons

Recommended Citation
Oren Bar-Gill, *The Law, Economics and Psychology of Subprime Mortgage Contracts*, 94 Cornell L. Rev. (2009)
Available at: http://scholarship.law.cornell.edu/clr/vol94/iss5/2

This Article is brought to you for free and open access by Scholarship@Cornell Law: A Digital Repository. It has been accepted for inclusion in Cornell Law Review by an authorized administrator of Scholarship@Cornell Law: A Digital Repository. For more information, please contact jmp8@cornell.edu.

THE LAW, ECONOMICS AND PSYCHOLOGY OF SUBPRIME MORTGAGE CONTRACTS

Oren Bar-Gill†

Almost three 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 U.S. and world economies. 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.

INTRODUCTION 1074
I. THE SUBPRIME MORTGAGE MARKET 1087
A. Defining Subprime 1087
B. Subprime Mortgage Loans: The Numbers 1088
C. Market Structure 1089
1. *Participants* 1089
2. *Competition* 1091
D. Regulatory Scheme 1093
E. Summary 1095
II. THE SUBPRIME MORTGAGE CONTRACT 1096
A. Deferred Costs 1096
1. *Small Down Payments and High LTVs* 1097
2. *Escalating Payments* 1098
3. *Prepayment Penalties* 1101

† Professor of Law, New York University School of Law. I wish to thank Barry Adler, Jennifer Arlen, Lily Batchelder, Lucian Bebchuk, Vicki Been, Omri Ben-Shahar, Paul Calem, Clay Gillette, Solomon Greene, Louis Kaplow, Kevin Kordana, Lewis Kornhauser, Adam Levitin, Elizabeth Renuart, Alan Schwartz, Diane Thompson, Elizabeth Warren, Lauren Willis, and workshop and conference participants at the University of Pennsylvania, NYU, Seton Hall, UVA, and the 2008 Meetings of the American Law and Economics Association for helpful comments and discussions. Margot Pollans and Michael Schachter provided excellent research assistance.

B. Complexity 1102
1. *Interest Rates* 1103
2. *Fees* 1103
3. *Prepayment and Default* 1105
4. *A Complex Array of Complex Products* 1106
C. Summary 1107
III. Rational-Choice Theories and Their Limits 1107
A. Deferred Costs 1108
1. *Affordability* 1108
2. *Speculation* 1112
B. Complexity 1116
1. *Interest Rates* 1116
2. *Fees* 1116
3. *Prepayment and Default* 1117
4. *A Complex Array of Complex Products* 1117
C. Summary 1118
IV. A Behavioral-Economics Theory 1118
A. Deferred Costs 1119
B. Complexity 1121
C. Heterogeneity in Cognitive Ability 1123
D. Market Correction 1127
1. *On the Demand Side: Learning by Borrowers* 1128
2. *On the Supply Side: Mistake Correction by Sellers and Reputation Effects* 1129
V. Welfare Implications 1130
A. Hindered Competition 1130
B. Distorted Competition 1132
C. Delinquency and Foreclosure 1133
D. Distributional Concerns 1138
VI. Policy Implications 1139
A. The Great Promise of the APR Disclosure 1140
B. The Failure of the APR Disclosure 1143
C. Fixing the APR Disclosure 1147
Conclusion 1150

Introduction

Almost three 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

[1] *See* Yuliya Demyanyk & Otto Van Hemert, *Understanding the Subprime Mortgage Crisis*, 22 Rev. Fin. Stud. (forthcoming 2009) (manuscript at 6 & n.6, 7 tbl.1, on file with authors) (analyzing data covering approximately 85 percent of securitized subprime loans. In 2006, 75 percent of subprime loans were securitized, and the authors' data set included 1,772,000 subprime loans originated in 2006, implying a total of 1,772,000 / (0.85 * 0.75) =

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 U.S. and world economies.[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 that compensated lenders for the increased risk that they undertook.[4] But high prices themselves are not the central problem; the problem is that lenders hid these high prices and borrowers underappreciated them. In the prime market, the traditional loan is a standardized thirty-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

---

2,779,608); *see also State of the U.S. Economy and Implications for the Federal Budget: Hearing Before the H. Comm. on the Budget*, 110th Cong. 10 (2007) [hereinafter *Hearing*] (prepared statement of Peter Orszag, Director, Congressional Budget Office) ("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 November 27, 2007, there were 7.2 million outstanding subprime loans with an estimated total value of $1.3 trillion. A Snapshot of the Subprime Market, Center for Responsible Lending, http://www.responsiblelending.org/issues/mortgage/quick-references/a-snapshot-of-the-subprime.html (last visited Mar. 1, 2009) [hereinafter CRL Snapshot].

2 *See* CONG. BUDGET OFFICE, THE BUDGET AND ECONOMIC OUTLOOK: FISCAL YEARS 2008 TO 2018, 23 (2008) [hereinafter CBO OUTLOOK], *available at* http://www.cbo.gov/ftpdoc.cfm?index=8917&type=1 (noting 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* Henry M. Paulson, Jr., U.S. Sec'y of the Treasury, Remarks on Current Housing and Mortgage Market Developments at the Georgetown University Law Center (Oct. 16, 2007), *available at* http://www.treasury.gov/press/releases/hp612.htm (noting that foreclosures on subprime loans increased more than 200 percent between 2000 and 2006 and discussing the broad impact of these foreclosures on the economy).

3 *See* Demyanyk & Van Hemert, *supra* note 1 (manuscript at 5, 7 tbl.1); Center for Responsible Lending, Mortgage Lending Overview, http://www.responsiblelending.org/issues/mortgage/ (last visited Mar. 1, 2009).

4 *See* Lauren E. Willis, *Decisionmaking and the Limits of Disclosure: The Problem of Predatory Lending: Price*, 65 MD. L. REV. 707, 720–21 (2006) (describing the development of risk-based pricing in the mortgage market).

boasted a broad variety of complex loans with multidimensional pricing structures. 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 down payment, 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 nontrivial formulas that adjust

---

[5] A note on terminology: The residential mortgage market is divided into the prime segment and the nonprime segment. The nonprime segment is further divided into subprime (higher risk) and Alt-A (lower risk), although the line between subprime and Alt-A is not always clear. *See infra* Part 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."

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 loan amount. The prepayment option, of special importance in the subprime market, further complicates the valuation of these contracts. 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 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 their loans, were liquidity constrained: they could afford only a small down payment and a small monthly payment. The catch, of course, is that a small down payment 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 "make" argument is that the borrower will anticipate being able to make the higher payment if she expects her income 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

---

6 Truth in Lending, 73 Fed. Reg. 44,522, 44,524–25 (July 30, 2008) (to be codified at 12 C.F.R. pt. 226) ("[P]roducts 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-cost 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.

introductory period ends. The prepayment option depends on the expected ability to sell the house, on the expected availability of refinance loans with attractive terms, and on the expected ability to sell the house at an attractive price. Attractive refinancing and sale 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 would 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.

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. A rational-choice model can explain at least some of these fees. 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, nondelinquent borrowers would bear a large share of the costs

---

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

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, however, provide a complete account: a rational-choice model does not fully explain the prevalence of cost deferral and the exceedingly high level of complexity. 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 the 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 nonprice 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 lenders will offer complex, multidimensional contracts, shifting much of the loan's cost to the less salient dimensions.[10]

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 unscrupulous lenders who pushed risky

---

9 *See* Ben S. Bernanke, Chairman, Bd. of Governors of the Fed. Reserve Sys., Speech at the Women in Housing and Finance and Exchequer Club Joint Luncheon, Washington, D.C.: Financial Markets, the Economic Outlook, and Monetary Policy (Jan. 10, 2008), *available at* http://www.federalreserve.gov/newsevents/speech/bernanke20080110a.htm [hereinafter Bernanke January 2008 Speech] (suggesting that the ARM design responds to optimism about house prices).

10 *See* Edmund L. Andrews, *Fed and Regulators Shrugged as the Subprime Crisis Spread: Analysis Finds Trail of Warnings on Loans*, N.Y. TIMES, Dec. 18, 2007, at A1 (quoting Edward M. Gramlich, the former Federal Reserve governor, asking "Why are the most risky loan products sold to the least sophisticated borrowers? . . . The question answers itself—the least sophisticated borrowers are probably duped into taking these products.").

credit onto borrowers who were incapable of repaying.[11] Another common account focuses on irresponsible borrowers who took out loans they could not repay.[12] 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 borne by lenders.[13] The main cul-

---

11 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. DEP'T OF HOUS. & URBAN DEV., UNEQUAL BURDEN: INCOME & RACIAL DISPARITIES IN SUBPRIME LENDING IN AMERICA 1 (2000), *available at* http://www.huduser.org/Publications/pdf/unequal_full.pdf (documenting "the rapid growth of subprime lending during the 1990's" and calling for increased scrutiny of subprime loans 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 problem of predatory lending, the extent of the overlap is unclear, largely because there is no agreed-upon definition of predatory lending. *See* U.S. DEP'T OF HOUS. & URBAN DEV. & U.S. DEP'T OF THE TREASURY, CURBING PREDATORY HOME MORTGAGE LENDING 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 & Joseph D. Adamson, *The Law & Economics of Subprime Lending*, 80 U. COLO. L. REV. 1, 11–20 (2009) (discussing the relationship between predatory lending and subprime lending).

12 In some cases, borrowers engaged in outright fraud. *See* Jennifer E. Bethel, Allen Ferrell & Gang Hu, *Legal and Economic Issues in Litigation Arising from the 2007–2008 Credit Crisis* 17 (Harvard Law & Econ. Discussion Paper No. 212; Harvard Law Sch. Program on Risk Regulation Research Paper No. 08-5, 2008), *available at* http://ssrn.com/abstract=1096582 (citing evidence of widespread fraud in the application and appraisal processes among early payment default loans).

13 An immediate response is that lenders priced the increased risk. And there is some evidence of such pricing. *See* Demyanyk & Van Hemert, *supra* note 1 (manuscript at 5). But this response is misleading. The evidence shows that subprime risks were not accurately priced. *See* U.S. SEC. & EXCH. COMM'N, SUMMARY REPORT OF ISSUES IDENTIFIED IN THE COMMISSION STAFF'S EXAMINATIONS OF SELECT CREDIT RATING AGENCIES 34–35 (2008), *available at* http://www.sec.gov/news/studies/2008/craexamination070808.pdf [hereinafter SEC RATING AGENCIES REPORT] (finding that rating agencies underestimated risks associated with subprime mortgage-backed securities); Bethel et al., *supra* note 12. Bethel, Ferrell, and Hu argue 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,

prit is securitization—the process of issuing 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 principals, 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 principals-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.[14] Moreover, it is likely

---

and state attorneys general with respect to pricing of RMBSs and CDOs, suggesting that mispricing may be the result of malice, not only incompetence. *See* Bethel et al., *supra* note 12, at 2; *see also* SEC RATING AGENCIES REPORT, *supra*, at 12 (citing an analyst from one rating agency who wrote in an e-mail 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 ST. J., Nov. 3, 2008, at A1 (discussing the failure of AIG's risk models and quoting Warren Buffett: "All I can say is, beware of geeks . . . bearing formulas.").

14 *See* Scott Woll, *The Buildup to a Fall*, MORTGAGE BANKING, Nov. 2007, at 50, 53–54 (describing how 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."); *see also* Zywicki & Adamson, *supra* note 11, at 51–53 (discussing agency costs in the subprime market); Frederic S. Mishkin, Governor, Bd. of Governors of the Fed. Reserve Sys., Speech at the U.S. Monetary Policy Forum, New York, New York: Leveraged Losses: Lessons from the Mortgage Meltdown (Feb. 29, 2008), *available at* http://www.federalreserve.gov/newsevents/speech/mishkin20080229a.htm (arguing that rating agencies, underwriters, and CDO mangers were driven by fees). *But see* Gary B. Gorton, *The Subprime Panic* 27–31 (Nat'l Bureau of Econ. Research, Working Paper No. 14398, 2008), *available at* http://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, Chairman, Bd. of Governors of the Fed. Reserve Sys., Testimony Before the Committee on Financial Services, U.S. House of Representatives: Subprime Mortgage Lending and Mitigating Foreclosures (Sept. 20, 2007), *available at* http://www.federalreserve.gov/newsevents/testimony/bernanke20070920a.htm (noting that 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 charged with assessing the risk associated with mortgage-backed securities, see SEC RATING AGENCIES REPORT, *supra* note 13 (finding inadequate rating procedures and conflicts of interest, which 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* 16 (Levy Econ. Inst. of Bard Coll., Working Paper No. 530, 2008), *available at* http://ssrn.com/abstract=1123937 (noting how rating agencies that provided more lax assessment of subprime risks got more business—and more fees—from securitizers). These interinstitutional agency costs come on top of the intrainstitutional 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*, FIN. TIMES, Jan. 16, 2008, at 13 (discussing the conflicts of

that even 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.[15] The multibillion dollar losses incurred by these sophisticated players provide (at least suggestive) evidence that imperfect rationality was not confined to the demand side of the subprime market.[16]

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 rational-

---

interest that exist within lending institutions). Beyond these more subtle—albeit financially substantial—agency costs, there is evidence that some agents-intermediaries withheld information from principals-investors. *See* Bethel et al., *supra* note 12, at 2 (noting that 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).

15 *See* Bethel et al., *supra* note 12, at 27 ("The market appears to have not fully anticipated the probability or effect of correlated market events or the very small probability of an extremely negative outcome."); Martin S. Feldstein, *Housing, Credit Markets and the Business Cycle* 3–4 (Nat'l Bureau of Econ. Research, Working Paper No. 13471, 2007), *available at* http://www.nber.org/papers/w13471 (arguing that investors underestimated and mispriced risks); Gorton, *supra* note 14, at 26 (arguing that the complexity of the securitization process led to a loss of information along the securitization chain); Joseph R. Mason & Joshua Rosner, *Where Did The Risk Go? How Misapplied Bond Ratings Cause Mortgage Backed Securities and Collateralized Debt Obligation Market Disruptions* 35–36 (SSRN Working Paper, 2007), *available at* http://ssrn.com/abstract=1027475 (arguing that investors and investment banks falsely believed that pooling mortgages diversifies risk). Much of this underestimation of risk harkens back to optimism about house prices. *See, e.g.*, Thomas L. Friedman, Op-Ed., *All Fall Down*, N.Y. TIMES, Nov. 26, 2008, at A33 (citing Michael Lewis, *The End of Wall Street's Boom*, PORTFOLIO.COM, Dec. 2008, http://www.portfolio.com/news-markets/national-news/portfolio/2008/11/11/The-End-of-Wall-Streets-Boom (reporting, based on a telephone conversation between hedge fund investor Steve Eisman and a Standard & Poor's employee, that S&P's models assumed that home prices would keep going up)); Kristopher S. Gerardi et al., *Making Sense of the Subprime Crisis* 1 (Fed. Reserve Bank of Boston, Public Policy Discussion Paper No. 09-1, 2008), *available at* http://www.bos.frb.org/economic/ppdp/2009/ppdp0901.htm (finding that analysts in 2005 understood the risks of a steep decline in house prices but believed that the probability of such a decline was very low); *see also, e.g.*, JULIO ROTEMBERG, SUBPRIME MELTDOWN: AMERICAN HOUSING AND GLOBAL FINANCIAL TURMOIL 1 (2008) (quoting 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 1990's.").

16 *See* Bethel et al., *supra* note 12, at 21, 81 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); Press Release, Standard & Poor's, Subprime Write-Downs Could Reach $285 Billion, But Are Likely Past The Halfway Mark (Mar. 13, 2008), *available at* http://www2.standardandpoors.com/portal/site/sp/en/us/page.article/4,5,5,1,1204834027864.html (discussing Standard & Poor's increased estimate of writedowns at $285 billion, up from $265 billion earlier in the year). 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.

ity of borrowers. First, excessive complexity prevents effective comparison shopping and thus hinders competition in the subprime mortgage market. Second, deferred-cost features are correlated with increased levels of delinquency and foreclosure, which impose significant costs not only on borrowers but also on surrounding communities, lenders, loan purchasers, and the economy at large. Third, excessively complex deferred-cost contracts have adverse distributive consequences, disproportionally burdening financially weaker—often minority—borrowers. Finally, concentrating a loan's cost in 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. Accordingly, the subprime meltdown that followed this expansion can also be attributed, at least in part, to the identified contractual design features.[17]

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

---

17 *See* Andrey Pavlov & Susan Wachter, *Subprime Lending and House Price Volatility* 2 (Univ. of Pa. Law Sch. Inst. for Law & Econ., Research Paper No. 08-33, 2008), *available at* http://ssrn.com/abstract=1316891 (establishing a link between the use of aggressive mortgage lending instruments and house price volatility). While contractual design contributed to the subprime expansion, there are other factors that likely played a more central role in generating the subprime expansion. One such factor is the advent of new technology that enabled efficient risk-based pricing. *See* U.S. GEN. ACCOUNTING OFFICE, REPORT TO THE CHAIRMAN AND RANKING MINORITY MEMBER, SPECIAL COMMITTEE ON AGING, U.S. SENATE, GAO-04-280, CONSUMER PROTECTION: FEDERAL AND STATE AGENCIES FACE CHALLENGES IN COMBATING PREDATORY LENDING 21 (2004) [hereinafter GAO CONSUMER PROTECTION REPORT], *available at* www.gao.gov/new.items/d04280.pdf. Another factor is the increase in the supply (or availability) of funds brought about by securitization and the global saving glut. *See generally* Atif Mian & Amir Sufi, *The Consequences of Mortgage Credit Expansion: Evidence from the U.S. Mortgage Default Crisis* (Nat'l Bureau of Econ. Research, Working Paper No. 13936, 2008), *available at* http://ssrn.com/abstract=1072304 (arguing that the expansion in mortgage credit to subprime zip codes and its dissociation from income growth is closely correlated with the increase in securitization of subprime mortgages); Ben S. Bernanke, Governor, Bd. of Governors of the Fed. Reserve Sys., Remarks at the Sandridge Lecture, Virginia Association of Economics, Richmond, Virginia: The Global Saving Glut and the U.S. Current Account Deficit (Mar. 10, 2005), *available at* http://www.federalreserve.gov/boarddocs/speeches/2005/200503102/ (discussing how the global saving glut reversed the flow of credit to developing and emerging-market economies). A third factor is the increase in supply of funds for risky investments caused by investors' underestimation of risk. *See* Feldstein, *supra* note 15. It is important to emphasize that the main purpose of this Article is to explain the contractual design features common in subprime mortgages—not the subprime expansion itself—although, as argued above, contractual design did contribute to the subprime expansion.

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. Thus, ensuring robust competition in the subprime mortgage market would not solve the problem.[18]

The subprime crisis has spurred a plethora of reform proposals.[19] 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.[20] 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.[21] 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, as the APR calculation assigns proper weight to

---

18 *Cf.* Oren Bar-Gill, *The Behavioral Economics of Consumer Contracts*, 92 MINN. L. REV. 749, 751 (2008) [hereinafter Bar-Gill, *Consumer Contracts*] (explaining that competition will not always alleviate mistakes in the consumer-contracts market); Oren Bar-Gill, *Seduction by Plastic*, 98 NW. U. L. REV. 1373, 1388 (2004) [hereinafter Bar-Gill, *Seduction*] (arguing that consumers' underestimation of their future borrowing leads to inefficiencies "that cannot be cured even by perfect competition"); Oren Bar-Gill & Elizabeth Warren, *Making Credit Safer*, 157 U. PA. L. REV. 1, 69 (2008) (noting that competition in the credit markets creates valuable products and features while also creating an "array of risky products and unsafe features").

19 Mortgage reform bills recently proposed in Congress include Emergency Home Ownership and Mortgage Equity Protection Act of 2007, H.R. 3609, 110th Cong. (2007); Home Owners' Mortgage and Equity Savings Act, S. 2133, 110th Cong. (2007); Helping Families Save Their Homes in Bankruptcy Act of 2007, S. 2136, 110th Cong. (2007); Home Owners Mortgage and Equity Savings Act, H.R. 3778, 110th Cong. (2007).

20 *See* Truth in Lending, 73 Fed. Reg. 44,522, 44,524–25 (July 30, 2008) (to be codified at 12 C.F.R. pt. 226); *see also* Housing and Economic Recovery Act of 2008, Pub. L. No. 110-289, § 2502(a), 122 Stat. 2654, 2855–57 (to be codified at 15 U.S.C. § 1638(b)(2)).

21 Truth in Lending Act, Pub. L. No. 90-321, § 107, 82 Stat. 146, 149 (1968) (codified as amended at 15 U.S.C. § 1606 (2006)) (defining the APR); Truth in Lending Act, Pub. L. No. 90-321, §§ 121–31, 82 Stat. 146, 152–57 (1968) (codified as amended at 15 U.S.C. §§ 1631–49 (2006)) (requiring disclosure of the APR).

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 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 thirty years. The actual duration of a mortgage loan is, however, much shorter than thirty years: closer to five years on average in the subprime market. Most borrowers refinance and prepay (or default) long before the thirty-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. 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 regulations[22] and by the recently enacted Housing and Economic Recovery Act.[23] I commend these reforms but argue that more should be done. Elizabeth Renuart and Diane Thompson recently addressed the problem of an insufficiently inclusive APR. They advocate—in the most recent and most

---

22 *See* Truth in Lending, 73 Fed. Reg. 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.").

23 *See* Housing and Economic Recovery Act of 2008 § 2502(a).

comprehensive proposal to create a more inclusive APR—a broader definition of a "finance charge," one that that would cover all, or most, of the costs paid by borrowers.[24] 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 (nor 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 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 excluded 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.[25] While the crisis began with subprime, it did not end there. Defaults and foreclosures are also already appearing in substantial numbers in the Alt-A and even prime markets.[26]

---

24 *See* Elizabeth Renuart & Diane E. Thompson, *The Truth, The Whole Truth, and Nothing but the Truth: Fulfilling the Promise of Truth in Lending*, 25 YALE J. ON REG. 181 (2008). Renuart and Thompson, however, are not the first to recognize that the APR is not sufficiently inclusive, nor are they the first to propose a more inclusive APR. *See* HUD-TREASURY REPORT, *supra* note 11, at 69 (proposing that the law be amended "to require that the full costs of credit be included in the APR"); William N. Eskridge, Jr., *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 (1984) (proposing, over twenty years ago, a more inclusive APR).

25 *See* CHRISTOPHER L. CAGAN, FIRST AM. CORELOGIC, INC., MORTGAGE PAYMENT RESET: THE ISSUE AND THE IMPACT 2 (2007).

26 *See* Stan J. Liebowitz, *Anatomy of a Train Wreck: Causes of the Mortgage Meltdown*, *in* INDEP. INST., HOUSING AMERICA: BUILDING OUT OF A CRISIS (Randall G. Holcombe & Benjamin Powell eds., forthcoming July 2009), *available at* http://ssrn.com/abstract=1211822 (explaining that ARM defaults and foreclosures are as prevalent in the prime market as in

This 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.[27] 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.[28] But this definition establishes a misleading dichotomy. The risk associated with different 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.[29]

---

the subprime market); Gorton, *supra* note 14, 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.").

27 I say "in theory" since many low-risk borrowers end up with high-price subprime loans. *See infra* Part III.A.

28 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 & Adamson, *supra* note 11, at 6.

29 *See, e.g.*, IVY L. ZELMAN ET AL., CREDIT SUISSE, MORTGAGE LIQUIDITY DU JOUR: UNDERESTIMATED NO MORE 13 (2007) [hereinafter CREDIT SUISSE REPORT] (noting that prime conforming conventional loans are "typically limited to buyers with [FICO] scores above 620"); Kristopher Gerardi, Adam Hale Shapiro & Paul S. Willen, *Subprime Outcomes: Risky Mortgages, Homeownership Experiences, and Foreclosures* 5 (Fed. Reserve Bank of Boston, Working Paper No. 07-15, 2007), *available at* http://www.bos.frb.org/economic/wp/wp2007/wp0715.htm ("In the United States, a subprime borrower today typically refers to an indi-

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.[30] 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-point threshold defines "higher-priced loans" under the Home Mortgage Disclosure Act (HMDA).[31] 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."[32]

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 985,000 first-lien subprime loans were originated, while in 2006 that number was approximately 2,780,000 and represented over 20 percent of total loan-origination volume.[33] According to the Congressional Budget

---

vidual 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.").

30 CREDIT SUISSE REPORT, *supra* note 29, at 21. In 2006, the average FICO score of a borrower on a first-lien subprime loan was 618.1. *See* Demyanyk & Van Hemert, *supra* note 1 (manuscript at 7 tbl.1). These data reflect the trend of making subprime loans to high-FICO-score borrowers who exhibit risk factors other than an impaired credit history, such as borrowers who do not wish to produce a down payment ("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* Gerardi et al., *supra* note 29, at 6–7.

31 *See* Michael LaCour-Little, *Economic Factors Affecting Home Mortgage Disclosure Act Reporting*, 29 J. REAL EST. RES. 479, 506 n.3 (2007).

32 Truth in Lending, 73 Fed. Reg. 44,522, 44,531–32 (July 30, 2008) (to be codified at 12 C.F.R. pt. 226) (stating that "[t]he definition of 'higher-priced mortgage loans' appears in § 226.35(a)" and that the average prime offer rate is derived from the Freddie Mac Primary Mortgage Market Survey ®).

33 *See* Demyanyk & Van Hemert, *supra* note 1. The authors' data include 452,000 loans in 2001 and 1,772,000 loans in 2006. *Id.* (manuscript at 7 tbl.1). These data cover approximately 85 percent of securitized subprime loans. *Id.* (manuscript at 6). In 2001, 54 percent of subprime loans were securitized, implying a total of 452,000 / (0.85 * 0.54) = 984,749. *See id.* (manuscript at 6 n.6). In 2006, 75 percent of subprime loans were securitized, implying a total of 1,772,000 / (0.85 * 0.75) = 2,779,608). *See id.*; *see also* CBO OUTLOOK, *supra* note 2, at 23–24 ("The number of subprime mortgages has grown rapidly in recent years: In 2005 and 2006, such loans made up about one-fifth of all originations of home mortgages (in dollar terms) . . . ."); Zywicki & Adamson, *supra* note 11, at 20 (noting that subprime mortgage originations increased from $65 billion in 1995 to $332 billion in 2003); Christopher J. Mayer, Karen M. Pence & Shane M. Sherlund, *The Rise in Mortgage Defaults* 3 (Bd. of Governors of the Fed. Reserve Sys., Fin. & Econ. Discussion Series Paper No. 2008-59, 2008) (recording LP data showing a rise in subprime originations from 1.1 million in 2003 to 1.9 million in 2005); CRL Snapshot, *supra* note 1 (noting that subprime originations accounted for 28 percent of total loan volume in 2006). Focusing on purchase loans, subprime originations have also grown substantially. *See* CREDIT SUISSE RE-

Office (CBO), subprime mortgages "accounted for about 13 percent of all home mortgages at the end of [2006]."[34] 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.[35]

The average size of a subprime loan has also increased. In 2006, the average size of a first-lien subprime loan was $212,000, up from $126,000 in 2001.[36] In terms of loan purpose, in 2006, 42.4 percent of first-lien subprime loans were purchase loans, and 57.6 percent were refinance loans.[37] The average subprime borrower had a debt-to-income ratio of approximately 40 percent and a FICO score of 618.1.[38] The median subprime borrower had a FICO score of 620.[39] The median Alt-A borrower had a FICO score of 705.[40]

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 per-

---

PORT, *supra* note 29, at 4 (noting that the share of subprime purchase loans grew to approximately 20 percent in 2006); Mayer et al., *supra*, at 6 ("[P]urchase loans (as opposed to refinance loans) rose from 30 to 42 percent as a share of subprime originations over the 2003–2006 period . . . .").

34 CBO OUTLOOK, *supra* note 2, at 24.

35 Truth in Lending, 73 Fed. Reg. at 44,533; *see also* Mayer et al., *supra* note 33, at 3 (explaining that "Alt-A originations grew . . . from 304,000 in 2003 to 1.1 million in 2005").

36 *See* Demyanyk & Van Hemert, *supra* note 1 (manuscript at 7 tbl.1).

37 *See id.* Of the 57.6 percent of refinance loans in 2006, 51.4 percent were refinance/cash-out loans, and 6.2 percent were refinance/no-cash-out loans. *Id.* At the peak of the subprime expansion, in 2004, only 35.8 percent of first-lien subprime loans were purchase loans, and 64.2 percent were refinance loans. *See id.* (including both cash-out and no-cash-out loans in the refinance percentage); *see also* MICHAEL FRATANTONI ET AL., MORTGAGE BANKERS ASS'N, THE RESIDENTIAL MORTGAGE MARKET AND ITS ECONOMIC CONTEXT IN 2007, at 24 (MBA Research Monograph Series, 2007) (showing subprime originations by loan purpose and type); LaCour-Little, *supra* note 31, at 498 (noting that a little more than half of the loans in 2004–2005 were refinancing loans). *See generally* Yan Chang & Frank E. Nothaft, *Demystifying the Refi-Share Mystery*, 29 J. REAL EST. RES. 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* Gerardi et al., *supra* note 29, at 4–5, 14 (emphasizing the importance of distinguishing subprime loans made for initial purchase from subprime refinances of existing mortgages and finding that "the average number of mortgages over the life of completed homeownerships is 2.7").

38 *See* Demyanyk & Van Hemert, *supra* note 1 (manuscript at 7 tbl.1).

39 *See* Mayer et al., *supra* note 33, at 6.

40 *Id.*

formed by different entities.[41] I focus on the parties involved in origination and financing since they exert the most influence on the design of the mortgage contract.[42]

In the subprime (and Alt-A) market, mortgages were originated mainly by depository institutions—that is, banks or bank subsidiaries and affiliates—and by mortgage companies,[43] with the bulk of loan volume originated by mortgage companies.[44] 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."[45] In 2006, brokerages accounted for 58 percent of total origination activity.[46]

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,

---

41 *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.").

42 On the role of servicers, see, for example, Kurt Eggert, *Limiting Abuse and Opportunism by Mortgage Servicers*, 15 HOUSING POL'Y DEBATE 753, 755 (2007).

43 U.S. GOV'T ACCOUNTABILITY OFFICE, REPORT TO THE CHAIRMAN, SUBCOMMITTEE ON HOUSING AND TRANSPORTATION, COMMITTEE ON BANKING, HOUSING, AND URBAN AFFAIRS, U.S. SENATE, GAO-06-1021, ALTERNATIVE MORTGAGE PRODUCTS: IMPACT ON DEFAULTS REMAINS UNCLEAR, BUT DISCLOSURE OF RISKS TO BORROWERS COULD BE IMPROVED 7 (2006) [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, *supra* note 31, at 498 ("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.").

44 Robert B. Avery, Kenneth P. Brevoort & Glenn B. Canner, *Opportunities and Issues in Using HMDA Data*, 29 J. REAL EST. RES. 351, 353 (2007) ("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.").

45 GAO AMP REPORT, *supra* note 43. Brokers also play a more direct role via indirect originations. *See* LaCour-Little, *supra* note 31, at 498.

46 Press Release, Access Mortgage Research & Consulting, Inc., New Broker Research Published (Aug. 17, 2007), *available at* http://accessmtgresearch.com/?p=40 ("[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) . . . .").

carved up the expected cash flows, and converted these cash flows into bonds that were secured by the mortgages.[47] At the peak of the subprime expansion, most mortgages were financed through this process of securitization.[48] 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 fifteen subprime lenders divided among themselves 80.5 percent of the market, with no lender holding more than a 13 percent share.[49] The Department of Housing and Urban Development's (HUD) list of lenders that specialize in subprime lending named 210 lenders (although not all of these lenders offer loans nationally).[50] Barriers to

---

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

48 *See* CREDIT SUISSE REPORT, *supra* note 29, at 11 (finding 75 percent securitization rate); Demyanyk & Van Hemert, *supra* note 1 (manuscript at 6 n.6) (reporting securitization rates of 76 percent and 75 percent in 2005 and 2006, respectively). For a good exposition on securitization, see Engel & McCoy, *supra* note 47, at 2045–48. *See generally* Bethel et al., *supra* note 12.

49 *See* CREDIT SUISSE REPORT, *supra* note 29, at 22 (noting that 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%, and that the top fifteen lenders commanded 80.5% of the market). Similar numbers are reported by other sources. *See, e.g.*, 2 MARKET SHARE REPORTER: AN ANNUAL COMPILATION OF REPORTED MARKET SHARE DATA ON COMPANIES, PRODUCTS, AND SERVICES: 2008, at 704–05 (Robert S. Lazich, ed., 2008) (reporting that the top ten lenders commanded less than 58.8 percent of the market with no single lender controlling more than 8.3 percent of the market, based on a conservative combination of the two sources cited in *Market Share Reporter*). The 2005 figures are similar. *See* 2 MARKET SHARE REPORTER: AN ANNUAL COMPILATION OF REPORTED MARKET SHARE DATA ON COMPANIES, PRODUCTS, AND SERVICES: 2007, at 719 (Robert S. Lazich ed., 2007) (reporting that the top ten lenders commanded less than 51 percent of the market with no single lender controlling more than 9 percent of the market). These numbers represent the outcome of a consolidation process.

50 *See* Randall M. Scheessele, *HUD Subprime and Manufactured Home Lender List*, HUD USER, Mar. 16, 2007, http://www.huduser.org/datasets/manu.html (describing the 2005 list). Many other lenders, while not specializing in subprime lending, also offer subprime loans. *See* Avery et al., *supra* note 44, at 353 (noting that there were 8,850 Home Mortgage Disclosure Act (HMDA) reporting institutions in 2005).

entry in this industry have been substantially reduced with the growth in securitization, which enables entry by new, small lenders.[51] The internet has enhanced competition by reducing shopping costs.[52] The FRB, at least, characterized this market as competitive.[53]

Nevertheless, because many consumers engage in limited shopping, several observers have expressed concerns about the level of competition in the subprime market.[54] The increasing complexity of mortgage products renders comparison shopping more difficult and limits the efficacy of the shopping that does occur.[55] In fact, limited shopping may be a rational response to its reduced efficacy. The result is imperfect information and imperfect competition.[56] 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.[57] And two recent studies—one by the Government Accountability Office (GAO) and another by the Federal Trade Commission (FTC) and the Department of Justice (DOJ)—have expressed concerns about the level of competition in the real

---

51 *See* Engel & McCoy, *supra* note 47, at 2041 ("[S]ecuritization funds small, thinly capitalized lenders and brokers, thus enabling 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 capital, helping to make them judgment-proof.").

52 *See, e.g.*, LendingTree.com, Lender Ratings, http://www.lendingtree.com/stm3/lenders/scorecard.asp (last visited Mar. 10, 2009) (listing over 250 affiliated lenders). Although clearly not all of these lenders offer subprime loans, and those who do might not offer loans nationally.

53 Truth in Lending, 73 Fed. Reg. 1672, 1674 (proposed Jan. 9, 2008) (to be codified at 12 C.F.R. pt. 226) ("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.").

54 *See, e.g.*, Marsha J. Courchane, Brian J. Surette & Peter M. Zorn, *Subprime Borrowers: Mortgage Transitions and Outcomes*, 29 J. REAL EST. FIN. & ECON. 365, 371–72 (2004) (finding, based on a survey study, that subprime borrowers search less and are less informed).

55 *See* Willis, *supra* note 4, at 726–27. The limits of advertising in the subprime market further increase the cost of comparison shopping. *See* Truth in Lending, 73 Fed. Reg. 44,522, 44,524 (July 30, 2008) (to be codified at 12 C.F.R. pt. 226) ("[P]rice 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.").

56 *See* Eskridge, *supra* note 24, *passim* (stating that imperfect information, largely driven by limited shopping, has lead to monopolistic competition, rather than perfect competition); Willis, *supra* note 4, at 749 (arguing that lack of sufficient disclosure and low levels of financial literacy among borrowers make shopping extremely difficult).

57 *See* Real Estate Settlement Procedures Act (RESPA): Rule to Simplify and Improve the Process of Obtaining Mortgages and Reduce Consumer Settlement Costs, 73 Fed. Reg. 68,204, 68,207 (Nov. 17, 2008) (to be codified at 24 C.F.R. pts. 203, 3500) (describing "important changes that should increase consumer understanding and competition in the mortgage marketplace").

estate brokerage industry, which, as explained above, plays an important role in the loan origination process.[58]

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 ten securitizers—Lehman Brothers, Bear Stearns, Morgan Stanley, JP Morgan, Credit Suisse, Bank 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.[59]

D. Regulatory Scheme

The regulatory authority over mortgage lending is divided between the federal and state levels and among several regulators at the

---

58 *See generally* U.S. GOV'T ACCOUNTABILITY OFFICE, REPORT TO THE COMMITTEE ON FINANCIAL SERVICES, HOUSE OF REPRESENTATIVES, GAO-05-947, REAL ESTATE BROKERAGE: FACTORS THAT MAY AFFECT PRICE COMPETITION (2005); U.S. DEP'T OF JUSTICE & FED. TRADE COMM'N, COMPETITION IN THE REAL ESTATE BROKERAGE INDUSTRY: A REPORT BY THE FEDERAL TRADE COMMISSION AND THE U.S. DEPARTMENT OF JUSTICE (2007), *available* at www.ftc.gov/reports/realestate/V050015.pdf [Hereinafter DOJ & FTC REPORT]. There are about 98,000 brokerage firms; they employ around 2.5 million real estate licensees. *See* DOJ & FTC REPORT, *supra*, at 31. Of these firms, 60 percent have fewer than five agents and operate locally, and only about 5 percent have more than fifty agents. *See id.* Indeed, competition among brokers is primarily local; on the national level in 2004, the top ten firms accounted for only 9.1 percent of the market share, while at the local level, top firms often control much larger market shares. *See id.* 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) that are typically operated by local groups affiliated with the National Association of Realtors. *See id.* at 10. Access to the MLS is limited to members, who use the database to list homes for sale on behalf of sellers and to search for homes on behalf of buyers. *Id.* While the MLS limits both access and competition, it also reduces costs for brokers and customers. *Id.* at 12–14. Competition is 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. For further discussion, see Eskridge, *supra* note 24, at 1148–49; Matthew Magura, *How Rebate Bans, Discriminatory MLS Listing Policies, and Minimum Service Requirements Can Reduce Price Competition for Real Estate Brokerage Services and Why It Matters* (U.S. Dep't of Justice Econ. Analysis Group, Discussion Paper No. 07-8, 2007), *available at* http://ssrn.com/abstract=997137.

59 *See* Bethel et al., *supra* note 12, at 81 tbl. 2.

federal level.[60] 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.[61] Moreover, the federal banking agencies can use § 8 of the Federal Deposit Insurance Act to prevent unfair or deceptive acts or practices under § 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.[62] Focusing on high-priced mortgage loans—that is, 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.[63] The FRB also promulgates disclosure regulations under TILA.[64] Additional disclosure regulations are promulgated by HUD under RESPA, which governs the loan-closing process.[65]

Nondepository institutions—that is, nonbanks, including mortgage companies, brokers, and advertisers—fall under the jurisdiction of the 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.[66]

---

60 William Eskridge ably summarizes the history of mortgage lending regulation in the U.S. *See* Eskridge, *supra* note 24.

61 15 U.S.C. §§ 57b-1 to -4 (2006).

62 *See* Comptroller of the Currency, Administrator of National Banks, Guidance on Unfair or Deceptive Acts or Practices, Advisory Letter No. 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).

63 *See* Truth in Lending, 73 Fed. Reg. 44,522, 44,527 (July 30, 2008) (to be codified at 12 C.F.R. pt. 226); Raphael W. Bostic et al., *State and Local Anti-Predatory Lending Laws: The Effect of Legal Enforcement Mechanisms*, 60 J. ECON. & BUS. 47, 49 (2008); Willis, *supra* note 4, at 744–54.

64 *See, e.g.*, sources cited *supra* note 21.

65 *See* Real Estate Settlement Procedures Act (RESPA): Rule to Simplify and Improve the Process of Obtaining Mortgages and Reduce Consumer Settlement Costs, 73 Fed. Reg. 68,204 (Nov. 17, 2008) (to be codified at 24 C.F.R. pts. 203, 3500). RESPA applies to all "federally related mortgage loans," a somewhat broader category than loans originated by depository institutions. 24 C.F.R. § 3500.5(a) (2008).

66 Letter from Donald S. Clark, Sec'y, U.S. Fed. Trade Comm'n, to Jennifer L. Johnson, Sec'y, Bd. of Governors of the Fed. Reserve Sys. 1 (Sept. 14, 2006), *available at* http://

At the state level, mini-FTC statutes prohibit unfair and deceptive acts and practices. Likewise, mini-HOEPA statutes, as well as other statutes, ban or restrict specific practices, such as prepayment penalties and balloon clauses.[67] There is substantial variation in the scope and enforcement of state-level laws.[68] Because some states clearly go further than federal regulators in their attempts to protect borrowers,[69] there have been heated preemption battles, especially with the OCC and other federal banking agencies. State law is being increasingly preempted by federal law.[70]

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

---

www.federalreserve.gov/SECRS/2006/November/20061121/OP-1253/OP-1253_53_1.pdf [hereinafter FTC Comment] (commenting on the FRB's hearing notice, published in the Federal Register, regarding the Home Equity Lending Market).

67 *See* Bostic et al., *supra* note 63 (describing the mini-HOEPA statutes and older anti-predatory lending laws restricting the use of prepayment penalties and balloon clauses).

68 *See id.*; Anthony Pennington-Cross & Giang Ho, *The Termination of Subprime Hybrid and Fixed Rate Mortgages* 8–9 (Fed. Reserve Bank of St. Louis, Research Div., Working Paper No. 2006-042A, 2006), *available at* http://research.stlouisfed.org/wp/2006/2006-042.pdf; Ctr. for Responsible Lending, CRL State Legislative Scorecard: Predatory Mortgage Lending, http://www.responsiblelending.org/issues/mortgage/statelaws.html (last visited Mar. 12, 2009).

69 *See* Bar-Gill & Warren, *supra* note 18, at 79–83; *see also* Eggert, *supra* note 42, at 774–75 (noting that many states have implemented regulations that are more stringent than the regulations promulgated by HUD under RESPA).

70 *See* Julia Patterson Forrester, *Still Mortgaging the American Dream: Predatory Lending, Preemption, and Federally Supported Lenders*, 74 U. CIN. L. REV. 1303 (2006); Christopher L. 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); *see also* Bar-Gill & Warren, *supra* note 18, at 79–83. 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 43, 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 prelicensure 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 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.

Id.

down.[71] Still, the proposed analysis is more than a 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 noncredit markets.

II
THE SUBPRIME MORTGAGE CONTRACT

The traditional, prime mortgage contract is a relatively simple, fixed-rate, thirty-year loan for 80 percent, or less, of the home price (that is, a down payment of at least 20 percent is required).[72] 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 down payments and high LTVs, escalating payments, and prepayment penalties.

---

71 *See, e.g.*, Ben S. Bernanke, Chairman, Bd. of Governors of the Fed. Reserve Sys., Testimony Before the Committee on the Budget, U.S. House of Representatives: The Economic Outlook (Jan. 17, 2008), *available at* http://www.federalreserve.gov/newsevents/testimony/bernanke20080117a.htm (noting the "virtual shutdown of the subprime mortgage market").

72 *See, e.g.*, FTC Comment, *supra* note 66, at 5 (describing the traditional mortgage contract); *see also* GAO CONSUMER PROTECTION REPORT, supra note 17, at 21 ("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 715–18 (describing the traditional mortgage that dominated the market until the end of the twentieth century); Kristopher Gerardi, Harvey S. Rosen & Paul Willen, *Do Households Benefit from Financial Deregulation and Innovation? The Case of the Mortgage Market* 1 (Nat'l Bureau of Econ. Research, Working Paper No. 12967, 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 . . . .").

1. *Small Down Payments and High LTVs*

The down payment, 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 down payment, and 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. Second, because in many cases, a close (formal or informal) relationship between the seller and the lender allows payment shifting between these two parties.[73]

One way to defer the costs associated with a home purchase is to reduce the down payment. Indeed, the size of the average down payment declined during the subprime expansion. Traditionally, a home buyer was required to make a down payment equal to (at least) 20 percent of the purchase price.[74] In 2005 and 2006, the median subprime home buyer put no money down, borrowing 100 percent of the purchase price of the house.[75] Down payments were a bit higher in the Alt-A market, with a median value of 5 percent in 2006.[76]

The flip side of the down payment is the LTV ratio. In a purchase loan, a 10 percent down payment 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 an LTV ratio of (at most) 80 percent, over 40 percent of subprime loans originated in

---

73 *See* Eskridge, *supra* note 24, at 1124–27.

74 *See, e.g.*, FTC Comment, *supra* note 66, at 5 (describing the traditional mortgage contract).

75 *See* Mayer et al., *supra* note 33, at 33 tbl.2B; *see also* FTC Comment, *supra* note 66, at 10 n.45 (indicating that, in the few years prior to 2005, over 40 percent of first-time home buyers did not make any down payment at all); Gerardi et al., *supra* note 29, at 44 tbl.2 (finding—using the HUD-list definition of "subprime" and Massachusetts data—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); Amy Hoak, *100% More Difficult: First-Time Home Buyers 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) (stating that for the period between July 2006 and June 2007, the National Association of Realtors estimated that 45 percent of first-time home buyers opted for 100 percent financing).

76 Mayer et al., *supra* note 33, at 33 tbl.2B.

2006 had combined LTVs exceeding 90 percent.[77] LTVs were somewhat lower in the Alt-A market.[78]

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 19.9 percent of first-lien subprime loans were FRMs.[79] The vast majority of loans were ARMs or 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 2003 to 2007 were 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).[80] In 2006, the average initial rate was 8.4 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 11.4 percent.[81] The expected increase in the

---

77 *See* Ben S. Bernanke, Chairman, Bd. of Governors of the Fed. Reserve Sys., Speech at the Independent Community Bankers of America Annual Convention, Orlando, Florida: Reducing Preventable Mortgage Foreclosures (Mar. 4, 2008), *available at* http://www.federalreserve.gov/newsevents/speech/bernanke20080304a.htm [hereinafter Bernanke March 2008 Speech] (basing this figure 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—that 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. *See* U.S. Dep't of Hous. & Urban Dev., PMI Act Information, http://www.hud.gov/offices/hsg/sfh/res/respapmi.cfm (last visited Mar. 13, 2009). The insurance premium for the PMI is often financed through a second mortgage, further increasing the LTV.

78 Mayer et al., *supra* note 33, at 33 tbl.2B.

79 *See* Demyanyk & Van Hemert, *supra* note 1 (manuscript at 7 tbl.1) (counting only non-I/O, nonballoon FRMs); *see also* Pennington-Cross & Ho, *supra* note 68, at 1 (finding that, between 2003 and 2005, "the ARM market share for securitized subprime loans has ranged from just approximately 60 percent to over 80 percent").

80 *See* Truth in Lending, 73 Fed. Reg. 44,522, 44,540 (July 30, 2008) (to be codified at 12 C.F.R. pt. 226). 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 (that is, index plus margin) level. *See* Joe Peek, *A Call to ARMs: Adjustable Rate Mortgages in the 1980s*, NEW ENG. ECON. REV., Mar.–Apr. 1990, at 47, 54.

81 *See* Demyanyk & Van Hemert, *supra* note 1 (manuscript at 7 tbl.1) (reporting the average initial rate, 8.4 percent, and the average margin, 6.1 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. *See* ARM Index Values—2006 Fannie Mae LIBOR, https://www.efanniemae.com/sf/refmaterials/libor/index.jsp (last visited Mar. 13, 2009); *see also* Mayer et al., *supra* note 33, at 11 (noting that, between 2003 and 2007, the initial (teaser) rate on subprime hybrids remained relatively constant, "hover[ing] in the range of 7.5 to 8.5 percentage points"). The fully indexed rate was lower than the initial rate in 2003 and early 2004 when short-term interest rates were low.

monthly payment at the end of the low-rate introductory period was substantial.[82] Monthly payments escalated even more steeply in Alt-A (and prime) mortgages, where teaser rates were set further below the market rate.[83] These contracts stipulated an increase of up to 100 percent, or $1,500 on average, in the monthly payment at the end of the introductory period.[84] According to one estimate, rate resets have increased borrowers' annual mortgage payments by about $42 billion.[85]

The escalating-payments feature was most pronounced in interest-only (I/O) mortgages and payment-option (or simply, option) mortgages.[86] 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.[87] The most popular I/O mortgages are hybrid loans, where the introductory interest rate is fixed and the postintroductory interest rate is variable.[88] In 2006, approximately 20 percent of subprime originations and over 40 percent of Alt-A originations were I/O mortgages.[89]

Id. In 2005, the fully indexed rate was nearly 350 basis points above the initial rate. *Id.* In 2006 and early 2007, the fully indexed rate was closer to 300 basis points above the initial rate. *Id.*

82 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 March 2008 Speech, *supra* note 77 (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?* 10 (presentation at FTC Mortgage Conference, May 29, 2008), *available at* http://www.ftc.gov/be/workshops/mortgage/presentations/willen_paul.pdf (finding that payment shock for a typical subprime borrower in 2007 was 15 percent). Moreover, 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, as of December 2006, subprime ARMs originated between 2004 and 2006 calculated an approximate monthly payment increase of $400. *See* CAGAN, *supra* note 25, at 44.

83 *See* CAGAN, *supra* note 25, at 13 tbl.4 (showing "red" nonsubprime loans with less steep resets than the "orange" subprime loans).

84 *See id.* at 13 tbl.4 (estimating a 97 percent increase); *id.* at 44 (estimating payment increases exceeding $1,500).

85 *See id.* 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.

86 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.

87 *See* FTC Comment, *supra* note 66, at 6–7 ("I/O loans provide for an initial loan period during which borrowers pay only the interest that is accruing on the loan balance. When the initial period expires, the borrower's payments expand to pay both principal and interest.").

88 *See id.* at 7 (describing hybrid-rate I/O loans as "[p]articularly popular").

89 *See* CREDIT SUISSE REPORT, *supra* note 29, at 28 (showing that I/O loans constituted $171 billion of the $824 billion in subprime loans); *see also* Mayer et al., *supra* note 33, at 7

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

> [o]ption 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 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.[90]

While I/O mortgages are zero-amortization loans, option ARMs imply negative amortization by allowing below-interest monthly payments.[91] Accordingly, at the end of the introductory period, or even earlier, a borrower might end up owing more than the value of the home.[92] 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.[93] Option ARMs were rare in the subprime market but quite popular in the Alt-A market. By 2006 and 2007, more than 25 percent of Alt-A loans were option ARMs.[94] 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.[95]

("Forty percent of Alt-A mortgages involved only interest payments without any scheduled principal repayment (only about 10 percent of subprime mortgages have such an interest-only feature).").

90 FTC Comment, *supra* note 66, at 7 (footnotes omitted).

91 *See id.* at 9 ("Generally, when a consumer has made only the minimum payment [on an option ARM], the loan 'negatively amortizes,' so that the amount the person owes is increased by the difference between the interest accruing and the minimum amount paid.").

92 *Id.*

93 *See* CAGAN, *supra* note 25, at 56 tbl.30 (finding that, as of December 2006, 22.4 percent of subprime ARMs originated between 2004 and 2006 had zero or negative equity). Another 5 percent drop in house prices, as happened after December 2006, increases the 22.4 percent figure to 36 percent.

94 *See* Mayer et al., *supra* note 33, at 13–14; *see also* CREDIT SUISSE REPORT, *supra* note 29, at 26, 28 (finding, based on nonagency MBS data, that in 2006, option ARMs comprised approximately 0.5 percent of the subprime market and 30 percent of the Alt-A market).

95 Truth in Lending, 73 Fed. Reg. 44,522, 44,541 (July 30, 2008) (to be codified at 12 C.F.R. pt. 226) (stating that, according to one estimate, 78 percent of Alt-A originations in 2006 were either I/O or option mortgages). Looking more broadly at the entire residential mortgage market, the Government Accountability Office found that "[f]rom 2003 through 2005, AMP originations grew threefold, from less than 10 percent of residential

These deferrals led to substantial increases—exceeding 100 percent in some cases—in the monthly payment at the end of the introductory period.[96]

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.[97] The penalty amount is usually expressed as a percentage of the outstanding balance on the loan, up to 5 percent,[98] or as the sum of a specified number of months, commonly six 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.[99]

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

---

mortgage originations to about 30 percent. Most of the AMPs originated during this period consisted of interest-only and payment-option ARMs." GAO AMP REPORT, *supra* note 43, at 3. Likewise, the Mortgage Bankers Association (MBA) noted that "[i]nterest 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." FRATANTONI ET AL., *supra* note 37, at 3.

96 *See* GAO AMP REPORT, *supra* note 43, at 14 (describing an example with a 128 percent increase in the monthly payment at the end of the 5-year payment option period); FTC Comment, *supra* note 66, at 9 (referring to "payment shock"). With an option ARM, 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 percent 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, *supra* note 31, at 484; FTC Comment, *supra* note 66, at 9.

97 *See* Mayer et al., *supra* note 33, at 7; *see also* Demyanyk & Van Hemert, *supra* note 1 (manuscript at 7 tbl.1) (showing that in 2006, 71 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 FRMs, only 40 percent of which have prepayment penalties. *See* Pennington-Cross & Ho, *supra* note 68, at 11–12.

98 *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 (describing one contractual design that 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).

99 Gretchen Morgenson, *Inside the Countrywide Lending Spree*, N.Y. TIMES, Aug. 26, 2007, § 3, at 1; *see also* ERIC STEIN, COAL. FOR RESPONSIBLE LENDING, QUANTIFYING THE ECONOMIC COSTS OF PREDATORY LENDING 7–9 (2001), *available at* http://www.responsiblelending.org/pdfs/Quant10-01.pdf (estimating prepayment penalty revenues at $2.3 billion each year).

rates, then the escalating-payments feature becomes moot. Prepayment penalties make it more difficult for borrowers to evade the escalating payments.[100] 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—that is, the prepaying borrower will only pay a penalty if she prepays within the specified period.[101] Further, in many contracts the prepayment-penalty period expired before the end of the low-rate introductory period.[102] 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.[103] Prepayment penalties thus produce the temporal-shift characteristic of deferred-cost contracts: pay less now, pay more later.

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

---

100 *See Hearing*, *supra* note 1, at 11 (explaining how prepayment penalties "protected lenders from the potential churning of mortgages with very low initial rates"); Zywicki & Adamson, *supra* note 11, at 18 (noting that lenders needed prepayment penalties to recoup their upfront costs because subprime borrowers often financed closing costs and had low introductory rates).

101 *See* Michael LaCour-Little & Cynthia Holmes, *Prepayment Penalties in Residential Mortgage Contracts: A Cost-Benefit Analysis*, 19 HOUSING POL'Y DEBATE 631, 635 (2008).

102 *See* Mayer et al., *supra* note 33, at 12 ("[P]repayment penalties were scheduled to be in effect after the end of the teaser period for only 7 percent of the subprime short-term hybrids originated from 2003 to 2007, and over these years the share originated with such a provision dropped from 10 to 2 percent.").

103 *See* Gregory Elliehausen, Michael E. Staten & Jevgenijs Steinbuks, *The Effect of Prepayment Penalties on the Pricing of Subprime Mortgages*, 60 J. ECON. & BUS. 33, 34 (2008); LaCour-Little & Holmes, *supra* note 101, at 642; Chris Mayer, Tomasz Piskorski & Alexei Tchistyi, The Inefficiency of Refinancing: Why Prepayment Penalties Are Good for Risky Borrowers 18 (Apr. 28, 2008) (unpublished manuscript), *available at* http://www1.gsb.columbia.edu/mygsb/faculty/research/pubfiles/3065/Inefficiency%20of%20Refinancing.pdf.

governing the application of these multiple prices.[104] 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—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 that applies for the first two years of the loan. After the two-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 magnitude of both the periodic and total rate adjustment.[105]

Other products are even more complex. As detailed above, option ARMs commonly specify four different options for each monthly payment.[106] 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 postorigination fees. Origination fees are paid at closing—that is, at the consummation of the credit transaction. Before closing a loan contract, the lender obtains information

104 *See* GAO CONSUMER PROTECTION REPORT, *supra* note 17, 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); JAMES M. LACKO & JANIS K. PAPPALARDO, FED. TRADE COMM'N, IMPROVING CONSUMER MORTGAGE DISCLOSURES: AN EMPIRICAL ASSESSMENT OF CURRENT AND PROTOTYPE DISCLOSURE FORMS, at ES-11 (2007) (explaining that subprime borrowers have more difficulty answering questions about their loans than prime borrowers); Renuart & Thompson, *supra* note 24, at 196 ("The lender-created complexity of mortgage loans now exceeds what most consumers, even highly educated consumers, are capable of comprehending."); Zywicki & Adamson, *supra* note 11, at 55–56 (explaining that subprime loans are more complex than prime loans, and that it is more likely that a subprime borrower will misunderstand her loan terms).

105 See Peek, *supra* note 80, at 53.

106 *See supra* Part II.A.2.

about the 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).[107] 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 $26 fee for flood certification, and a $60 fee for the tax certification.[108] In 2006, Countrywide's appraisal fee revenues totaled $137 million, and its credit report fee revenues totaled $74 million.[109]

Separate fees are charged for analyzing the acquired information. These include escrow analysis fees, which cover the cost of determining the appropriate balance for the escrow account and the borrower's monthly escrow payments, and underwriting analysis fees, which cover the costs of analyzing a borrower's creditworthiness.[110] Still more fees are charged for insuring against identified risks, including premiums for credit insurance, title insurance, and private mortgage insurance (PMI).[111]

Also at closing, the lender charges fees for administrative services associated with the loan-origination process, such as preparing documents, notarizing documents, and sending e-mails, faxes, and courier mail.[112] For example, some Countrywide loans included fees of $45 to ship documents overnight and $100 to e-mail documents.[113] And then there are the general fees: for loan origination, loan processing, signing documents, and closing the loan.[114] 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.[115]

---

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

108 Morgenson, *supra* note 99. As Morgenson points out, "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.*

109 *Id.*

110 Pamela Reeves, *Many Settle for Really Bad Terms to Get a House*, SCRIPPS HOWARD NEWS SERVICE, July 19, 2001; Mortgage Ctr., Inside Scoop—Current Tips: Junk Fees—What You Don't Know Can Hurt You, http://www.mtgctr.com/tips/default.asp?gaid=4 (last visited Apr. 9, 2009).

111 *See* Renuart, *supra* note 107, at 493; Willis, *supra* note 4, at 725. According to one—now dated—estimate, financed credit insurance costs borrowers $2.1 billion each year. *See* STEIN, *supra* note 99, at 5–7.

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

113 Morgenson, *supra* note 99.

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

115 *See* Willis, *supra* note 4, at 786; *see also* HUD-TREASURY REPORT, supra note 11, at 21 (noting origination fees of up to 10 percent of the loan amount, "far exceed[ing] what would be expected or justified based on economic grounds"). According to HUD, borrowers are paying excess fees averaging $700 per mortgage. *See* News Release, U.S. Dep't of

These fees are often financed into the loan amount and form the basis for additional interest charges.[116]

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.[117] Again, these fees can be substantial. Prepayment penalties and foreclosure fees can amount to thousands of dollars.[118] Late fees can amount to 5 percent of the monthly payment.[119]

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 nontrivial. A commonly used rule of thumb would have borrowers prepay when the expected savings 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

---

Hous. & Urban Dev., HUD Proposes Mortgage Reform to Help Consumers Better Understand Their Loan, Shop for Lower Costs (Mar. 14, 2008), *available at* http://www.hud.gov/news/release.cfm?content=pr08-033.cfm. According to Michael Kratzer, founder of FeeDisclosure.com, a website 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*, N.Y. TIMES, Dec. 23, 2007, § 3, at 1. Kratzer estimates that "junk fees" have risen 50 percent in recent years. *See* Gretchen Morgenson, *Given a Shovel, Digging Deeper Into Debt*, N.Y. TIMES, July 20, 2008, at A1.

116 *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—cost borrowers $1.8 billion each year. *See* STEIN, *supra* note 99, at 7.

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

118 *See supra* Part II.A.3.

119 *See* Freddie Mac, Glossary of Finance and Economic Terms, http://www.freddiemac.com/smm/g_m.htm#L (last visited Mar. 13, 2009); *see also* Morgenson, *supra* note 99 (noting that, in 2006, Countrywide's revenues from late charges amounted to $285 million).

expected benefits exceed transaction costs, 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 be solved only by high-powered computers implementing sophisticated numeric algorithms.[120] 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.

4. *A Complex Array of Complex Products*

A typical subprime or Alt-A contract is multidimensional and complex. Complexity, however, 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. Borrowers 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 postintroductory 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 is evident. In reality the borrower must choose between more than two products.[121]

---

120 *See* Sumit Agarwal, John C. Driscoll & David Laibson, *Optimal Mortgage Refinancing: A Closed Form Solution* 5–6 (Nat'l Bureau of Econ. Research, Working Paper No. 13487, 2007), *available at* http://www.nber.org/papers/w13487.

121 *See* WILLIAM C. APGAR, JR. & CHRISTOPHER E. HERBERT, U.S. DEP'T OF HOUS. & URBAN DEV., SUBPRIME LENDING AND ALTERNATIVE FINANCIAL SERVICE PROVIDERS: A LITERATURE REVIEW AND EMPIRICAL ANALYSIS § 2.2.3 (2006) (describing "the bewildering array of mortgage products available").

C. Summary

In this Part, I described several common contractual design features of subprime and Alt-A mortgages.[122] 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.[123] While cost deferral and high levels of complexity are not unique to subprime loans, 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 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.[124]

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 fea-

---

122 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. Unlike the traditional mortgage transaction, many subprime mortgages are based on little or no documentation of income and assets. In 2006, 62.3 percent of first-lien subprime loans were no-doc or low-doc loans. *See* Demyanyk and Van Hemert, *supra* note 1 (manuscript at 7 tbl.1); *see also* CREDIT SUISSE REPORT, *supra* note 29, at 4 ("Roughly 50% of all subprime borrowers in the past two years [i.e., 2005–2006] have provided limited documentation regarding their incomes."). Further, "[w]hile 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%." CREDIT SUISSE REPORT, *supra* note 29, at 5.

123 *See* Peek, *supra* note 80, at 50, 54; *see also* Zywicki and Adamson, *supra* note 11, at 5–7 (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 (interest-only mortgages are standard in the United Kingdom) and in other sectors (corporate bonds are designed as interest-only loans).

124 *See* CREDIT SUISSE REPORT, *supra* note 29, at 1 ("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 99 (reporting that on February 23, 2007 Countrywide stopped offering no-doc loans for more than 95 percent of a home's appraised value, and on March 16, 2007 it eliminated piggyback loans).

tures. 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 down payment, 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.[125] Deferred-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. 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 down payments (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 availa-

125 *See* GAO AMP REPORT, *supra* note 43, 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."); Mayer et al., *supra* note 33, at 7 ("[S]ubprime borrowers may have turned to these products in an attempt to obtain more affordable monthly payments."). Affordability concerns were especially acute in areas where rapidly rising home prices forced borrowers to take larger loans, which, if they were traditional FRMs, implied larger down payments and higher monthly payments. *See* CREDIT SUISSE REPORT, *supra* note 29, 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 . . . . In order to mitigate the record price increases seen throughout the majority of the country in the first half of this decade, home buyers became increasingly dependant on exotic mortgage products intended to reduce down payments and monthly payments."); FRATANTONI ET AL., *supra* note 37, at 23 ("IOs in particular allowed borrowers to afford homes in a booming market."); Szu-Yin Kathy Hung & Charles Tu, *An Examination of Housing Price Appreciation in California and the Impact of Alternative Mortgage Instruments*, 17 J. HOUSING RES. 33 (2008) (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).

ble income is expected to increase as fast as (or faster than) the escalating mortgage payments.[126]

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) . . . ."[127] 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 second-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

---

126 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 the low short-term payments but not the high long-term payments. *See Hearing, supra* note 1, at 11 ("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* Truth in Lending, 73 Fed. Reg. 44,522, 44,539 (July 30, 2008) (to be codified at 12 C.F.R. pt. 226) ("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."). The effect of these regulations, had they come sooner, could have been substantial. In a presentation to investors, Countrywide Financial acknowledged that it would have refused 89 percent of its 2006 borrowers and 83 percent of its 2005 borrowers, representing $138 billion in mortgage loans, had it followed the long-term affordability standards adopted in the FRB's regulations. *See* Binyamin Appelbaum & Ellen Nakashima, *Banking Regulator Played Advocate over Enforcer: Agency Let Lenders Grow out of Control, Then Fail*, WASH. POST, Nov. 23, 2008, at A1.

Some have blamed the government for the lowering of underwriting standards. *See* Liebowitz, *supra* note 26 (manuscript at 3–8) (arguing that policymakers, eager to expand home ownership, especially in lower-income and minority segments, facilitated—even mandated, through threats of Community Reinvestment Act challenges—lower underwriting standards).

127 *See* BD. OF GOVERNORS OF THE FED. RESERVE SYS. ET AL., INTEREST-ONLY MORTGAGE PAYMENTS AND PAYMENT-OPTION ARMS—ARE THEY FOR YOU? 7 (2006), *available at* http://www.federalreserve.gov/pubs/mortgage_interestonly/mortgage_interestonly.pdf [hereinafter FRB, INTEREST ONLY]; *see also* FTC Comment, *supra* note 66, 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* 35 tbl.2, 39 tbl.6 (Fed. Reserve Bank of San Francisco, Working Paper No. 2007-05, 2007), *available at* http://www.frbsf.org/publications/economics/papers/2007/wp07-05bk.pdf.

three million hybrid loans originated per year at the height of the subprime market.[128]

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.[129] 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.[130] 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—that is, from rising income. A less literal interpretation of affordability may include an expectation to avoid, rather than make, the high future

---

128 The three million estimate is based on the 2,780,000 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.

129 *See* FRB, INTEREST ONLY, *supra* note 127 (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 66, at 8 (noting the advantage of alternative mortgage products for borrowers with variable income).

130 *See* Paulson, *supra* note 2. In October 2007, Treasury Secretary Hank Paulson observed,

> 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.

Id. Recall that for 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.

payments, specifically by refinancing the loan before the low-rate introductory period ends.[131]

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 introductory period),[132] (2) the 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 would 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.[133] 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.[134]

---

131 *See* Truth in Lending, 73 Fed. Reg. 1672, 1687 (proposed Jan. 9, 2008) (to be codified at 12 C.F.R. pt. 226) ("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 . . . ."); FTC Comment, *supra* note 66, at 8 ("[B]orrowers who are confident they will sell or refinance their homes for an equal or increased value before the introductory period of the loan expires may benefit from alternative loan options.").

132 *See* Mayer et al., *supra* note 33, at 11 ("Industry participants claim that teaser mortgages were never designed as long-term mortgage products. Instead, they argue that the two- or three-year teaser period was designed for consumers with tarnished credit to improve their credit scores by making regular payments . . . .").

133 Prepayment to avoid high post-reset rates was common before the subprime crisis hit and the credit crunch set in. *See* Pennington-Cross & Ho, *supra* note 68, at 10 (finding, based on LP data, that hybrid mortgages tend to prepay quickly around the first mortgage reset date); Shane M. Sherlund, *The Past, Present, and Future of Subprime Mortgages* 10 (Bd. of Governors of the Fed. Reserve Sys., Fin. & Econ. Discussion Series Paper No. 2008-63, 2008) (finding that "prepayments jump during reset periods").

134 Truth in Lending, 73 Fed. Reg. at 1688. 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 103, at 12. 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

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.[135] 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.[136] While this explanation for the prevalence of prepayment penalties is persuasive, it is likely incomplete. This explanation implies that prepayment penalties replace higher interest rates. There is evidence, however, that the amounts paid in penalties *ex post* exceed the foregone interest payments that were not paid *ex ante*.[137]

2. *Speculation*

An alternative rational-choice explanation portrays the deferred-cost mortgage as an investment vehicle designed to facilitate speculation on real estate prices.[138] 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.[139] 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

---

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. *See id.* at 12–13.

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

136 *See supra* Part II.A.3.

137 *See* LaCour-Little & Holmes, *supra* note 101, at 662 (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 penalty 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 47, at 2060.

138 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.

139 Mayer et al., *supra* note 33, at 19 (reporting the shares of loans originated on investment properties in the subprime and Alt-A markets).

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. 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.[140]

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 is important to note, however, that a large number of states, including subprime hot spots like California, Colorado, Nevada, and Arizona, have no-recourse laws.[141] 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.[142] 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

---

140 Professor Todd Sinai articulated this strategy nicely:

> 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.

John Leland, *Facing Default, Some Abandon Homes to Banks*, N.Y. TIMES, Feb. 29, 2008, at A1 (reporting the statement by Professor Sinai). Professor Sinai focuses on purchase loans. *See id.* Nevertheless, it should be noted that the speculation explanation applies to refinance loans as well. 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* note 14 and accompanying text. Another set of answers recognizes that lenders enjoyed a substantial portion of the upside benefit. In many cases, an increase in housing prices led to refinancing by the same lender. *See* Gorton, *supra* note 14, at 4–5.

141 *See* 2 MICHAEL T. MADISON, JEFFRY R. DWYER, & STEVEN W. BENDER, THE LAW OF REAL ESTATE FINANCING § 12:69 (rev. ed. 2008). A full list of state laws is available at http://www.foreclosurelaw.org/. For further discussion, see Zywicki & Adamson, *supra* note 11, at 29 n.134 ("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 fifteen to twenty states, including many larger states.").

142 *See* Zywicki & Adamson, *supra* note 11, at 30.

and foreclosure, for many borrowers this cost will amount to tens of thousands of dollars.[143] Despite the cost of default, however, 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 and fast enough, then speculation is rational even if the costs incurred in the unlikely event of default are substantial.[144]

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.[145] As noted by Peter Orszag, the CBO director, "for 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."[146] But 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. This expectation, while it proved to be erroneous for many subprime and Alt-A borrowers *ex post*, may well have been rational *ex ante*.

---

143 *See* ELLEN SCHLOEMER ET AL., CTR. FOR RESPONSIBLE LENDING, LOSING GROUND: FORECLOSURES IN THE SUBPRIME MARKET AND THEIR COST TO HOMEOWNERS 16 (2006), *available at* http://www.responsiblelending.org/pdfs/foreclosure-paper-report-2-17.pdf (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 March 2008 Speech, *supra* note 77 ("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 principal.").

144 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.

145 Robert J. Shiller, *Understanding Recent Trends in House Prices and Home Ownership* 4–5 (Yale Univ. Econ. Dep't, Working Paper No. 28, 2007), *available at* http://www.econ.yale.edu/ddp/ddp25/ddp0028.pdf.

146 *Hearing, supra* note 1, at 10. One indicator, cited by both the CBO and Shiller, that housing prices were high relative to underlying fundamentals, particularly in 2005–2006, was the ratio of housing prices to rents. *See* CBO OUTLOOK, *supra* note 2, at 8; Shiller, *supra* note 145, at 4–5. On the limits of this indicator, see Jonathan McCarthy & Richard W. Peach, *Are Home Prices the Next 'Bubble'?*, FED. RES. BANK N.Y. ECON. POL'Y REV., Dec. 2004, at 1, 7–8; Housing Price-Rental Ratios, http://cboblog.cbo.gov/?p=52 (Dec. 21, 2007, 05:38 EST).

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.[147] 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 expect that home prices will also increase by 10 percent 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; put differently, backward-looking tendencies drive expectations of future price growth (beyond what could plausibly be justified in a rational-expectations model).[148] The subprime and Alt-A markets experienced both rational and irrational speculation.[149] The

147 Rational speculation is more plausibly attributed to the Wall Street banks that securitized and sold the MBSs. Additionally, the banks' sophisticated clients who purchased these MBSs may have also been rational speculators. And there is reason to believe that even these sophisticated parties were making irrational assessments. *See Hearing*, *supra* note 1, at 11 ("[T]he 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.").

148 *See* Karl E. Case & Robert J. Shiller, *The Behavior of Home Buyers in Boom and Post-Boom Markets*, NEW. ENG. ECON. REV., Nov.–Dec. 1988, at 29; *see also* Karl E. Case & Robert J. Shiller, *Is There a Bubble in the Housing Market?*, 2003 BROOKINGS PAPERS ON ECON. ACTIVITY, No. 2, at 299; Robert J. Shiller, *Speculative Prices and Popular Models*, J. ECON. PERSP., Spring 1990, at 55, 58–61. Moreover, Case and Shiller found that many home buyers believe that home prices cannot decline. *Id.* at 59. 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 145, at 11. These survey results are also supported by evidence of borrower behavior. In particular, home buyers 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 & Todd Sinai, Housing and Behavioral Finance (Sept. 25, 2007) (unpublished manuscript), *available at* http://real.wharton.upenn.edu/~sinai/papers/Housing-Behavioral-Boston-Fed-v9.pdf. In addition, Christopher Mayer and Todd Sinai found that "the lagged five-year average of house price growth is positively associated with increases in the price-rent ratio." *See id.* at 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 Karen Pence found that "[a] one standard deviation increase in house price appreciation in [2004] is associated with a 39 percent increase in subprime loans [in 2005]." Christopher J. Mayer & Karen Pence, *Subprime Mortgages: What, Where, and to Whom?* 13 (Nat'l Bureau of Econ. Research, Working Paper No. 14083, 2008), *available at* http://ssrn.com/abstract=1149330. Since it is a lagged appreciation variable that is correlated with the increase in subprime originations, this finding 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.

149 This is consistent with a leading economic theory of bubbles, which posits the existence of both rational and irrational traders. *See* J. Bradford De Long et al., *Noise Trader Risk in Financial Markets*, 98 J. POL. ECON. 703, 705 (1990); J. Bradford De Long et al., *Positive Feedback Investment Strategies and Destabilizing Rational Speculation*, 45 J. FIN. 379, 380 (1990); Andrei Shleifer & Lawrence H. Summers, *The Noise Trader Approach to Finance*, J.

relative proportion of these two species of speculators remains an open question.

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 polar opposite allocation, imposing all the interest-rate risk on the borrower. 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.[150] In a time when loan originators held mortgages on their own balance sheets shifting the risk to the borrower was an important means of shedding the risk. This explanation for ARMs is, however, less powerful in the era of securitization. Originators no longer bear interest-rate risk, or they at least bear much less of it. The securitizers then 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

---

ECON. PERSP., Spring 1990, at 19, 28–29; *see also* ROBERT J. SHILLER, IRRATIONAL EXUBERANCE 60–64 (2000) (developing a market-psychological theory of bubbles).

150 *See* Peek, *supra* note 80, at 48.

all borrowers purchase, such as credit checks, document preparation, and appraisals. 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.[151]

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 nondefaulting 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 that, while ubiquitous in mortgage contracts in the United States, is virtually nonexistent in most other countries.[152] The prepayment option serves two main goals: First, by allowing borrowers who improve their credit ratings to refinance into lower-rate loans, the prepayment option allows individuals to consider home ownership 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 or 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, in theory, is able to choose the mortgage that is best for her. This explanation, however, assumes

---

151 *See* Mark D. Shroder, *The Value of the Sunshine Cure: The Efficacy of the Real Estate Settlement Procedures Act Disclosure Strategy*, 9 CITYSCAPE: J. POL'Y DEV. & RES., No. 1, at 73, 84 (2007) (noting, for example, that 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).

152 Richard K. Green & Susan M. Wachter, *The American Mortgage in Historical and International Context*, J. ECON. PERSP., Fall 2005, at 93, 101.

that informed choice is possible, despite the high level of complexity of the choice problem.[153]

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 demand structure of rational borrowers and the contractual-design response to this demand. As shown below, however, not all borrowers, and especially not all subprime and Alt-A borrowers, were financially sophisticated, rational borrowers.[154] The rational-choice theories leave an explanatory gap. I now turn to the task of filling this gap.[155]

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.[156]

---

153 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. 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.

154 *See infra* Part IV.C.

155 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. *Cf.* 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, 633–34 (1979) (noting that courts and legislatures often determine and enforce purchase terms based on their conception of rational consumer preferences). 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 & Warren, *supra* note 18, at 35–36 (describing a market experiment in which a bank "offered consumers a choice between two credit card contracts: one with an annual fee and a lower interest rate, and one with no annual fee and a higher interest rate").

156 For a good, early behavioral analysis of mortgage-market imperfections, see Eskridge, *supra* note 24, at 1112–18 (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-

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.[157] 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: $\hat{P}_{LT} = {}^1/_2 \cdot P_{LT}$. As a result of such misperception, lenders will no longer offer the optimal contract. To see this, 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 $\hat{P}(5,5) = 5 + {}^1/_2 \cdot 5 = 7.5$.[158] Perceived total payments under the inefficient, deferred-cost contract would be $\hat{P}(3,8) = 3 + {}^1/_2 \cdot 8 = 7$. Borrowers would prefer, and thus lenders will offer, the inefficient, deferred-cost contract.[159]

---

brokers whose interests are not aligned with those of the buyers, arguing that these agents-brokers take advantage of buyers' imperfect information and imperfect rationality. *See id.* at 1118–23.

157 The 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." *Hearing*, *supra* note 1, at 13. Further, "[c]ertain 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." *Id.* at 21 n.3.

158 Time discounting is ignored for simplicity.

159 *Cf.* DAVID MILES, THE U.K. MORTGAGE MARKET: TAKING A LONGER-TERM VIEW, INTERIM REPORT: INFORMATION, INCENTIVES AND PRICING 3 (2003), *available at* http://www.hm-treasury.gov.uk/consult_miles_index.htm (noting that borrowers tend to focus disproportionately on the initial, rather than the long-term, cost of a loan); Monica Paiella & Alberto Franco Pozzolo, Choosing Between Fixed and Adjustable Rate Mortgages 1 (Mar. 26, 2007) (unpublished manuscript), *available at* http://ssrn.com/abstract=976346 (finding, based 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.").

There are several reasons to expect systematic underestimation of future costs. Myopia is one such reason.[160] High LTV contracts are attractive to myopic borrowers, who place excessive weight on the short-term benefits of a low down payment (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.[161] 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 illness, will bring about financial hardship.[162] 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

---

160 An especially troubling manifestation of myopia is the problem of insufficient saving for retirement. *See* Brigitte C. Madrian & Dennis F. 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); 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.").

161 *See* Rick Brooks & Ruth Simon, *Subprime Debacle Traps Even Very Credit-Worthy: As Housing Boomed, Industry Pushed Loans to a Broader Market*, WALL ST. J., Dec. 3, 2007, at A1 ("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 a less than perfect understanding of this contractual design feature. The term "payment shock" is used, for example, by the FRB and the FTC. *See* FED. RESERVE BD., CONSUMER HANDBOOK ON ADJUSTABLE RATE MORTGAGES 20 (2006), *available at* http://www.federalreserve.gov/pubs/arms/arms_english.htm; FRB, INTEREST ONLY, *supra* note 127; FTC Comment, *supra* note 66, at 9.

162 *See* Ola Svenson, *Are We All Less Risky and More Skillful than Our Fellow Drivers?*, 47 ACTA PSYCHOLOGICA 143, 143 (1981) (describing a study revealing that the majority of people "regard themselves as more skillful and less risky than the average driver"); Neil D. Weinstein, *Unrealistic Optimism About Future Life Events*, 39 J. PERSONALITY & SOC. PSYCHOL. 806, 806 (1980) (describing two studies revealing that people tend to be unrealistically optimistic about future life events); *see also In re* Eashai, 87 F.3d 1082, 1090 (9th Cir. 1996) ("[W]e recognize the fragility of human nature. '[H]uman 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.").

loan at an attractive rate and to avoid the high, long-term costs associated with a deferred-cost loan by doing so. 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.[163] 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.[164] These biases, and especially optimism about future house prices, also add an important dose of reality to the speculation explanation.[165]

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, however, is incapable of such an accurate assessment. He is unable to calculate prices that are not directly specified. Even if he could perform this calculation, he would

---

163 *See* Truth in Lending, 73 Fed. Reg. 44,522, 44,542 (July 30, 2008) (to be codified at 12 C.F.R. pt. 226) ("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* Complaint, People v. Countrywide Fin. Corp. (Cal. Super. Ct. June 24, 2008) (claiming that Countrywide encouraged borrowers to take complex hybrid and option ARMs by emphasizing low teaser rates and misrepresenting long-term costs) (the complaint, the California settlement, signed by the California Attorney General on October 6, 2008, and the Multistate Settlement Term Sheet, signed by the Attorneys General of Arizona, Connecticut, Florida, Illinois, Iowa, Michigan, Nevada, North Carolina, Ohio, and Texas, can be found at http://www.consumerlaw.org/unreported); Gretchen Morgenson, *Countrywide Subpoenaed by Illinois*, N.Y. TIMES, Dec. 13, 2007, at C1 (stating that the Illinois Attorney General 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).

164 *See supra* Part III.A.1.

165 *See supra* Part III.A.2. *Cf.* Robin Greenwood & Stefan Nagel, *Inexperienced Investors and Bubbles* (Nat'l Bureau of Econ. Research, Working Paper No. 14111, 2008), *available at* http://www.nber.org/papers/w14111 (arguing that less experienced investment managers were more likely to exhibit irrational trend-chasing behavior).

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 nonsalient price dimensions.[166] 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.[167] 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.[168]

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.[169] This strategy depends on the existence of nonsalient price dimensions. When the number of price dimensions goes up, the number of nonsalient price dimensions can also be expected to go up. Lenders thus have a strong incentive to increase complexity and multidimensionality.

---

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

167 *Cf.* Truth in Lending, 73 Fed. Reg. at 44,525–26.

168 *See* GAO AMP REPORT, *supra* note 43, 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 66, at 14 ("[F]or loans with more complexity—such as nontraditional mortgages—consumers face further challenges in understanding all significant terms and costs."). For over five years, HUD has been working on reforming the home buying process, specifically through increased transparency regarding closing costs. *See* Mary McGarity, *Closing Nirvana*, MORTGAGE BANKING, Aug. 2005, at 32 (quoting HUD Secretary Alphonso Jackson as saying, "Buying a home today is too complicated, confusing and costly. . . . Each year Americans spend approximately $55 billion on closing costs they don't fully understand.").

169 *See* Bar-Gill, *Consumer Contracts*, *supra* note 18, at 771–78; *see also* Willis, *supra* note 4, at 725–26 (describing how "a lender can creatively manipulate each component of the price of a loan to effect 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.[170]

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 nonsalient price dimension, borrowers will eventually learn to focus on this price dimension and it will become salient. Lenders will have to find another nonsalient price dimension. When they run out of nonsalient 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.[171]

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. Meanwhile, the behavioral-economics theory explains the demand

---

170 *See* Brian Bucks & Karen Pence, *Do Homeowners Know Their House Values and Mortgage Terms?* 1 (Bd. of Governors of the Fed. Reserve Sys., Fin. & Econ. Discussion Series Paper No. 2006-3, 2006), *available at* http://www.federalreserve.gov/Pubs/feds/2006/200603/200603pap.pdf (noting that ARM borrowers "appear to underestimate or not know how much their interest rates could change").

171 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.*, Glenn Ellison, *A Model of Add-On Pricing*, 120 Q.J. ECON. 585 (2005); Xavier Gabaix & David Laibson, *Shrouded Attributes, Consumer Myopia, and Information Suppression in Competitive Markets*, 121 Q.J. ECON. 505 (2006); Ran Spiegler, *Competition over Agents with Boundedly Rational Expectations*, 1 THEORETICAL ECON. 207 (2006); Glenn Ellison & Sara Fisher Ellison, *Search, Obfuscation, and Price Elasticities on the Internet* (Nat'l Bureau of Econ. Research, Working Paper No. 10570, 2004), *available at* http://www.nber.org/papers/w10570.pdf.

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 Amromin, 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 imperfect rationality is pervasive in the residential mortgage market and especially in the subprime market.[172] A recent study, by Sumit Agarwal, Gene Amromin, Itzhak Ben-David, Souphala Chomsisengphet, and Douglas D. 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.[173] 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.[174] 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.[175]

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

---

172 *See* Howard Lax et al., *Subprime Lending: An Investigation of Economic Efficiency*, 15 HOUSING POL'Y DEBATE 533, 544–46 (2004) (noting that subprime borrowers tend to be less educated and less sophisticated about the mortgage market).

173 Sumit Agarwal et al., *Can Mandated Financial Counseling Improve Mortgage Decision-Making? Evidence from a Natural Experiment* 27 (Fisher Coll. of Bus., Working Paper No. 2008-03-019, 2009), *available at* http://ssrn.com/abstract=1285603. This study also found that the mandated financial counseling led to a decline in the demand for credit. *Id.* at 3; *see also* ROBERT J. SHILLER, THE SUBPRIME SOLUTION: HOW TODAY'S GLOBAL FINANCIAL CRISIS HAPPENED, AND WHAT TO DO ABOUT IT 124 (2008) (noting that most people need to be financially educated); Annamaria Lusardi, *Household Saving Behavior: The Role of Financial Literacy, Information, and Financial Education Programs* 2 (Nat'l Bureau of Econ. Research, Working Paper No. 13824, 2008), *available at* http://www.nber.org/papers/w13824 (arguing that households enter into risky financial contracts due to lack of financial education).

174 *See* LACKO & PAPPALARDO, *supra* note 104, at ES-6 (demonstrating the limits of mortgage disclosures and noting 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."); Bucks & Pence, *supra* note 170.

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

loan applications that increased borrowers' APRs by an average of 125 basis points.[176] Another study, by Susan Woodward, identified systemic mistakes leading to excessive broker fees of up to $1,500.[177] 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 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.[178] According to one estimate, these refinancing mistakes can cost borrowers tens of thousands of dollars or up to 25 percent of the loan's value.[179]

Evidence of rapid defaults, within six to twelve months of origination,[180] provides further support to the behavioral-economics theory. One explanation for borrowers' inability "to afford the monthly pay-

---

176 *See* Sumit Agarwal et al., The Age of Reason: Financial Decisions over the Lifecycle 9–11 (Oct. 21, 2008) (unpublished manuscript), *available at* http://ssrn.com/abstract=973790.

177 *See* Susan E. Woodward, Consumer Confusion in the Mortgage Market (July 14, 2003) (unpublished manuscript), *available at* www.sandhillecon.com/pdf/consumer_confusion.pdf; *see also* John Y. Campbell, *Household Finance*, 61 J. FIN. 1553, 1589 (2006) (citing Woodward, *supra*).

178 *See* Campbell, *supra* note 177, at 1579, 1581, 1590; LaCour-Little & Holmes, *supra* note 101, at 644 (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"); Agarwal et al., *supra* note 120, at 3 (surveying evidence that borrowers fail to make optimal refinancing decisions); *see also* Robert Van Order, Simon Firestone & Peter Zorn, *The Performance of Low Income and Minority Mortgages* (Ross Sch. of Bus., Working Paper No. 1083, 2007), *available at* http://ssrn.com/abstract=1003444. Similar mistakes have been identified in the U.K. *See* MILES, *supra* note 159, at 33; Campbell, *supra* note 177, 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* Michael LaCour-Little, *Another Look at the Role of Borrower Characteristics in Predicting Mortgage Prepayments*, 10 J. HOUSING RES. 45, 47 (1999) (emphasizing the role of transaction costs and relocation and liquidity motives); Richard Stanton, *Rational Prepayment and the Valuation of Mortgage-Backed Securities*, 8 REV. FIN. STUD. 677, 681, 706 (1995) (arguing that heterogeneous transaction costs and exogenous factors such as divorce and sudden unemployment can explain seemingly irrational refinancing behavior). 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 and his colleagues have shown that the optimal prepayment decision can be approximated using an implementable formula. *See* Agarwal et al., *supra* note 120, at 5–6.

179 *See* Agarwal et al., *supra* note 120, at 25 ("[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. *Id.* at 28 tbl.5.

180 *See* Mayer et al., *supra* note 33, at 16 (noting that "2 percent of outstanding loans in the 2007 vintage were in default within six months of origination, and 8 percent were in default after 12 months").

ments almost from the moment of origination"[181] is that they did not fully understand the extent of the obligations that they were undertaking. Evidence that loan prices are affected by factors unrelated to the risk of nonpayment provides 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.[182] Evidence that borrowers 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 dimension[183] 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 FRB, in justifying its new mortgage regulations, referred to borrowers who "unwittingly accept[ed] loans" with terms that they did not fully understand.[184] Likewise, the CBO 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."[185]

A clarification is in 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

---

181 *See id.* Other early defaulters were rational speculators, who stopped paying when house prices stopped rising. *Id.*

182 *See* James H. Carr & Lopa Kolluri, *Predatory Lending: An Overview*, *in* FINANCIAL SERVICES IN DISTRESSED COMMUNITIES: ISSUES AND ANSWERS 31, 37 (2001) (recording estimates by Freddie Mac and Fannie Mae that between 35 percent and 50 percent of borrowers in the subprime market could qualify for prime market loans); Lew Sichelman, *Community Group Claims CitiFinancial Still Predatory*, ORIGINATION NEWS, Jan. 2002, at 25 (reporting that, 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); *see also* Willis, *supra* note 4, at 730; Morgenson, *supra* note 99, at 9 (recounting that in December 2006, in an agreement with the New York State Attorney General, Countrywide agreed "to compensate black and Latino borrowers to whom it had improperly given high-cost loans in 2004").

183 Woodward, *supra* note 177, at 2.

184 Truth in Lending, 73 Fed. Reg. 44,522, 44,525–26 (July 30, 2008) (to be codified at 12 C.F.R. pt. 226) ("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.").

185 *See Hearing*, *supra* note 1, at 13; *see also* GAO CONSUMER PROTECTION REPORT, *supra* note 17, at 14 (describing borrowers "who lack sophistication about financial matters, are not highly educated, or suffer physical or mental infirmities").

the cost of attaining perfect information and perfect understanding of the contract is high, 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.[186]

Imperfect rationality, however, 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. As a result, the incentive to increase 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.[187]

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. As I discuss below, however, 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.

---

186 *See, e.g.*, Bucks & Pence, *supra* note 170, at 19–20 (finding that many borrowers do not even know that they have an ARM rather than a FRM).

187 *Cf.* Philip Bond, David K. Musto & Bilge Yilmaz, *Predatory Mortgage Lending* 3 (Fed. Reserve Bank of Phila., Working Paper No. 08-24, 2008), *available at* http://ssrn.com/abstract=1288094 (demonstrating that "a realistic information asymmetry between borrowers and lenders is enough to generate [predatory mortgage lending] and can explain (at least qualitatively) when and where it occurs").

1. *On the Demand Side: Learning by Borrowers*

Individuals make mistakes.[188] 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 between.[189] Interpersonal learning can compensate for limited intrapersonal learning, as borrowers share mortgage-related experiences. Interpersonal learning, however, is not always common enough and detailed enough to eliminate mistakes. More generally, the evidence shows that learning about financial decisions is incomplete.[190]

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.[191] Moreover,

---

188 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, *Imperfect Information in Markets for Contract Terms: The Examples of Warranties and Security Interests*, 69 VA. L. REV. 1387 (1983); Schwartz & Wilde, *supra* note 155; 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 18, at 22–23; Eskridge, *supra* note 24, at 1141–43.

189 *See* Truth in Lending, 73 Fed. Reg. 1672, 1676 (proposed Jan. 9, 2008) (to be codified at 12 C.F.R. pt. 226) ("Disclosures themselves, likely cannot provide this minimum understanding for transactions that are complex and that consumers engage in infrequently."); Shlomo Benartzi & Richard H. Thaler, *Heuristics and Biases in Retirement Savings Behavior*, J. Econ. Persp., Summer 2007, at 81.

190 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* HEURISTICS AND BIASES: THE PSYCHOLOGY OF INTUITIVE JUDGMENT (Thomas Gilovich et al. eds., 2002); Keith E. Stanovich, *The Fundamental Computational Biases of Human Cognition: Heuristics that (Sometimes) Impair Decision Making and Problem Solving*, *in* THE PSYCHOLOGY OF PROBLEM SOLVING 291 (Janet E. Davidson & Robert J. Steinberg eds., 2003); *see also* Victor Stango & Jonathan Zinman, *Exponential Growth Bias and Household Finance*, J. FIN. (forthcoming) (manuscript at 1–2), *available at* http://ssrn.com/abstract=1081633 (documenting the "exponential growth biases" that lead borrowers to underestimate both borrowing costs and returns to savings); Sumit Agarwal et al., *Do Consumers Choose the Right Credit Contracts?* (Fed. Reserve Bank of Chi., Working Paper No. 2006-11, 2006) (discussing how systematic and costly consumers' mistakes are in practice); Agarwal et al., *supra* note 176 (discussing the diminished returns from learning about finances).

191 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 & Manuel L. Valcarcel, *Real Estate Brokerage: Recent Changes in Relationships and a Proposed Cure*, 29 CREIGHTON L. REV. 25 (1995) (describing this shift); Christopher Curran & Joel Schrag, *Does It Matter Whom an Agent Serves? Evidence from Recent Changes in Real Estate Agency Law*, 43 J.L. & ECON. 265, 265–71 (2000) (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.

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 the loan value.[192]

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

Competing sellers will often have an incentive to correct consumer mistakes through, for example, advertising.[193] While these incentives are not always sufficient in competitive markets, they are even weaker in imperfectly competitive markets.[194] As explained above, ineffective shopping by borrowers inhibits competition in the subprime mortgage market.[195] 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.[196] 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.[197]

---

192 *See* Agarwal et al., *supra* note 120, 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 S. Haigh & John A. List, *Do Professional Traders Exhibit Myopic Loss Aversion? An Experimental Analysis*, 60 J. FIN. 523 (2005) (documenting biased decisions by financial professionals despite ample opportunities for learning).

193 *See* Bar-Gill, *Consumer Contracts*, *supra* note 18, at 758–61.

194 *Id.* at 769–70.

195 *See supra* Part I.

196 This phenomenon is evidenced by the number of loan originators that have gone out of business during the recent crisis. *See* Worth Civils & Mark Gongloff, *Subprime Shakeout: Lenders that Have Closed Shop, Been Acquired or Stopped Loans*, WALL ST. J. ONLINE, http://online.wsj.com/public/resources/documents/info-subprimeloans0706-sort.html (last visited Mar. 30, 2009) (listing eighty loan originators that closed or filed for bankruptcy between November 2006 and September 2007).

197 *See* Engel & McCoy, *supra* note 47, at 2041 ("[S]ecuritization funds small, thinly capitalized lenders and brokers, thus enabling 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 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.

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.[198] 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 borrowers. But the limited competition also imposes a welfare cost in the form of allocation 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 origination fees exceeding the actual costs that these fees

198 *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."); *see also* Susan Block-Lieb & Edward J. Janger, *The Myth of the Rational Borrower: Rationality, Behavioralism, and the Misguided "Reform" of Bankruptcy Law*, 84 TEX. L. REV. 1481, 1530, 1539–40 (2006); Engel & McCoy, *supra* note 47, at 2080; Willis, *supra* note 4, at 726 (describing the increased complexity of mortgage products, and arguing that borrowers face a "bewildering array" of home loan products (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))); Zywicki & Adamson, *supra* note 11, at 70–71 (noting that, while standardization and transparency provide for easy comparison shopping and foster competition in the prime market, the same is not true of the subprime market, where lack of standardization and complexity impede comparison shopping and hinder competition). Since borrowers cannot value the different loan options, they are susceptible to skewed advertising that selectively emphasizes certain dimensions of the loan contract. *See* FTC Comment, *supra* note 66, at 3–4 (describing 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, imperfect rationality of borrowers, or both.

allegedly cover by hundreds—or even thousands—of dollars.[199] Borrowers are also paying interest rates that are higher than what the borrowers' risk profiles justify.[200] The most extreme case is that of borrowers who would qualify for lower-cost conventional loans but are nonetheless obtaining high-cost subprime mortgages.[201] It is the

---

199 *See* SUSAN E. WOODWARD, U.S. DEP'T OF HOUS. & URBAN DEV., A STUDY OF CLOSING COSTS FOR FHA MORTGAGES (2008). The Woodward study finds that complexity and multidimensionality of origination fees prevent effective shopping, hinder competition, and lead to inflated prices; it further analyzes more than 7,500 FHA-insured thirty-year fixed-rate home purchase loans with a 7 percent coupon rate closed in May and June of 2001. These were not the typical subprime loans but loans than often target similarly high-risk borrowers. According to HUD, borrowers are paying excess fees averaging around $700 per mortgage, and these excess fees can be eliminated by improved disclosure that would enhance competition. *See* News Release, U.S. Dep't of Hous. & Urban Dev., *supra* note 115.

200 *See* Engel & McCoy, *supra* note 47, at 2058; Howard Lax et al., *Subprime Lending: An Investigation of Economic Efficiency*, 15 HOUSING POL'Y DEBATE 533 (2004) (arguing that subprime interest rates cannot be justified by risk alone); *see also* STEIN, *supra* note 99 (valuing the cost to borrowers of excess interest at $2.9 billion).

201 *See* FREDDIE MAC, AUTOMATED UNDERWRITING: MAKING MORTGAGE LENDING SIMPLER AND FAIRER FOR AMERICA'S FAMILIES ch. 5 (1996), *available at* http://www.freddiemac.com/corporate/reports/moseley/chap5.htm (reporting that 10 to 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 (describing a poll of fifty subprime lenders who estimated that half of subprime borrowers could have qualified for prime loans); *Fannie Mae Has Played Critical Role in Expansion of Minority Homeownership Over Past Decade; Raines Pledges to Lead Market for African American Mortgage Lending*, BUS. WIRE, Mar. 2, 2000, LexisNexis Academic (noting that up to half of subprime borrowers would qualify for lower-cost conventional loans); *see also* Bar-Gill & Warren, *supra* note 18, at 38–40; Engel and McCoy, *supra* note 47, at 2058 n.92; Ass'n of Cmty. Orgs. for Reform Now (ACORN), *Many Borrowers in Subprime Loans Should Have Qualified for a Lower Cost Loan*, ACORN.ORG, http://www.acorn.org/index.php?id=114. The *Wall Street Journal* noted the incentive to steer borrowers toward higher-cost loans:

> 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.

Brooks & Simon, *supra* note 161. Gretchen Morgenson, writing for the *New York Times*, made a similar observation:

> 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 maxi-

higher profit margin in the subprime market that induced lenders to steer borrowers into subprime loans.[202] 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 vulnerable borrowers into the market. These abuses can lead consumers to pay more for their loans than their risk profiles warrant."[203]

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, there would still 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}.[204] 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}.[205]

> mum 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.

Morgenson, *supra* note 99.

202 *See* Morgenson, *supra* note 99 (explaining that internal Countrywide documents and testimonies of former employees reveal larger profit margins on subprime loans as compared to prime loans and especially large margins on loans with high prepayment penalties and high go-to rates. As a result, the 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). Evidence refutes the alternative hypothesis that the relative increase in subprime loans reflects an increase in borrower risk. *See* LaCour-Little, *supra* note 31, at 490–93 (showing empirically, through assessment of the two most common risk indicators—the FICO score and LTV—that borrower risk remained relatively stable).

203 Truth in Lending, 73 Fed. Reg. 1672, 1675 (proposed Jan. 9, 2008) (to be codified at 12 C.F.R. pt. 226).

204 *See supra* Part IV.A.

205 *See supra* Part IV.A.

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 importantly, 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.[206] The result is excessive borrowing (and excessive home purchases).[207]

This analysis applies to all the examples of cost deferral discussed above: small down payments, high LTVs, escalating payments, and prepayment penalties.[208] The analysis also applies to the complexity examples, where one (or more) less salient or indirectly specified price dimensions is 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; 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 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.[209] Deferred-cost contracts are associated with higher rates of delinquency and foreclosure. Specifically, increased delinquency and foreclosure rates have been

206 *See supra* Part IV.A.

207 Excessive borrowing would result even absent a contractual-design response—that is, even under the optimal contract. The contractual design response exacerbates the welfare cost.

208 Focusing on prepayment penalties, several studies found empirical evidence of one of the welfare costs associated with distorted competition. *See, e.g.*, Engel & McCoy, *supra* note 47, at 2060 (reviewing studies that found a positive correlation between prepayment penalties and *higher* interest rates); LaCour-Little & Holmes, *supra* note 101, at 660–61 (finding that, for the common 2-28 ARM, the total interest rate savings is significantly less than the amount of the expected prepayment penalty).

209 *See generally* EDWARD M. GRAMLICH, SUBPRIME MORTGAGES: AMERICA'S LATEST BOOM AND BUST 66–67 (2007) (arguing, based on the study by Schloemer and her colleagues, *supra* note 143, that mortgage contract design is linked to borrower distress).

linked to high LTVs,[210] escalating payments,[211] and prepayment penalties.[212] The FRB, in advocating its new mortgage regulations, ac-

---

210 *See* Gerardi et al., *supra* note 29, at 4. According to Kristopher Gerardi, Adam Shapiro, and Paul Willen:

> 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 [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.

211 *See* Demyanyk & Van Hemert, *supra* note 1 (manuscript at 19 tbl.3) (finding positive correlation coefficients, though with limited statistical significance, on ARM (vs. FRM) and Hybrid (vs. FRM) loans in regressions that try to explain default and foreclosure rates). All types of mortgages—not only the nonstandard ARMs—originated in 2006 performed badly in terms of delinquency and foreclosure rates. ARMs, however, performed worse (and many ARMs are nonstandard). *Cf. id.* (manuscript at 11 fig.4) (showing a much higher delinquency rate for hybrids as compared to FRMs); Bernanke March 2008 Speech, *supra* note 77 ("The worst payment problems have been among subprime adjustable-rate mortgages . . . ."); Bernanke January 2008 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."). Mayer, Pence, and Sherlund noted the data indicating far worse performance for ARMs:

> [D]elinquincies have been particularly pronounced for loans that include an adjustable interest rate component—floating-rate mortgages, short-term hybrids, and long-term hybrids. For example, looking at subprime mortgages, the serious delinquency rates for both adjustable-rate and fixed-rate loans were about 5.6 percent in mid-2005. But by July 2008, serious delinquencies on adjustable-rate mortgages had risen to over 29 percent, while the similar rate for fixed-rate mortgages rose to 9 percent. Similarly, serious delinquency rates for both the adjustable-rate and fixed-rate Alt-A mortgages were about 0.6 percent in mid-2005. But by July 2008, the delinquency rate on adjustable-rate Alt-A mortgages had risen past 13 percent, while the delinquency rate on fixed-rate mortgages had risen over 5 percent.

Mayer et al., *supra* note 33, at 8. 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. Mayer, Pence, and Sherlund observed:

> The exceptionally high default rates of subprime adjustable-rate mortgages may be due in part to the relatively poor risk attributes of these loans. Short-term hybrids, which make up almost all subprime adjustable-rate mortgages, had an average FICO credit score of only 612 and a mean combined loan-to-value ratio of 89 percent. By contrast, subprime fixed-rate mortgages have higher credit scores (FICO of 627) and lower combined loan-to-value ratios (80 percent).

Id. In other words, poor underwriting standards are to blame. Contractual design facilitated lower underwriting standards, such as the fact that ARMs enabled lenders to qualify borrowers based on the low, initial rate.

212 *See* Demyanyk & Van Hemert, *supra* note 1 (manuscript at 19 tbl.3) (finding positive correlation 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*, 18 HOUSING POL'Y DEBATE 311, 337 (2007) (finding, based on

knowledged 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."[213] 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 refinancing (due to high LTVs).[214] The continuing deterioration in the housing and credit markets since December 2006 suggests that the 12 percent figure could well be an underestimate.[215]

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 principal."[216] An industry study that assumes foreclo-

---

LP data, that "lengthy"—that is, 3 years or more—prepayment penalties increase foreclosure risk by about 20 percent and that 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 33, at 12–13.

213 Truth in Lending, 73 Fed. Reg. 1672, 1674 (proposed Jan. 9, 2008) (to be codified at 12 C.F.R. pt. 226).

214 *See* CAGAN, *supra* note 25, at 69–70 (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 December 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.

215 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 33, at 28 (noting studies showing that "borrowers with hybrid mortgages appeared more likely to refinance and prepay their mortgages around the first reset date but were not necessarily more likely to default around that time" while suggesting that "[m]ortgage rate resets may yet cause difficulties going forward"). Shane Sherlund observed:

> House price appreciation seems to be the primary determinant of default and prepayment behavior. Borrowers with subprime mortgages could more easily prepay when house price appreciation was high (almost regardless of the initial credit quality of the loan), but found it more difficult to prepay once house price appreciation slowed and turned negative. New, stricter underwriting further limited the ability of many borrowers with subprime mortgages unable to refinance or even 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 data to date. Prepayment is much more difficult for many borrowers, so their ability and willingness to face mortgage rate reset may now be an issue. Short-term interest rates have declined recently, so these borrowers are not currently facing drastically higher mortgage payments.

Sherlund, *supra* note 133, at 11.

216 Bernanke March 2008 Speech, *supra* note 77.

sure losses equal to 37.5% of a loan's value estimates total subprime foreclosure losses on loans originated between 2004 and 2006 at nearly $29 billion.[217] Substituting Bernanke's 50 percent figure for the 37.5 percent assumption, the estimate of foreclosure losses increases to $38.7 billion. Of this $38.7 billion, the 10 percent (or $7.7 billion) in transaction costs—the "legal, sales, and maintenance expenses" that Bernanke referred to—are clear welfare costs.[218] The remainder is partly a welfare cost and partly a welfare-neutral transfer. The transfer component is the "foreclosure discount," the difference between the market price and the price received for a foreclosed property.[219] 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, is composed of the negative externalities that foreclosures impose on neighborhoods and cities.[220] The FRB noted that "[w]hen foreclosures are clustered, they can injure entire communities by reducing property values in surrounding areas."[221] Finally, to the extent that foreclosures contributed to the real estate slump and

---

217 CAGAN, *supra* note 25, at 69–71.

218 *See* Paul S. Calem & Michael LaCour-Little, *Risk-Based Capital Requirements for Mortgage Loans* 12 (Bd. of Governors of the Fed. Reserve Sys., Fin. & Econ. Discussion Series Paper No. 2001-60, 2001) (assuming it costs 10 percent of the unpaid balance to dispose of the foreclosed property and that foreclosure transaction costs amount to 5 percent of unpaid balance).

219 *See* CAGAN, *supra* note 25, at 70 (arguing that foreclosed properties sell at a discount of up to 30 percent).

220 *See* Vicki Been, Dir., Furman Ctr. for Real Estate & Urban Policy, Testimony Before Committee on Oversight and Government Reform Subcommittee on Domestic Policy: External Effects of Concentrated Mortgage Foreclosures: Evidence from New York City 4–5 (May 21, 2008) (reporting that, in New York, properties adjacent to recent foreclosure filings sell at a 1.8 percent to 3.7 percent discount); *see also* WILLIAM C. APGAR & MARK DUDA, HOMEOWNERSHIP PRES. FOUND., COLLATERAL DAMAGE: THE MUNICIPAL IMPACT OF TODAY'S MORTGAGE FORECLOSURE BOOM (2005), *available at* http://www.995hope.org/content/pdf/Apgar_Duda_Study_Short_Version.pdf; CTR. FOR RESPONSIBLE LENDING, SUBPRIME SPILLOVER: FORECLOSURES COST NEIGHBORS $202 BILLION: 40.6 MILLION HOMES LOSE $5,000 ON AVERAGE (2008), *available at* http://www.responsiblelending.org/issues/mortgage/research/subprime-spillover.html; FAMILY HOUS. FUND, COST EFFECTIVENESS OF MORTGAGE FORECLOSURE PREVENTION: SUMMARY OF FINDINGS 5 (1998) (noting foreclosure costs of around $7,000 for borrowers, $2,000 for lenders, and additional costs of $15,000 to $60,000 on third parties); STEIN, *supra* note 99, at 11–13 (detailing externalities such as declines in neighboring property values and increased crime rates (citing U.S. DEP'T OF HOUS. & URBAN DEV. & U.S. DEP'T OF THE TREASURY, CURBING PREDATORY HOME MORTGAGE LENDING 25 (2000))); Engel & McCoy, *supra* note 47, at 2042 n.12; Gerardi et al., *supra* note 29, at 1 n.1 (citing Dan Immergluck & Geoff Smith, *The Impact of Single-Family Mortgage Foreclosures on Neighborhood Crime*, 21 HOUSING STUD. 851 (2006)).

221 Truth in Lending, 73 Fed. Reg. 44,522, 44,524 (July 30, 2008) (to be codified at 12 C.F.R. pt. 226).

to the credit crunch, staggering macroeconomic costs should also be considered.

Focusing on borrowers, delinquency and foreclosure imply substantial hardship.[222] First, borrowers will face higher rates for other credit transactions and reduced access to credit.[223] Second, borrowers will lose some or all of their accumulated home equity if the lender forecloses.[224] 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 outstanding loan balance, the lender will suffer a loss. Lenders partially compensated for this risk by increasing the interest rate.[225] Much of this risk, however, 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 institutions[226]—suggests that the risks were not fully accounted for *ex ante.*

In measuring the social cost of foreclosure, it is important to distinguish between costs borne by borrowers and lenders on the one hand and costs borne 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 sour 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 borne by third parties: these costs—negative exter-

---

222 *Id.* ("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.").

223 *Id.*

224 *Id.* Consider a borrower with 20 percent equity in her home and a loan balance equal to 80 percent of 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. The Center for Responsible Lending 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 ET AL., *supra* note 143, at 2–3, 11, 16. 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.

225 *See* Demyanyk & Van Hemert, *supra* note 1 (manuscript at 28–29) (finding that high loan-to-value borrowers increasingly became high-risk borrowers over the past five years, in terms of elevated delinquency and foreclosure rates, and that lenders were aware of this and adjusted mortgage rates accordingly over time).

226 *See* Bethel et al., *supra* note 12, at 21, 81 tbl.2 (citing one estimate of $150 billion in writedowns as of February 2008 as well as a forecast that this amount will more than double, and summarizing the tens of billions of dollars worth of subprime-related write-offs by banks); Press Release, Standard & Poor's, *supra* note 16.

nalities 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.[227] Moreover, the inverse correlation between borrower wealth and contractual complexity—wealthier borrowers generally got simpler prime loans and poorer borrowers generally got more complicated subprime or Alt-A loans—raises another distributional concern.

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"[228] also raises distributional concerns. Disparities in financial sophistication and in the ability to effectively comparison shop—if only because minority borrowers had fewer options to compare—led to substantial price variations.[229] A recent study found that black borrowers paid an additional $415 in fees and Latino borrowers paid an additional $365 in fees.[230] Nonprice terms likewise reflected variations. Specifically, "black homeowners are significantly more likely to have prepayment penalties or balloon payments attached to their mortgages than nonblack homeowners, even after controlling for age, income, gender, and creditworthiness."[231]

Gender disparities have also been identified. Women as a group have a relatively poor understanding of credit terms and are less likely

---

227 *See* Bar-Gill & Warren, *supra* note 18, at 64 ("Richer consumers are also less likely to make mistakes, if only because they can hire experts who will prevent them from making mistakes.").

228 Mayer & Pence, *supra* note 148, at 2.

229 *See* Michael S. Barr, Sendhil Mullainathan & Eldar Shafir, *Behaviorally Informed Home Mortgage Credit Regulation*, *in* UNDERSTANDING CONSUMER CREDIT (Eric S. Belsky & Nicolas P. Retsinas eds.) (forthcoming 2009) (manuscript at 11, on file with author) ("[L]ow-income and minority buyers are the least likely to shop for alternate financing arrangements . . . ."); Jinkook Lee & Jeanne M. Hogarth, *Consumer Information Search for Home Mortgages: Who, What, How Much, and What Else?*, 9 FIN. SERVICES REV. 277, 283 (2000). More generally, subprime borrowers are less likely to search for the best loan terms. *See* Courchane et al., *supra* note 54 (reporting findings from a survey study); *see also* Zywicki & Adamson, *supra* note 11, at 55–56.

230 WOODWARD, *supra* note 199, at ix.

231 Michael S. Barr, Jane K. Dokko & Benjamin J. Keys, Who Gets Lost in the Subprime Mortgage Fallout? Homeowners in Low- and Moderate-Income Neighborhoods 2–3 (Apr. 2008) (unpublished manuscript), *available at* http://ssrn.com/abstract=1121215.

to shop for credit.[232] These findings imply that women will get inferior mortgage products. Socioeconomic 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 diminished ability to effectively shop for better terms.[233] Indeed, there is evidence that better-educated borrowers received better terms on their loans.[234]

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 inter-

---

232 *See* John Leland, *Baltimore Finds Subprime Crisis Snags Women*, N.Y. TIMES, Jan. 15, 2008, at A1; *see also* ALLEN J. FISHBEIN & PATRICK WOODALL, CONSUMER FED. OF AM., WOMEN ARE PRIME TARGETS FOR SUBPRIME LENDING: WOMEN ARE DISPROPORTIONATELY REPRESENTED IN HIGH-COST MORTGAGE MARKET 1 (2006), *available at* http://www.consumerfed.org/pdfs/WomenPrimeTargetsStudy120606.pdf (finding that women are more likely to receive subprime mortgages than men and that disparity between men and women increases as income rises); NAT'L CMTY. REINVESTMENT COAL., HOMEOWNERSHIP AND WEALTH BUILDING IMPEDED: CONTINUING LENDING DISPARITIES FOR MINORITIES AND EMERGING OBSTACLES FOR MIDDLE-INCOME AND FEMALE BORROWERS OF ALL RACES 12–14 (2006), *available at* http://www.ncrc.org/index.php?option=com_content&task=view&id=344&Itemid=76 (finding that women received 37 percent of high-cost home loans in 2005, compared with just 28 percent of prime loans); PRUDENTIAL INS. CO. OF AM., FINANCIAL EXPERIENCE & BEHAVIORS AMONG WOMEN 7 (2006), *available at* http://www.prudential.com/media/managed/2006WomenBrochure_FINAL.pdf (finding that "a majority of financial and investment products are unfamiliar to almost half of all women"); Annamaria Lusardi & Olivia S. Mitchell, *Planning and Financial Literacy: How Do Women Fare?* (Nat'l Bureau of Econ. Research, Working Paper No. 13750, 2008), *available at* http://ssrn.com/abstract=1087003 (finding that older women display much lower levels of financial literacy than the older population as a whole); *Women in the Subprime Market*, CONSUMERS UNION, Oct. 2002, http://www.consumersunion.org/finance/women-rpt1002.htm (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).

233 Bucks & Pence, *supra* note 170, at 3, 20–21, 26.

234 *See* WOODWARD, *supra* note 199 (finding that offers made by brokers to borrowers without a college education are $1,100 higher on average); Thomas P. Boehm & Alan Schlottmann, *Mortgage Pricing Differentials Across Hispanic, African-American, and White Households: Evidence from the American Housing Survey*, 9 CITYSCAPE: J. POL'Y DEV. & RES., No. 2, at 93, 105 (2007) (finding a negative correlation between education and interest rates); Annamaria Lusardi, *Financial Literacy: An Essential Tool for Informed Consumer Choice?* 10 (Nat'l Bureau of Econ. Research, Working Paper No. 14084, 2008), *available at* http://ssrn.com/abstract=1149331 (citing a 2003 study by Danna Moore showing that low-literacy borrowers are more likely to purchase high-cost mortgages). Individuals with little education, women, African-Americans, and Hispanics display particularly low levels of literacy. *Id.* at 1.

vention should be considered.[235] 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 significant difference.[236] Second, disclosure can help less-sophisticated borrowers without significantly restricting the choices available to more-sophisticated borrowers.[237] Third, as a practical matter, disclosure has proven to be the most politically feasible form of regulation in consumer credit markets.[238]

A. The Great Promise of the APR Disclosure

Perhaps the most important reason to focus on disclosure regulation is that an existing disclosure mandate seems 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.[239] The APR is a normalized measure of the total cost of credit. A lender is required to sum all the different prices and fees that the

---

235 The FRB, when proposing its recently adopted TILA amendments, endorsed a similar approach, stating:

> 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.

Truth in Lending, 73 Fed. Reg. 1672, 1675 (proposed Jan. 9, 2008) (to be codified at 12 C.F.R. pt. 226)

236 *See generally* LACKO & PAPPALARDO, *supra* note 104 (showing that better-designed disclosure can make a significant difference).

237 *See* Colin Camerer et al., *Regulation for Conservatives: Behavioral Economics and the Case for "Asymmetric Paternalism"*, 151 U. PA. L. REV. 1211 (2003); Cass R. Sunstein & Richard H. Thaler, *Libertarian Paternalism Is Not an Oxymoron*, 70 U. CHI. L. REV. 1159 (2003).

238 *See generally* Bar-Gill, *Seduction*, *supra* note 18. Since the abolition of usury laws, disclosure requirements have been the centerpiece of the regulatory scheme governing the mortgage market. *See* Eskridge, *supra* note 24 (describing the history of mortgage-contract regulation in the U.S. and specifically the shift from usury laws to disclosure regulation). The legislative and regulatory reaction to the recent crisis has focused on disclosure. *See, e.g.*, Truth in Lending, 73 Fed. Reg. 44,522, 44,524–25 (July 30, 2008) (to be codified at 12 C.F.R. pt. 226); *see also, e.g.*, Housing and Economic Recovery Act of 2008, Pub. L. No. 110-289, §§ 2501–2503, 122 Stat. 2654, 2855–57. The Housing and Economic Recovery Act, as well as other legal responses to the crisis, includes 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, such as requiring creditors to evaluate borrowers' ability to repay; limiting the scope of permissible prepayment penalties; and requiring creditors to establish escrow accounts for the payment of property taxes and premiums for specified insurance products. *See* Truth in Lending, 73 Fed. Reg. 44,522.

239 *See* Truth in Lending Act, Pub. L. No. 90-321, § 107, 82 Stat. 146, 149 (1968) (codified as amended at 15 U.S.C. § 1606 (2006)) (defining the APR); Truth in Lending Act

borrower is required 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 this figure as well.[240]

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.[241] Second, the APR should provide an effective remedy to the myopia and optimism that give rise to deferred-cost contracts. Since the APR is a composite of short-term and long-term interest rates,[242] capturing both long-term costs and short-term benefits, it should reveal the false allure of deferred-cost 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 nonsalient 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.[243] 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 weight to both short-term

---

§§ 121–31, 82 Stat. at 152–57 (codified as amended at 15 U.S.C. §§ 1631–49 (2006)) (requiring disclosure of the APR).

240 *See* Renuart & Thompson, *supra* note 24, at 217 ("Congress designed the APR to be *the* single number that consumers should focus upon when shopping for credit.").

241 *See id.* at 214 (arguing that a comprehensive, fee-inclusive APR will help imperfectly rational consumers who cannot aggregate the multiple fees on their own).

242 12 C.F.R. § 226.17 (2008); Official Staff Commentary § 226.17(c)(1)–(10) (2008).

243 *See* BD. OF GOVERNORS OF THE FED. RESERVE SYS. & U.S. DEP'T OF HOUS. & URBAN DEV., 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 ("[T]he APR concept deters hidden or 'junk' fees to the extent that the fees must be included in the APR calculation.").

and long-term costs, then lenders will have no incentive to defer costs.[244]

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.[245] This has led to enhanced competition and reduced rates.[246] There is even evidence that the APR succeeded in fighting imperfect rationality. Specifically, Victor Stango and Jonathan Zinman show that the most biased consumers—that is, 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; yet, such consumers pay 300–400 basis points more in interest compared to less-biased consumers in markets where TILA disclosures are not made reliably.[247]

---

244 To clarify, it is not that lenders will be indifferent to the choice between deferring cost or not deferring cost or between adding nonsalient 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.

245 *See* Lee & Hogarth, *supra* note 229, at 286 (finding that 78 percent of homeowners who refinanced their homes report comparison shopping on the basis of the APR); Lee & Hogarth, *supra* note 198, at 74 (reporting that more than 70 percent of the population reports using the APR to shop for closed-end credit); Renuart & Thompson, *supra* note 24, 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."). 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, *The Effect of Life-Cycle Cost Disclosure on Consumer Behavior* (unpublished Ph.D. dissertation, Univ. of Md., 2007), *available at* http://hdl.handle.net/1903/6794 (finding that shoppers who received "life-cycle cost" information chose cooling appliances and washing machines that used less energy); *see also* Matthias Deutsch, *Life-Cycle Cost Disclosure, Consumer Behavior, and Business Implications: Evidence from an Online Field Experiment*, *in* SUSTAINABLE CONSUMPTION AND PRODUCTION: FRAMEWORK FOR ACTION 391, 406 (Theo Geer Ken et al. eds., 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.").

246 *See* S. REP. NO. 96-368, at 16 (1979), *reprinted in* 1980 U.S.C.C.A.N. 236, 252 (crediting TILA with increasing consumer awareness of annual percentage rates and with a substantial reduction of the market share of creditors charging the highest rates); Randall S. Kroszner, Governor, Bd. of Governors of the Fed. Reserve Sys., Speech at the George Washington University School of Business Financial Services Research Program Policy Forum: Creating More Effective Consumer Disclosures (May 23, 2007), *available at* http://www.federalreserve.gov/newsevents/speech/Kroszner20070523a.htm (stating that TILA disclosure requirements and specifically the APR disclosure "are generally believed to have improved competition and helped individual consumers" (citing BD. OF GOVERNORS OF THE FED. RESERVE SYS., ANNUAL PERCENTAGE RATE DEMONSTRATION PROJECT (1987))).

247 Victor Stango & Jonathan Zinman, *Fuzzy Math, Disclosure Regulation and Credit Market Outcomes* 5 (Tuck Sch. of Bus., Working Paper No. 2008-42, 2007), *available at* http://ssrn.com/abstract=1081635.

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.[248] Why has the APR failed? 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—that is, an APR that they cannot change after the disclosure—until consummation of the loan transaction (closing).[249] 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.[250] Moreover, in some cases, 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.[251] 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 com-

---

248 The evidence showing the success of the APR is limited to the prime market. *See supra* notes 245–47; *see also* Patricia A. McCoy, *Rethinking Disclosure in a World of Risk-Based Pricing*, 44 HARV. J. ON LEGIS. 123, 126, 138–39 (2007) (noting robust competition in the prime market and that TILA disclosures effectively facilitate this competition). On the general failure of the TILA disclosure regime in the nonprime segments, see, for example, GAO AMP REPORT, *supra* note 43, at 21 (noting that current disclosure requirements "are not designed to address more complex products such as [Alternative Mortgage Products]"); Paulson, *supra* note 2; Edward L. Rubin, *Legislative Methodology: Some Lessons from the Truth-in-Lending Act*, 80 GEO. L.J. 233, 236 (1991) (noting that shopping for credit is limited to "upscale consumers who would manage perfectly well without [the] benefit of [the TILA disclosures]"). Secretary Paulson highlighted the need for more and better information:

> 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 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.

Paulson, *supra* note 2.

249 *See* McCoy, *supra* note 248, at 141.

250 *See id.*

251 *See id.* at 137–43; Willis, *supra* note 4, at 749–50; FTC Comment, *supra* note 66, at 11–12. The exception is HOEPA loans, where binding early disclosures are required. *See* McCoy, *supra* note 248, at 141.

peting loan, the borrower would have to reach the closing stage with the second loan as well.)[252]

Second, while purporting to provide a total-cost-of-credit measure, the APR excludes numerous price dimensions, such as 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.[253] 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.[254] These problems undermine the effectiveness of the APR: since the APR does not measure the total cost of credit, borrowers are less likely to focus on the APR; 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 option[255]—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

---

252 *See* McCoy, *supra* note 248; Willis, *supra* note 4, at 749–50.

253 *See* COMPTROLLER OF THE CURRENCY, TRUTH IN LENDING: COMPTROLLER'S HANDBOOK 98 (2006), *available at* http://www.occ.treas.gov/handbook/til.pdf (showing 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); Eskridge, *supra* note 24, at 1165–66; Willis, *supra* note 4, at 744, 747, 750 (noting APR includes origination fees and points, but not interest rate escalations, prepayment penalties, late fees, title insurance, and application, appraisal, and document preparation fees).

254 Elizabeth Renuart and Diane Thompson, both former members of the Consumer Advocacy Council to the Federal Reserve Board, made note of this possibility:

> 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, 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.

Renuart & Thompson, *supra* note 24, at 185, 221. Regulation has focused on "the most obvious, transparent and important terms," Zywicki & Adamson, *supra* note 11, at 71, such as interest rates, points, and closing costs, causing substitution to less transparent terms, such as prepayment penalties and LTV ratios. Such a focus "makes it more difficult to for borrowers to easily shop and compare terms." *Id.*

255 *See* HUD-TREASURY REPORT, *supra* note 11, at 66 (noting that "the APR does not account for an early payoff").

for traditional, prime loans.[256] The effect on deferred costs of subprime and Alt-A loans that were taken with intent to prepay before the end of the low-rate introductory period can be much greater. 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 $1,500 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 thirty-year FRM with a $1,000 monthly payment, the effective APR is 7.19 percent.[257] 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.[258] This problem is exacerbated when complex contracts include a set of varying terms that interact differently with the prepayment option.[259]

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

---

256 *See* Agarwal et al., *supra* note 120, at 28 (calculating a 26.8 percent impact on a $100,000 mortgage for using the wrong rule to make prepayment decisions; the impact of ignoring the prepayment option altogether may well be larger).

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

258 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.

Reed Mortgage Corp., Annual Percentage Rate (APR), http://www.reedmc.com/APR.htm (last visited Mar. 13, 2009). More generally, by ignoring the prepayment option, the APR underestimates the importance of origination fees (those that are included in the APR calculation) that accrue at closing; no such underestimation afflicts interest charges that accrue gradually over the life of the loan. *See* Renuart & Thompson, *supra* note 24, at 231. This may provide another explanation for the proliferation of origination fees.

259 Compare the value of the prepayment option on an 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.

restrict their use in higher-priced loans.[260] 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.[261] 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. Moreover, 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. Further, 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 thirty-year loan period ends and that they should therefore pay little attention to an APR that assumes thirty 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

---

260 Truth in Lending, 73 Fed. Reg. 44,522, 44,551 (July 30, 2008) (to be codified at 12 C.F.R. pt. 226).

261 *See id.* 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* Truth in Lending, 73 Fed. Reg. 1672, 1694 (proposed Jan. 9, 2008) (to be codified at 12 C.F.R. pt. 226) ("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, an FTC 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 & PAPPALARDO, *supra* note 104, at 110.

market. The resulting cost to borrowers and to society more generally was substantial. As explained above, the APR has the potential to ameliorate the effects of imperfect rationality, but it can effectively respond to the imperfect rationality of borrowers only if imperfectly rational borrowers rely on the APR; many borrowers, however, did not.[262]

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.[263] Further, the recently enacted Housing and Economic Recovery Act requires lenders to disclosure an updated APR three days before consummation of the loan transaction, in case the previously disclosed APR "is no longer accurate."[264]

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.[265] 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

---

262 *See* 73 Fed. Reg. at 44,525–26. As noted by the Federal Reserve Board in its recent revision of its Truth in Lending regulations:

> 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.

Id.

263 *See id.* at 44,590–92; *see also* Housing and Economic Recovery Act of 2008, Pub. L. No. 110-289, § 2502(a), 122 Stat. 2654, 2855–57 (to be codified at 15 U.S.C. § 1638(b)(2)).

264 Housing and Economic Recovery Act of 2008 § 2502(a).

265 *See* Kathleen C. Engel & Patricia A. McCoy, *A Tale of Three Markets: The Law and Economics of Predatory Lending*, 80 TEX. L. REV. 1255, 1269 (2002) (noting that lenders face no liability for errors in the Good Faith Estimate (GFE), including the GFE of the APR).

shopping.[266] Second, the enforcement of these improved timing-of-disclosure rules is imperfect. Specifically, several appellate courts have interpreted TILA's civil liability section[267] as precluding statutory damages for timing-of-disclosure violations.[268] The borrower would thus have to claim 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,[269] 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.[270] 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 will 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 inac-

---

266 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 (three days before closing) and consummation.

267 Truth in Lending Act, 15 U.S.C. § 1640 (2006).

268 *See, e.g.*, Dykstra v. Wayland Ford, Inc., 134 F. App'x 911 (6th Cir. 2005); 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); *In re* Ferrell, 358 B.R. 777 (B.A.P. 9th Cir. 2006). Other courts have adopted a more expansive interpretation of TILA's civil liability provisions. *See, e.g.*, Bragg v. Bill Heard Chevrolet, Inc., 374 F.3d 1060 (11th Cir. 2004).

269 *See* HUD-TREASURY REPORT, *supra* note 11, at 67 (proposing that originators be required to provide an accurate, within a prescribed tolerance, Good Faith Estimate 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 248, at 138 (arguing that similar rate lock-ins are common in the prime market even though lenders are not required to disclose a binding APR).

270 Renuart & Thompson, *supra* note 24; *see also* HUD-TREASURY REPORT, *supra* note 11, at 69 (proposing that the law be amended "to require that the full cost of credit be included in the APR"); Eskridge, *supra* note 24 (proposing a more inclusive APR more than twenty years ago).

curate 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, they will ignore an APR that does not include the prepayment option. 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 nontrivial 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 income, and future LTV, to estimate the refinancing options that would be available to the specific borrower.[271]

These estimates and projections would necessarily be based on a series of assumptions. While the use of assumptions is not new to disclosure regulation,[272] 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.[273] However, the difficulties of generating accurate projections should not be exaggerated. The mortgage industry already employs sophisticated valuation algorithms to arrive at projections tailored to specific home and loan characteristics.[274] An APR disclosure that uses these projections to account for the prepayment option will thus re-

---

271 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.

272 Note, for example, the assumptions needed for calculating the total payment period for credit card debt under BAPCPA.

273 Sophisticated valuation algorithms can be used to more closely tailor predictions to specific homes and specific loans. *See* CAGAN, *supra* note 25, at 5 (describing the valuation algorithms).

274 Projections and forecasts are commonly used in the industry. *See, e.g.*, CAGAN, *supra* note 25; Sherlund, *supra* note 133, at 11 ("I draw house price, interest rate, and unemployment rate forecasts from Fannie Mae's and Freddie Mac's June 2008 monthly economic outlooks . . . ."); *cf.* W. Miles, *Boom-Bust Cycles and the Forecasting Performance of Linear and Non-Linear Models of House Prices*, 36 J. REAL EST. FIN. & ECON. 249 (2008) (comparing the power of competing models to predict house prices). Futures markets can be used to help predict price trajectories.

duce the information asymmetry between lenders and borrowers.[275] 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.[276]

It is worth reminding ourselves that even an optimally designed APR will not be perfect. It is impossible to fully capture the multidimensionality of a mortgage loan in a one-dimensional metric.[277] This inevitable limitation, however, does not detract 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 mainly, on the APR will be the less sophisticated borrowers who, absent the APR disclosure, would rely on an even less accurate proxy.[278]

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 an inefficient allocation of resources. Default and foreclosure rates increase, imposing costs on borrowers, lenders, neighborhoods, cities, and the economy at large. And distributional concerns are raised.

---

275 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 the 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?

276 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.

277 *See* Barr et al., *supra* note 229 (manuscript at 9) ("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.").

278 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 the best lenders), where the best options, or at least some of them, would not necessarily be picked solely by the APR. *Cf.* JOHN LYNCH, CONSUMER INFORMATION PROCESSING AND MORTGAGE DISCLOSURES (2008), *available at* http://www.ftc.gov/be/workshops/mortgage/presentations/Lynch_John.pdf (proposing a "personalized screening agent website for best alternatives in region").

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. The APR can serve this important role, however, 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—that is, earlier than what recent reforms require—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.