

# Risk-Based Mortgage Pricing: Present and Future Research

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## *Abstract*

The debate surrounding predatory lending laws and the subprime mortgage market revolves around two hypotheses. The efficient-pricing hypothesis says that the market is providing broader access to credit, offering higher rates and fees to higher-risk borrowers, and that prices relate directly to risk. The opportunity-pricing hypothesis says that the high interest rates and fees charged in the subprime market are well in excess of risk-related costs.

A number of facts about the subprime mortgage market support the second hypothesis. Existing research includes price information, papers inferring a correlation between high prices and high risk of credit loss from observed default rates, theoretical discussions to explain pricing dispersion, and studies trying to determine whether laws that indirectly restrict prices have reduced the supply of mortgage credit. Information asymmetries, seller obfuscation, and search costs contribute to the inefficiencies in this market and suggest several policy responses.

**Keywords:** Mortgages; Risk-based pricing; Subprime and predatory lending

## **Introduction**

Is the price of subprime mortgage credit fair? This question is at the heart of the current policy debate about what was once called usury law and is now called predatory mortgage lending reform. Consumer protection advocates hold that the price of credit paid by subprime consumers is excessive, exploitive, and inequitable, while defenders of the unregulated market praise the development of risk-based pricing of credit as a means of democratizing the granting of loans and making them available to previously excluded

groups of consumers. Some empirical research has been done on this question, and some data are available, but a good deal more needs to be done.

The policy question of whether to restrict or regulate high-cost mortgage credit is often posed as follows: Do the interest rates and fees paid by subprime borrowers efficiently reflect the cost and risk of making loans to these previously excluded groups, or do information asymmetries and price discrimination lead to excessive rates and fees? This formulation equates fairness with efficiency. Certainly, critics of the subprime mortgage industry would argue that distributional equity is as important as efficiency in defining the fairness of mortgage pricing. While efficient pricing does not in itself preclude predatory lending (such as loans creating an unacceptably high risk of default and foreclosure), inefficient pricing or rent-seeking is an element of most definitions of predatory lending. This article will summarize the existing research and empirical evidence on the efficiency and equity of risk-based pricing in this market.

## **The two hypotheses**

### *The efficient-pricing hypothesis*

According to the efficient-pricing hypothesis, the high price of subprime mortgages efficiently reflects the cost of the credit risks associated with the borrowers and the nature of the loans. This hypothesis underlies the defense of present industry practices and the objections to legislative and regulatory proposals to restrict prices (Litan 2001; Office of the Comptroller of the Currency 2003; Staten and Elliehausen 2001; Weicher 1997). The hypothesis says that the pricing of subprime mortgages is in fact risk-based. According to this theory, individual borrowers whose loans present a greater measurable risk of loss to the lender pay higher interest rates and fees that directly reflect the marginal cost of the additional risk. Therefore, the higher prices charged to some borrowers are necessary to make loans available to them. The converse proposition is that if prices were regulated, borrowers who can now get mortgage loans would no longer be able to get them. This version of the efficient-pricing hypothesis can also be called the “regulation causes rationing” hypothesis.

### *The opportunity-pricing hypothesis*

The opposite hypothesis, advanced by proponents of stricter regulation, says that subprime mortgage prices, both the interest rate and fee components, are higher than the marginal cost (in economic terms, “rents” are being paid) and are not closely correlated with risk on an individual loan basis. In other words, there is price discrimination. The rents being paid may be producing

profits above the norm, may be allowing inefficient lenders to remain in business, or may allow high-cost marketing of loans that do not benefit consumers. Wherever the rents are going, the main implication of this hypothesis is that substantial amounts of real estate wealth are being transferred from low- and moderate-income homeowners to brokers, loan originators, and securities investors, among others. A corollary to this hypothesis is that the losers in this efficiency and wealth transfer are disproportionately minority homeowners, especially blacks (because of racially biased pricing), and that many homeowners pay high prices for subprime mortgages needlessly because they could qualify for prime rates.

The opportunity-pricing hypothesis derives from the real world experience of consumer advocates and from the often observed racial disparities between subprime and prime mortgage markets. The predatory lending phenomenon clearly exists, as attested by numerous detailed narratives of the experiences of individual borrowers (ACORN [Association of Community Organizations for Reform Now] 2002; HUD–Treasury Joint Task Force 2000). Proponents of this hypothesis point to loan fees amounting to 7 to 10 percent or more of the mortgage amount, additional fee and price elements that do not appear to provide the consumer with much reciprocal value (single-premium credit insurance, prepayment penalties, balloon payments), and rate spreads far higher than credit losses would seem to justify. They also cite the extensive evidence that similarly situated consumers pay widely varying prices for mortgages (Joint Center for Housing Studies 2004). Proponents of this view also doubt that laws limiting interest rates, or especially points and fees, will necessarily result in a reduced supply of credit, but may instead drive down the price of loans offered to the same borrowers, rein in profits, and drive out the worst lenders.

### **Which risks are being priced?**

When risk-based pricing of mortgage loans is being discussed, it is important to identify the risks that are being priced. There are several unstated and implicit corollaries to the efficient-pricing hypothesis. For example, the efficiency rationale behind charging riskier borrowers higher rates presupposes that the risk that is being priced is the risk of default by the borrower and associated servicing costs, combined with the risk that the collateral is not enough to prevent a loss to the lender. This risk, known as “credit risk,” must be distinguished from other forms of risk that may influence subprime mortgage prices to varying degrees.

Other kinds of risk contribute to prices in ways that can be more problematic from a policy standpoint. These include prepayment, interest rate, and reputation risk. Each of these may play a role in subprime mortgage prices. For example, subprime interest rates and prepayment penalties are justified on the basis of claims that subprime mortgages prepay rapidly and frequently (Alexander et al. 2002; Joint Center for Housing Studies 2004). From a policy perspective, however, using prepayment penalties as a pricing device to reduce prepayment risk has the undesirable consequence of locking borrowers into high subprime interest rates even after they improve their credit rating. This can be viewed as creating a barrier to entry for competing lenders that would offer lower rates to incorrectly priced borrowers.

Reputation and/or litigation risk is the risk that the lender or servicer will lose money because of loss of market share, legal action, or illegal or disfavored practices. Reputation risk may be embedded in subprime mortgage prices. Alexander et al. (2002) observe that the tendency of brokered loans to involve fraud or deception is not weeded out by the market but simply reflected in the pricing. Regulators have imposed settlement costs in the hundreds of millions on several large lenders (U.S. General Accounting Office [GAO] 2004): Incorporating these costs into mortgage prices is surely not desirable.

Interest rate risk is the risk that the market price will fall because interest rates on comparable instruments have risen during the life of a fixed-rate loan pool. The subprime market deals with interest rate risk both by hedging, which adds a small cost increment to the interest rate (Standard & Poor's [S&P] 1998), and by selling variable-rate loans.

Even the credit risk factor is composed of two distinct risks—the risk of default and the risk of loss. Some defenders of present pricing practices seem to focus only on the risk of default. Subprime rates and fees are higher, they argue, because subprime mortgages have much higher default and foreclosure rates than conventional mortgages. Litan (2001) writes: “[T]he serious delinquency rate...rises significantly as credit scores decline, underscoring a central feature of the subprime lending market: *that interest rates reflect the risks posed by borrowers with different financial characteristics* [emphasis in the original].” And later: “As already shown, subprime loans carry rates that are higher than those that are charged prime borrowers because subprime borrowers are riskier.” This correlation between credit scores and default rates, even if exact, falls short of demonstrating that subprime mortgages are priced according to risk.

First, a mortgage loan that goes to default or even foreclosure does not necessarily impose a cost on the lender equal to the unpaid balance of the loan. A mortgage is secured by real estate that can be foreclosed and sold to repay the loan and even the added costs of collection and foreclosure. For example, if a \$50,000 mortgage goes into foreclosure and the house can be sold for \$80,000, there is no loss unless the carrying costs, interest, and foreclosure costs exceed \$30,000. If the same \$80,000 house is foreclosed and the loan amount, including all costs, has mounted to \$100,000, there is a loss, but it is not a \$100,000 loss; rather, it is a \$20,000 loss (i.e., 20 percent of the loan balance, including advances and interest). This 20 percent figure is known as “loss severity.”

To know the cost of credit losses in a group of subprime mortgages, one needs to know both the actual completed foreclosure rate (the liquidation timeline) and the loss severity (Brown and Madden 2001). If 5 percent of the mortgages in a pool result in a completed foreclosure in a single year and the loss severity is 20 percent, then there is a net credit loss of 1 percent per annum (5 percent times 20 percent).

Some subprime mortgage lenders have very high weighted average loss severities, either because the appraised values of the homes turn out to have been systematically inflated or because there are long delays and inefficiencies in servicing and foreclosure. Other lenders have high default and foreclosure rates but low weighted average loss severities, so that their actual credit losses are much lower than their delinquency and foreclosure rates might suggest. Regarding a particular subprime lender, a report by Moody's Investors Service (Burkhalter 2000) notes on the one hand: “The delinquency rates of Delta's fixed rate pools...are among the highest recorded in the industry. [But on the other hand:] Losses on Delta's pools have been relatively low compared to other subprime pools of comparable seasoning. The principal factor accounting for the deals' low loss performance is Delta's success in limiting loss severities” (1–2).

The foreclosure rate that is usually reported is not the rate of completed foreclosures, but rather typically includes all pending foreclosures or the number of new foreclosures initiated. Some foreclosures are started but not finished: The borrower may catch up, sell the home to pay the mortgage, or make some other arrangement that avoids a loss to the lender. Because of the completion and loss severity factors, a high foreclosure rate does not necessarily mean high losses—or even any losses. Although subprime mortgages have reported foreclosure filing rates of 5 to 9 percent, losses are typically less

than 1 percent of the outstanding dollar balances annually (Brown and Madden 2001; Hurst 2001).<sup>1</sup>

To put it another way, the credit risk included in the cost, and hypothetically in the price, of subprime mortgages includes the risk of loss severities, which among other things includes the risk of bad appraisals. Apart from the specialized high loan-to-value (LTV) market, most subprime lenders do not intentionally make loans at LTV ratios of more than 95 percent. (For example, see table 2, which appears later in this article.) Moreover, most subprime lenders tend to require a lower LTV for borrowers with lower credit scores, in order to offset higher default rates by those borrowers with (hopefully) lower loss severities at foreclosure. For example, IndyMac allows a 95 percent LTV for customers with the highest-quality credit but only 65 percent for those with the lowest-quality credit. (See table 2.) Thus, it is not necessarily the case that C mortgages have higher credit loss costs than A- mortgages, if lower loss severities offset higher foreclosure rates. It may therefore not be the case that the higher interest rate charged to the C borrower directly reflects the marginal cost of credit losses.

Lenders may now also be setting prices to take into account, to some degree, the risk that borrowers' homes are being appraised improperly or even fraudulently, that credit losses will occur despite cautious LTV requirements. This is also risk-based pricing in a way, but pricing for appraisal fraud has different policy implications than pricing that reflects only the risk that borrowers will fail to make payments.

Properly understood, the pure risk-based pricing hypothesis is that subprime mortgage interest rates fairly reflect the marginal cost of each individual borrower's credit risk and therefore cannot be considered unfairly discriminatory or predatory. Proponents would presumably minimize the significance of loss severity, reputation, and prepayment risk in the setting of individual borrower interest rates in this market or suggest that these price components could be minimized through the appropriate use of prepayment penalties and the enforcement of existing laws against fraud. Many proponents would also deny that price discrimination and information asymmetries in favor of lenders affect a significant fraction of this market.

A fair amount of empirical evidence and research is already available on this question, but certainly a great deal more can be learned, especially when

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<sup>1</sup> The National Delinquency Survey, released quarterly by the Mortgage Bankers Association of America, reported a subprime foreclosure rate of 7.97 percent for the fourth quarter of 2002 (2003). For an example of subprime lender losses, Banc One reported in a March 1999 prospectus supplement that its net losses as a percentage of the average amount outstanding on all serviced mortgage loans was 0.78 percent on March 31, 1999. (All prospectuses and supplements may be obtained through the SEC's EDGAR database at <http://www.sec.gov>.)

the new Home Mortgage Disclosure Act (HMDA) rules go into effect and require price information on most U.S. residential mortgages reported for the first time. I will now review some of the available empirical evidence on the risk-based pricing question and suggest areas for further study.

### The real world evidence—Observable features of subprime mortgage prices

#### *Prices are secret: Rate charts are not public*

Mortgage interest rates and points in the prime market are widely advertised. Consumers can readily get price information from a variety of lenders for a variety of loan products, both in newspapers and on the Internet. In general and with some adjustments for loan size and property type, all consumers who apply to a given lender on a given day are offered the same price(s). An example of a retail prime mortgage rate advertisement is found in table 1.

By contrast, current subprime mortgage rates at the retail level are secret. No newspaper lists them in the real estate section. The rate tables used by wholesale subprime lenders are available only to brokers and are sometimes regarded as trade secrets. Wholesale subprime lenders publish their interest rates in a tabular form called a rate matrix, with rows representing borrower credit quality (A-, B, or C, based on FICO scores<sup>2</sup> or delinquencies) and columns representing other loan features, like LTV ratio. Interest rates are shown in the cells of the table, and a list of other rate adjustments is provided beneath the matrix. An example of a rate matrix for IndyMac, a wholesale subprime lender, is shown in table 2.

**Table 1.** Retail Mortgage Rates, Absolute Mortgage Company, April 18, 2003

	30-Year			15-Year		
	Points	Rate	APR	Points	Rate	APR
Conventional fixed	0	5.625	5.65	0	4.875	4.89
	2.5	5.0	5.48	2.5	4.25	4.63
Jumbo fixed	0	5.875	5.88	0	5.125	5.14
	2.5	5.25	5.47	2.5	4.5	4.88

Source: Absolute Mortgage Co. 2003.

APR = Annual percentage rate.

<sup>2</sup>FICO scores are credit scores developed by Fair, Isaac & Company from consumer credit report information. FICO scores below 660 are often considered subprime (Office of the Comptroller of the Currency 2003).

**Table 2. IndyMac Bank: Subprime Wholesale Interest Rates**

Effective: 4/17/03 7:19 AM B2B Lending [www.indymacb2b.com](http://www.indymacb2b.com)  
 Rate Lock: [www.indymacb2b.com](http://www.indymacb2b.com) Traditional Rate Lock Desk: 1-800-669-4300  
 e-MITS Help Desk: 1-888-56e-MITS

Lender Insured, NO Reserve Requirements, and 6 x 30 Rolling Lates Counted as 1x30!  
 80/20 Now allows up to 1x30 day lates on mortgage rating—Level 1+ only  
 80/15 Now allows up to 2x30 day lates on mortgage rating—Level 1 and 1+ only  
 12 months bank statements as full doc if LTV is less than 80%—Self employed only

Levels	FICO	LTV	DR	2/6 LIBOR					3/1 Treasury					2/6 &	30-Yr Fixed				
				Rates based on 2-YR PP-30 BE					Rates based on 3-YR PP-30 BE					3/1	Rates based on 3-YR PP-30 BE				
				99	100	101	102	103	99	100	101	102	103	Margins	99	100	101	102	103
Level 1+	600-up	65	55	5.875	6.375	6.875	7.500	8.375	6.125	6.625	7.125	7.750	8.625	4.500	6.875	7.250	7.750	8.375	9.000
		70	55	6.125	6.625	7.125	7.750	8.625	6.375	6.875	7.375	8.000	8.875	4.500	7.125	7.500	8.000	8.625	9.250
		75	55	6.250	6.750	7.250	7.875	8.750	6.500	7.000	7.500	8.125	9.000	4.500	7.250	7.625	8.125	8.750	9.375
		80	55	6.375	6.875	7.375	8.000	8.875	6.625	7.125	7.625	8.250	9.125	4.500	7.375	7.750	8.250	8.875	9.500
		85	50	6.750	7.250	7.750	8.375	9.250	7.000	7.500	8.000	8.625	9.500	4.500	7.750	8.125	8.625	9.250	9.875
		90	50	7.000	7.500	8.000	8.625	9.500	7.250	7.750	8.250	8.875	9.750	4.500	8.000	8.375	8.875	9.500	10.125
Level I	575-599	65	55	6.250	6.750	7.250	7.875	8.750	6.500	7.000	7.500	8.125	9.000	5.000	7.500	7.875	8.375	9.000	9.625
		70	55	6.500	7.000	7.500	8.125	9.000	6.750	7.250	7.750	8.375	9.250	5.000	7.750	8.125	8.625	9.250	9.875
		75	55	6.625	7.125	7.625	8.250	9.125	6.875	7.375	7.875	8.500	9.375	5.000	7.875	8.250	8.750	9.375	10.000
		80	55	6.750	7.250	7.750	8.375	9.250	7.000	7.500	8.000	8.625	9.500	5.000	8.000	8.375	8.875	9.500	10.125
		85	50	7.125	7.625	8.125	8.750	9.625	7.375	7.875	8.375	9.000	9.875	5.000	8.375	8.750	9.250	9.875	10.500
Level II	550-574	65	55	6.750	7.250	7.750	8.375	9.250	7.000	7.500	8.000	8.625	9.500	5.250	7.875	8.250	8.750	9.375	10.000
		70	55	7.000	7.500	8.000	8.625	9.500	7.250	7.750	8.250	8.875	9.750	5.250	8.125	8.500	9.000	9.625	10.250
		75	55	7.125	7.625	8.125	8.750	9.625	7.375	7.875	8.375	9.000	9.875	5.250	8.250	8.625	9.125	9.750	10.375
		80	55	7.250	7.750	8.250	8.875	9.750	7.500	8.000	8.500	9.125	10.000	5.250	8.375	8.750	9.250	9.875	10.500
Level III	525-549	65	55	8.500	9.000	9.500	10.125	11.000	8.750	9.250	9.750	10.375	N/A	6.000	9.875	10.25	10.750	11.375	N/A
		70	55	8.750	9.250	9.750	10.375	11.250	9.000	9.500	10.000	10.625	N/A	6.000	10.125	10.50	11.000	N/A	N/A
		75	55	8.875	9.375	9.875	10.500	11.375	9.125	9.625	10.125	10.750	N/A	6.000	10.25	10.625	11.125	N/A	N/A
Level IV	500-524	65	55	10.000	10.500	11.000	11.625	N/A	10.250	10.750	11.250	11.875	N/A	7.000	11.125	11.500	12.000	N/A	N/A

**Table 2.** IndyMac Bank: Subprime Wholesale Interest Rates *continued*

Levels	Stated Income	2/6 LIBOR					3/1 Treasury					2/6 &	30-Yr Fixed							
		FICO	LTV	DR	Rates based on 2-YR PP-30 BE					Rates based on 3-YR PP-30 BE					3/1	Rates based on 3-YR PP-30 BE				
					99	100	101	102	103	99	100	101	102	103	Margins	99	100	101	102	103
Level I+	600- up	65	55		6.250	6.750	7.250	7.875	8.750	6.500	7.000	7.500	8.125	9.000	4.875	7.250	7.625	8.125	8.750	9.375
		70	55		6.500	7.000	7.500	8.125	9.000	6.750	7.250	7.750	8.375	9.250	4.875	7.500	7.875	8.375	9.000	9.625
		75	55		6.625	7.125	7.625	8.250	9.125	6.875	7.375	7.875	8.500	9.375	4.875	7.625	8.000	8.500	9.125	9.750
		80	55		6.750	7.250	7.750	8.375	9.250	7.000	7.500	8.000	8.625	9.500	4.875	7.750	8.125	8.625	9.250	9.875
		85	50		7.125	7.625	8.125	8.750	9.625	7.375	7.875	8.375	9.000	9.875	4.875	8.125	8.500	9.000	9.625	10.250
Level 1	575- 599	65	55		6.625	7.125	7.625	8.250	9.125	6.875	7.375	7.875	8.500	9.375	5.375	7.875	8.250	8.750	9.375	10.000
		70	55		6.875	7.375	7.875	8.500	9.375	7.125	7.625	8.125	8.750	9.625	5.375	8.125	8.500	9.000	9.625	10.250
		75	55		7.000	7.500	8.000	8.625	9.500	7.250	7.750	8.250	8.875	9.750	5.375	8.250	8.625	9.125	9.750	10.375
		80	55		7.125	7.625	8.125	8.750	9.625	7.375	7.875	8.375	9.000	9.875	5.375	8.375	8.750	9.250	9.875	10.500
Level II	550- 574	65	55		7.125	7.625	8.125	8.750	9.625	7.375	7.875	8.375	9.000	9.875	5.625	8.250	8.625	9.125	9.750	10.375
		70	55		7.375	7.875	8.375	9.000	9.875	7.625	8.125	8.625	9.250	10.125	5.625	8.500	8.875	9.375	10.000	10.625
		75	55		7.500	8.000	8.500	9.125	10.000	7.750	8.250	8.750	9.375	10.250	5.625	8.625	9.000	9.500	10.125	10.750
Level III	525- 549	65	55		8.875	9.375	9.875	10.500	11.375	9.125	9.625	10.125	10.750	N/A	6.375	10.250	10.625	11.125	11.750	N/A

Rate & Margin Adjustments	Rate	Margin	Prepay Penalty Rate Adjustments	2-YR Fixed	30 Fixed/3:1 ARM
Limited Doc—Based on Full Doc	0.250	0.250	0 Years Prepay Penalty	0.500	0.750
No Ratio—Based on Stated Income	0.375	0.375	1 Years Prepay Penalty	0.375	0.625
			2 Years Prepay Penalty	0.000	0.500
			3 Years Prepay Penalty	(0.500)	0.000
			Credit Score Rate Adjustments		
2nd Home	0.500	0.500	Credit Score 620-640	(0.125)	
Non Owner Occupied	0.750	0.750	Credit Score 641-660	(0.250)	
			Credit Score 661-up	(0.500)	
2-4 Units	0.250	0.250	Borrower Paid MI Rate Adjustments		
Low-rise Condo	0.250	0.250	LTV 80.01—85%	(0.375)	
			LTV 85.01—90%	(0.625)	
			LTV 90.01—95%	(0.875)	
Loan Amount ≥ \$150k to \$500k	(0.250)	(0.250)	Max Price/Yield Spread		
Adj from F30, F30/15, or F15	(0.125)	(0.125)	Max Price with 0-YR PPP	101.0	
			Max Price with 1-YR PPP	101.5	
			Max Price with 2-YR PPP	102.0	
			Max Price with 3-YR PPP	103.0	

Rates, comparisons, fees and programs are subject to change without notice. Information is intended for Mortgage Professionals only, and not for distribution to consumers, as defined by Section 226.2 of Reg. Z, which implements the Truth in Lending Act. IndyMac Bank does not represent or warrant the accuracy of the competitors' data. Ratesheets do not represent guidelines. Refer to IndyMac Lending Guide for specific parameters.

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The notation at the end of table 2 that the price information is “not for distribution to consumers” is typical. Brokers and retail lenders have the information to shop for prices; consumers do not. The broker or retail lender reviews these price sheets and then determines what product, including what combination of variable or fixed interest rate, prepayment penalty, and other terms to present to the consumer. After determining the broker or retail lender origination fee or markup desired, the broker or retail lender could in theory offer the consumer a variety of price options; however, it appears that in practice subprime borrowers are most often offered a single loan product, represented as the one for which they qualify based on their specific credit history and property value (Alexander et al. 2002; Courchane, Surette, and Zorn 2004; Kim-Sung and Hermanson 2003).

The column headings 99, 100, 101, 102, and 103 refer to the discount or premium the wholesale lender pays to the retail lender or broker. A loan purchased at 99 percent of par requires the borrower to pay 1 percent of the loan in points to reduce the rate. A loan purchased at 103 percent provides the retail lender or broker with a 3 percent cash premium for selling a higher interest rate to the consumer. Thus, the interest rates actually paid by the consumer depend on the markup charged by the retail lender or broker.

The IndyMac rate matrix also shows the multiplicity of price options for a given subprime borrower. In addition to the varying combinations of points (discounts or premiums) and rates, different rates are available depending on the LTV ratio. The same consumer can obtain a lower interest rate simply by taking out a smaller loan. Providing full income documentation versus limited verification or “stated income” (unverified income) also affects the rate. Finally, accepting prepayment penalties of varying duration can change the rate as well, sometimes to the borrower’s benefit and sometimes not.

### *Prices are discontinuous: The 200 basis point gap*

It is not a simple matter, then, even to describe subprime interest rates at the retail level. However, subprime interest rate data are available from some sources. The industry newsletter *Inside B&C Lending* publishes a weekly table providing average interest rates charged for A, B, and C loans. It is also possible, although tedious, to tabulate the rates charged for subprime loans sold through securitizations. The prospectus supplement usually provides a frequency distribution table of interest rates for the pool of loans, in 1 percent or 0.5 percent increments. Mansfield (2000) tabulates price data from prospectus supplements from 1996 to 1999 and reports rates ranging from 7 to 20 percent. Wholesale rate tables like table 2 can also be consulted, but

these fail to include the retail markup and the points and fees added by brokers and others to produce the actual price paid by the consumer.

One striking feature of mortgage interest rates (leaving the question of points and fees for later) is that the subprime rate range begins several percentage points higher than the prime mortgage rate. For example, as of April 2003, 15-year conventional mortgages were available at between 5 and 6 percent, with 0 to 3 points, while subprime mortgage rates ranged from 8 percent to 20 percent or more. (See tables 1 and 2.)

Using the rate matrix in table 2, we can find a wholesale subprime rate of 7.25 percent at par for a 30-year mortgage for the best credit rating and lowest LTV ratio. However, this wholesale rate requires a prepayment penalty. To eliminate the penalty, we must add 0.75 percent, for a rate of 8 percent. If the borrower has a FICO score above 660 (probably no longer a subprime borrower), we can subtract 0.5 percent and get 7.5 percent. To this rate, however, must be added either an interest rate markup, or points, to pay the retail lender or broker.

The prime retail rate in table 1 for a 30-year conventional mortgage without prepayment penalty is 5.625 percent with no points, or 5.0 percent with 2.5 points. This 200 basis point (or more) gap between the highest prime rate and the lowest subprime rate is an observable and enduring feature of this market (Courchane, Surette, and Zorn 2004; Mansfield 2000).

Approaching the matter as an economist would, *a priori*, it might seem that interest rates for a spectrum of consumers with the best- to the worst-quality credit would be continuous. As an example, let us assume that a prime lender's cutoff is a FICO score of 660 and a LTV ratio of 80 percent. Next, let us suppose that we have a borrower whose FICO score is 659 and/or who wants a loan for 81 percent of the property value and that this borrower cannot find a prime lender to offer a 5.5 percent mortgage. There should be a lender willing to accept the slightly higher risk by charging a slightly higher price, say, 25 basis points (i.e., an interest rate of 5.75 percent). Cutts and Van Order (2003) use wholesale rate information from a single lender, probably understating the gap at the retail level, to develop an interesting explanation based on inadequate information on the lender side and adverse selection. Engel and McCoy (2002) propose a model of market segmentation based on inadequate information on the borrower side, which allows extraction of rents in what they call the predatory lending segment.

The observed price discontinuity suggests a market segmentation in which certain consumers do not get interest rates reflecting the marginal cost of their mortgage loans because of information asymmetries. This empirical fact seems to support the opportunity-pricing hypothesis.

### *Prices have multiple components*

Interest rates do not constitute the total and final price paid by subprime mortgage borrowers for their loans. These borrowers pay points, fees, credit insurance premiums, prepayment penalties (a contingent price component), and a variety of charges for services from third parties for closing or servicing their loans. The points and fees retained by the originator or broker are particularly problematic. Almost no data are available on what these price components actually are in today's retail subprime market (Mansfield 2000).

Stein (2001) estimates that the average subprime loan may have fees of 7 percent of the loan amount, compared with 1.1 percent for prime mortgages. His extreme example of First Alliance Mortgage Company charging 20 points or more is well known. (First Alliance filed for bankruptcy in 2000.) Because the interest rate component of mortgage prices seems to compensate subprime lenders amply for credit losses, there does not appear to be any risk-related cost that points and fees would cover.

In the prime market, points and fees can be paid to reduce the interest rate (as opposed to the rate for a loan with no points). When points function this way, they can be called discount points. This tradeoff is found on the wholesale side of the subprime market. In table 2, we can see that the wholesale lender will pay the broker 99 percent of the loan value, that is, charge a 1 percent discount, to reduce the interest rate by 75 basis points. However, we can also see that a 1 percent, 2 percent, or 3 percent premium is offered to retailers to sell a higher interest rate to the consumer. When the retail lender receives this sort of premium, the points the consumer pays are not buying a lower rate or covering the costs of credit risk.

Points in the subprime market do not appear to function as discount points, especially at the 5 to 8 percent levels commonly seen. Instead, points and fees are used primarily to reward the sales effort and perhaps to cover higher loan origination costs, going in most cases to the brokers and retail lenders, rather than to pay any risk-related cost. The Washington Department of Financial Institutions (DFI) (State of Washington 2002) found that Household Finance, the number one originator of subprime mortgages, routinely charged borrowers 7.25 points between 1995 and 2001. Although the lender's employees claimed that the points were charged to "buy down" interest rates, they were unable to demonstrate any interest rate savings in the 92 cases the DFI examined (2002).

A prepayment penalty is a contingent price element. It is charged only if borrowers prepay when it is in effect. Nevertheless, more than 50 percent of subprime loans typically prepay in less than five years, and 40 to 80 percent of subprime loans may have prepayment penalties that extend up to five years.

Stein (2001) reports that 80 percent of subprime loans have prepayment penalties, compared with less than 2 percent of prime mortgages. Cutts and Van Order (2003) report that 41 percent of subprime loans in Freddie Mac's survey had prepayment penalties, compared with 12 percent of prime mortgages, and that the penalty period was usually between two and five years. The duration of these penalties has recently declined from five years to two as a result of the public controversy over predatory lending and the adoption of best practices standards (Stein 2001). Whether prepayment penalties are related to risk is debatable, but they are plainly not related to credit risk.

Prepayment penalties sometimes—but not always—can be bought out with a slightly higher interest rate. In table 2, we can see that the consumer can add 0.5 percent to the interest rate to avoid a prepayment penalty for a variable-rate loan, and 0.75 percent to eliminate it on a fixed-rate loan. If we assume that all subprime borrowers are expecting to make timely payments and thereby improve their credit rating, qualify for a prime rate, and save themselves 2 percent or more per year before the penalty expires, it is difficult to explain why a rational subprime borrower would elect a prepayment penalty, commonly equal to six months' interest (4 to 6 percent of the loan) (Stein 2001). It would be rational to choose the penalty only if the consumer is virtually certain of not refinancing at a better interest rate during the penalty period. The fact that 50 percent of subprime loans or more are sold with prepayment penalties suggests that consumers lack complete information. It is also difficult to explain why such a high proportion of subprime borrowers "choose" prepayment penalties, as opposed to so few borrowers in the prime market, unless choice is not the operative mechanism. A survey of subprime borrowers who refinance and the rate, points, and penalties they paid before and after refinancing could provide valuable data about prepayments and pricing in this market.

### *Price discrimination entails complexity and information asymmetry*

The IndyMac matrix in table 2 illustrates another important feature of subprime mortgage prices: their complexity. Even if the matrices were not secret, but were instead provided (or even available) to every consumer beforehand, most consumers would have difficulty determining their options. A single consumer might qualify for 10 or 20 different price points on the matrix, depending on the combination of loan amount, term, and other features. Even assuming that the consumer knows his or her FICO score and LTV (this assumes a very sophisticated consumer), the retail lender or broker is likely to have superior information about how the pricing operates and will therefore be in a position to price-discriminate—charge different prices to similar borrowers.

*Price and credit risk do not correlate closely*

In the aggregate, subprime mortgage interest rates are higher than prime, and the risk is higher. The robust version of the efficient-pricing hypothesis requires variation in interest rates (and fees and penalties) for individual subprime loans to correlate closely with individual borrower and loan credit risk. The subprime market is highly heterogeneous and includes many borrowers who could qualify for lower-priced credit. The empirical evidence suggests that pricing is not efficient in the robust sense (Joint Center for Housing Studies 2004).

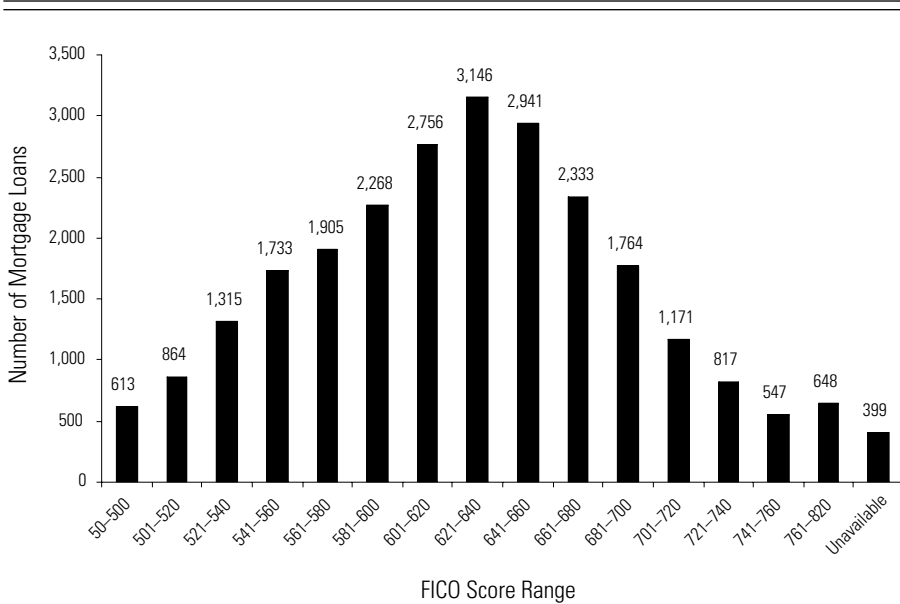
Some data are available on the credit profiles of borrowers who have subprime loans. Subprime lenders that sell their mortgages in the form of securities provide descriptive statistics on their loans. One variable often tabulated is the borrower's FICO score. The presence in a pool of subprime loans of substantial numbers of borrowers with prime FICO scores provides some evidence that borrowers paying subprime prices are not all high-risk.

The largest single pool of subprime loans securitized to date consisted of loans made by EquiCredit Corporation between 1999 and 2001. Data on these loans are provided in the prospectus and prospectus supplements associated with the securitization, summarized in figure 1 (EQCC Receivables Corp. 2001).

Of 25,000 loans, more than 10,000 were made to borrowers with FICO scores above 640, and 3,000 were made to borrowers with scores above 700. On the one hand, some of these subprime borrowers with high scores may be seeking loan products not available in the prime market. On the other, the presence in the subprime market of such a significant percentage of consumers with good or excellent credit scores is consistent with Freddie Mac's reports that many subprime borrowers could qualify for prime rate mortgages (1996).

*Credit losses are a small fraction of high subprime rates and costs*

Pricing models used in the securitization market provide another source of data on the risk components (and other components) of subprime mortgage rates. S&P (1998) has published a report on a hypothetical price model from which we can see at least some of the cost components of the interest rate charged to subprime mortgage borrowers. The model assumes that investors supplying loan capital will receive a weighted average return of about 6 percent and that the borrowers are paying a weighted average interest rate of about 10.55 percent, leaving a 4.55 percent spread to cover costs and profit (apart from the cost of funds). That spread is earned on a pool of loans that shrinks rapidly because of foreclosures and prepayments, and it takes sophisticated modeling to determine the spread needed to meet projected costs. The

**Figure 1.** EquiCredit Subprime Loans, 1999 to 2001

Source: EQCC Receivables Corp. 2001.

S&P (1998) model provides an example, albeit hypothetical, of the various costs that go into the spread and therefore into the rate paid by the consumer.

The striking thing about this model is how small a role actual credit losses play in the interest rate paid by the borrower. Only about 15 percent of the interest spread is needed to cover loan losses in the pool. From the borrower's point of view, only 6.25 percent of the weighted average interest rate (6.25 percent of the 10.55 percent weighted average coupon) is needed to cover credit losses. The originator's operating expense and profits each account for 25 percent of the spread. Table 3 shows the various cost components of the spread.

To put it another way, out of the 10.55 percent average retail interest rate, servicing costs are about 0.5 percent and credit losses are about 0.7 percent. The subprime lender's own borrowing and securitization costs, operating expenses, and profits account for the remaining 3.3 percent of the 4.5 percent spread. It is interesting to note that the S&P price model assumes a 1 percent origination fee to the lender, which is quite low for the industry, and allows the price model to include the costs of various risk factors entirely in the interest rate and not in up-front points or fees.

The S&P (1998) model is consistent with data from individual subprime lenders on their actual losses. These are typically less than 1 percent of the outstanding loan balances per annum. It is therefore only partly correct to say

that subprime mortgage rates are higher because credit risk is higher than in the prime mortgage market. Rates from 2 percent to 10 percent higher than prime mortgage rates cannot be accounted for solely by the direct cost of credit risk.

## The existing research

### *Theoretical discussions*

A number of economists have written descriptive reports in which they assert that high prices in the subprime mortgage industry are indeed based on credit risk (Elliehausen and Staten 2002; Litan 2001; Staten and Elliehausen 2001; Weicher 1997). Although these reports provide data on delinquency, default, and foreclosure rates for subprime mortgages, they do not generally provide information on actual credit losses, or other risk-related costs, or attempt to correlate cost and risk information with rates and fees charged in the real market.

Two articles have applied information asymmetry theories to the subprime mortgage market (Cutts and Van Order 2003; Engel and McCoy 2002). Two types of information asymmetry may exist in consumer credit markets. First, sellers may not have complete information about the risk characteristics of an individual consumer and therefore may not be able to offer the lowest appropriate price. Second, consumers may not be aware of the prices offered for loans, because of the complexity of the prices, their own misunderstanding of credit scoring and pricing, and obfuscation by sellers and brokers (Hynes and Posner 2002).

**Table 3.** S&P Subprime Mortgage Pricing Model

	Amount (\$)	Spread (%)
Sale proceeds from securitization	113,621,000	
Total expenses for the life of the pool	13,830,000	
Servicing	1,380,000	9.98
Securitization fee	250,000	1.81
Hedging	300,000	2.17
Operating expense of the originator	3,500,000	25.31
Interest—Warehouse line	2,000,000	14.46
Interest—Long-term debt	800,000	5.78
Loan losses	2,100,000	15.18
Profits	3,500,000	25.31
		100.00

*Source:* S&P 1998.

*Note:* The model allocates the lender's costs in a hypothetical \$100 million subprime mortgage pool.

Cutts and Van Order (2003) confront the problem of the price discontinuity between prime and subprime mortgage markets and suggest an explanation based on lenders having inadequate information about borrower-centered risk factors. As a result, the authors contend, subprime rates cannot reach marginal costs because of the cost to lenders and the secondary market of underwriting subprime mortgages—that is, the cost of determining the risk of individual loans. On the one hand, models of imperfect seller information and resulting adverse selection may explain the segmentation of the mortgage market, but they need to be revised in light of modern developments in credit reporting and scoring, which provide sellers of credit with comprehensive risk information about many consumers that was not available in the recent past (Engel and McCoy 2002).

On the other hand, Engel and McCoy (2002) propose that sellers in the predatory segment of the subprime mortgage market can price-discriminate because of consumer misinformation about available prices and about their own creditworthiness. Others have also noted the serious problems faced by subprime borrowers in obtaining price and credit rating information (GAO 2004; Joint Center for Housing Studies 2004).

Two important studies have found consumer misinformation relating to one aspect of mortgage pricing, namely broker fees (Jackson and Berry 2002; Woodward 2003). Both studies examined yield spread premiums—a payment from a lender to a broker in return for an increase in the consumer's interest rate—as a pricing device to pay broker fees. For example, in the IndyMac rate matrix (table 2), the lender will pay 1 percent of the loan to the broker as a premium—101 percent of the loan amount, in other words—in return for an interest rate increase over the consumer's par rate (0.5 percent in most cases). From the consumer's perspective, if the broker fee has been established in advance, the consumer could theoretically offer to pay a higher interest rate on the condition that the broker reduce his or her fee by the amount of the lender premium. Of course, it is equally possible that the consumer will pay the broker a fee, in cash from the loan proceeds, without taking account of the additional payment made by the lender to the broker. It all depends on whether the consumer knows the par rate and the formula for calculating premiums. Both Jackson and Berry (2002) and Woodward (2003) found that consumers who paid yield spread premiums were not getting a corresponding reduction in the broker fee they paid directly and thus the yield spread mechanism resulted in higher total broker fees.

Some researchers have pointed to consumer search behavior in the subprime market as a factor permitting price discrimination (Joint Center for Housing Studies 2004; Kim-Sung and Hermanson 2003). A majority of

subprime mortgages are sold by brokers, leading to a principal-agent problem (Joint Center for Housing Studies 2004). Three surveys of subprime borrowers have found that they typically do not initiate a search for a mortgage loan, especially for refinancing or home equity loans (California Reinvestment Committee 2001; Courchane, Surette, and Zorn 2004; Kim-Sung and Hermanson 2003). Instead, a broker or lender suggests the need for a refinancing or home equity loan through “push” marketing (Joint Center for Housing Studies 2004), which creates a market with both “costly search” and seller obfuscation. Costly search exists when consumers must expend time, money, and other resources to learn what prices are available to them. In addition, costly search can produce price dispersion (Salop and Stiglitz 1982). Seller obfuscation is a strategy to maximize profits by using bait-and-switch tactics, luring a consumer with a low price offer and then taking advantage of search costs by switching him or her to a higher price and/or a different product (Ellison 2002; Ellison and Ellison 2001). In both cases, the consumer cannot obtain the lowest available price without incurring more search costs, thus reducing or offsetting the potential welfare gain. Bait-and-switch tactics by subprime mortgage brokers have been well-documented (California Reinvestment Committee 2001). In addition, if each subprime consumer can be characterized as having a different risk profile and therefore buying a different product from that sold to any other consumer, product differentiation can defeat efficient pricing, which requires that products be fungible (Hynes and Posner 2002).

Studies of race discrimination in lending suggest another aspect of the consumer search problem: fear of rejection. Consumers with marginal credit may be reluctant to seek the lowest-priced credit for which they qualify because of the risk of being rejected by the lender. A denial of credit has a psychic cost to the consumer that may act as another form of search cost. Consumers may engage in self-screening that prevents them from obtaining the best price for credit (Wienk 1992). This possibility could be explored in constructing future surveys of subprime borrowers.

Further research could produce a better theoretical model explaining price dispersion in the subprime mortgage market, a model based on information asymmetry, search costs, seller obfuscation, product differentiation, and principal-agent problems and permitting extensive price discrimination by brokers and sellers.

*Price surveys—Description of interest rates*

Mansfield (2000) tabulates retail mortgage rates from seven large lenders for the years 1995 to 1999. She notes both the discontinuity with prime rates and the much wider variation in subprime rates compared with prime rates, both suggesting the presence of rents. Weicher (1997) also provides some descriptive data on prices charged by a small group of lenders that supplied information for his study. These descriptions confirm the gap between prime and subprime rates and also the wide dispersion of subprime rates. Unfortunately, surveys of loan fees, points, and other loan closing costs are not readily available. Having this basic information about the subprime mortgage market would do a great deal to inform the discussion of the two hypotheses I described at the outset.

*Risk-price correlation studies—Freddie Mac*

Freddie Mac has collected substantial data on subprime loans by buying them and by using its resources to gather data sets for subprime mortgages that it does not own. This research has consistently found that credit risk factors alone do not fully explain either the interest rate paid by subprime borrowers or indeed the assignment of borrowers to a subprime instead of a prime loan. In its recent survey of nearly 8,000 mortgages originated in 2001, 38 percent of subprime borrowers had FICO scores above 620 and 13.8 percent were above 680 (Courchane, Surette, and Zorn 2004). In an earlier survey of 15,000 loans from four subprime lenders, economists from Freddie Mac (1996) found that 10 percent to 35 percent of the subprime borrowers would qualify for prime mortgages under that organization's underwriting standards.

In their recent survey, Courchane, Surette, and Zorn (2004) sought to identify variables other than credit risk that would explain why borrowers got subprime mortgages. Although the study did not look at individual transaction prices per se, it did compare prime borrowers as a group with subprime borrowers as a group. The nonrisk variables studied included knowledge of mortgage products, search behavior, and demographics such as race, ethnicity, age, and income, in addition to whether the borrower suffered a recent adverse event such as unemployment. The study also found that while credit risk was clearly predictive of being a subprime borrower, search behavior, use of a broker, age, and ethnicity were also independently predictive. While not offering an explanation of pricing, this study illuminates possible causes of price variability and factors other than risk that may affect subprime pricing.

*Discrimination studies: Race, age, and gender in mortgage pricing*

Several studies have sought to determine whether minority, female, or elderly consumers pay higher rates for subprime mortgages than white, male, or nonelderly borrowers. The HUD–Treasury Joint Task Force (2000) and ACORN (2002), among others, have found that subprime loans are concentrated in minority neighborhoods and that geographic areas characterized as predominantly high-income minority have more subprime loans than low-income white areas. The National Community Reinvestment Coalition (2003) sought to control for credit risk by using census tract data from a national credit bureau and, after controlling for credit score, found that as black and elderly populations increased in a tract, so did subprime lending market share. Courchane, Surette, and Zorn (2004) used a survey of individual borrowers to identify factors predictive of being assigned a subprime loan. That study found that risk-related factors were significantly predictive of consumers receiving a subprime loan but that the predictive model improved by adding a combination of borrower knowledge, search, use of a broker, and demographic factors. In particular, borrowers who searched less, were Hispanic, or were over 65 were all more likely to have a subprime mortgage, even after controlling for risk factors. Calem, Gillen, and Wachter (2002), controlling for credit scores by using geographic data, also found race to be predictive of subprime mortgage borrowing.

The discrimination studies are suggestive of pricing that is not based entirely on risk and raise interesting questions about the link between risk variables and race and age, and between other variables such as search behavior, borrower information, or reliance on brokers, and these demographic characteristics.

*Impact of laws on supply of credit: Does price regulation cause rationing?*

Several natural experiments offer some evidence on what effect price regulation might have on the supply of subprime mortgage credit. At both the federal and state levels, laws that restrict, but do not prohibit, mortgage loans with very high points and fees and/or very high interest rates have been passed. Proponents of both hypotheses on risk-based mortgage pricing have examined the effects these quasi-usury laws have had on the supply and pricing of mortgage loans in the affected markets. These studies shed some light on both the basic question of pricing efficiency and on the policy questions of what efficiency and equity consequences different regulatory policies might produce.

*The effect of HOEPA after 1995.* In 1994, Congress enacted the Homeownership Equity Protection Act (HOEPA), which took effect on August 1, 1995.<sup>3</sup> HOEPA regulated, but did not prohibit, closed-end mortgage loans whose annual percentage rate (APR) is more than 10 percentage points above comparable Treasury rates and loans whose points and fees exceed 8 percent of the loan amount. If the simplest version of the efficient-pricing hypothesis is correct, the enactment of HOEPA should have eliminated lending to a segment of borrowers who had especially high credit risk factors and who previously were getting loans with an interest rate of 17 percent or 10 points.

The report sponsored by the American Financial Services Association (AFSA) on the impact of HOEPA revisions on subprime lending (Staten and Elliehausen 2001) includes an interesting table showing how many loans in its database of nine member lenders had either an APR or points and fees above the HOEPA triggers. The percentage declined from 26.7 percent in 1995 to 9.3 percent in 2000 for first mortgages, while the percentage for second mortgages remained relatively stable at around 50 percent. The table also shows that if the HOEPA APR trigger had been 8 percent above Treasury rates and if credit insurance premiums had counted toward the 8 percent points/fees trigger, 61 percent and 38 percent of loans in 1995 and 2000, respectively, would have been included. Put another way, high-priced loans above the given cutoffs (and/or the sale of single-premium credit insurance) declined substantially over time, at least as a share of first mortgages. Moreover, this decline coincided with substantial growth in overall subprime loan volume.

Staten and Elliehausen (2001) posit that this decline in high-priced loans means that over time, more loans were made to borrowers with higher credit ratings (and fewer were made in the C and D categories). The AFSA database apparently includes loan date and FICO scores for borrowers but does not provide FICO distributions by loan year. Although the data to test the credit improvement hypothesis appear to be available, the authors do not cite evidence that this rather significant change in the mix of subprime loans actually occurred, apart from the inference based on the pricing mix.

An alternative explanation, consistent with opportunity pricing, is that the enactment of HOEPA, which took effect in October 1995, and the gradually increasing resistance of the secondary market drove down rates and points for loans to the same borrowers. More efficiently priced, less profitable loans may have replaced the higher-priced loans to the same or similar borrowers.

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<sup>3</sup> Subtitle B of Title I of the Riegle Community Development and Regulatory Improvement Act, P. L. 103-325 (September 23, 1994), codified at 15 U.S.C. §1605(aa), 1639.

Subprime mortgage origination volume grew dramatically after 1995, despite the quasi-disappearance of the 10-point subprime mortgages brought about by HOEPA. No study or even anecdote has reported that a discrete category of consumers who were getting subprime loans at prices exceeding the HOEPA triggers in 1994 cannot now obtain subprime mortgage loans. Proponents of the opportunity-pricing hypothesis would suggest that HOEPA's effect on rates and points reduced some of the opportunities for rent-seeking.

*The North Carolina evidence—Conflicting views.* Those on both sides of the debate have also offered studies and interpretations of available data on the impact of the North Carolina predatory mortgage law, which took effect in July 2000. The North Carolina question is rapidly creating a literature of its own. The two most recent studies taking opposing views were conducted by the industry-sponsored Credit Research Center (CRC) (Elliehausen and Staten 2002) and the University of North Carolina's Center for Community Capitalism, in conjunction with the Center for Responsible Lending (Quercia, Stegman, and Davis 2003). The CRC uses a proprietary database of loans made by nine lenders and concludes that subprime lending volume declined as a result of the law and that the decline particularly affected borrowers with low incomes (although again one would like to have seen the FICO scores, which are a better indicator of high risk). This result is characterized as reducing access to credit for high-risk borrowers and the disadvantaged. The CRC study has been criticized on numerous grounds, the most salient of which is that the before and after comparison used an "after" period that was not really after the law went into effect.

The Quercia, Stegman, and Davis (2003) study found that the reduction in loan volume that has been observed in North Carolina can be attributed to reduced numbers of refinancing transactions with terms the authors characterize as predatory, but that the price of credit has not increased and the availability of credit, especially purchase money mortgages, to a wide range of borrowers has not been impaired. This study did look at FICO scores and found that lending to high-risk borrowers with low credit scores increased after the new law passed and that, conversely, fewer consumers with high credit scores obtained subprime refinancing loans (Quercia, Stegman, and Davis 2003). When the authors compared the seven quarters before and after the law was passed, subprime lending to borrowers with high FICO scores decreased by 28 percent, versus 4 percent nationally, suggesting the possibility that the North Carolina law discouraged steering and price discrimination and so reduced the volume of subprime loans made to prime borrowers (Quercia, Stegman, and Davis 2003).

The difficulty with these natural experiments is that the effects of new laws on mortgage pricing are hard to isolate from the effects of the general business cycle and other changes and from the market changes occurring as the subprime industry matures. At the same time that new state laws are being passed, the secondary market and bond rating agencies are evolving new criteria for the purchase of loans, disfavoring certain features viewed as predatory. Also, the structure of the mortgage industry is changing through technology and consolidation (Joint Center for Housing Studies 2004). The subprime mortgage industry remains very heterogeneous as well, so that sampling, especially by lender, is a tricky business.

### **Areas for further research**

Beginning with the 2004 reports, HMDA data will include loan APR above a certain threshold. This new price information can be compared with borrower demographics, addresses, and other HMDA variables. Borrower credit scores will not be reported, nor will other price components, such as points, so the primary contribution of the new HMDA data to the risk-based pricing debate will be to provide better descriptive statistics on interest rates charged in the prime and subprime markets at the retail level. Researchers will want to examine the extent of price differences and their correlation with the variables tabulated in HMDA and also (hopefully) with credit risk variables that can be associated with the HMDA data at a detailed geographic level.

The noninterest components of price in the subprime mortgage market are still virgin territory for researchers. Apart from studies on the effect of prepayment penalties, very little is known about how much subprime borrowers are paying for points, fees, and insurance premiums and how well or poorly these price components correlate with individualized costs. A related question is the extent to which (if any) the payment of broker premiums benefits or harms consumers in loans where the consumer pays an above-par rate. The essential starting point for any such study, obviously, is access to loan-level data that include rate, points, fees, other price elements, and risk factors such as FICO scores and LTV ratios.

A related question is what effect laws that cap points or strictly regulate high-point loans have on the other components of loan prices, such as points and fees, and on lending volume.

In the prepayment area, a number of behavioral models to explain refinancing and defaults by subprime borrowers have been posited, but not empirically tested. The credit curing model, for example, posits that subprime borrowers improve their credit and therefore refinance to get the benefit of the

lower rates for which they are newly qualified. The flipping model suggests that brokers seeking fees encourage subprime borrowers to refinance repeatedly with the lure of taking cash out, regardless of increases or decreases in rates. Goldstein (2002) suggests that credit curing may take place in some areas, while flipping is the dominant trend in more vulnerable neighborhoods with large elderly and minority populations. A well-designed survey of mortgage refinancees with price and loan information from the prior and subsequent mortgage loans would provide a significant contribution to the discussion.

### **Policy implications of the two hypotheses**

If subprime mortgage interest rates are competitive and correlate directly with the risk of credit loss on an individual basis, policies limiting interest rates could restrict access to credit for the riskiest borrowers. If subprime borrowers paid points and fees on a competitive and transparent basis to buy down interest rates, then limitations on points and fees might reduce pricing options.

If, as the data appear to show, interest rates are somewhat tied to credit risk, somewhat tied to other risks such as prepayment and reputation risk, and somewhat opportunistic in light of limited consumer information, two sorts of policies would be appropriate. First, regulators could seek to improve transparency and information by requiring that retail prices, including all components, be advertised and perhaps reduce the complexity of mortgage pricing by requiring that all points and fees be combined in a single, binding price. This was one of the recommendations of the joint HUD and Federal Reserve Board report (Federal Reserve Board and HUD 1998). Second, opportunistic pricing could be directly regulated. This is already the case, under the Equal Credit Opportunity Act, when price discrimination affects minority homeowners adversely. Other proposals, including regulatory and best practices requirements to give subprime borrowers the best available price and hold brokers to a fiduciary duty or suitability standard (Engel and McCoy 2002) would target the problem directly.

Prepayment risk is reflected in subprime mortgage prices both in the penalties that are a component of pricing and in the interest rates borrowers pay. Table 2 shows that one wholesale lender will either charge a prepayment penalty for three years or add 0.75 percent to the interest rate to avoid it. Penalties of up to 6 percent of the principal inhibit or even prevent subprime borrowers who improve their payment records and could refinance at prime rates from doing so and thereby prevent efficient transactions. If penalties were chosen by rational, well-informed borrowers who did not in fact refinance within the penalty period and took advantage of actual rate savings, their use

might seem beneficial. However, if substantial numbers of subprime borrowers incur the penalty and therefore pay more than they would have to get a loan without it, they may not understand the options they have and the costs of the penalty. Although improved disclosure might mitigate the information problem, prepayment penalties and pricing options also contribute to the price complexity that inherently undermines the ideal of perfect consumer information. If prepayment penalties are not “purchased” efficiently, a prohibition on them in the subprime market, forcing the risk to be priced in interest rates, could improve efficiency.

The implications of prepayment-risk-based pricing depend on a better understanding of these fees in the subprime market. Although prepayment speeds are carefully measured, rigorous data on why subprime mortgages prepay so frequently (assuming that they do) are lacking. Efficient-pricing proponents would assert that subprime borrowers refinance as soon as their credit improves and they can obtain a lower price. Opportunity-pricing proponents would assert that frequent prepayments are generated by push marketing by brokers churning customers to generate fees and do not necessarily save consumers money or increase their welfare. One investigator (Goldstein 2002) has found that subprime borrowers in vulnerable neighborhoods (with low incomes, high minority populations, and significant equity) usually refinance from one subprime loan to another, while borrowers in less vulnerable neighborhoods are more likely to move from subprime to prime mortgages. Freddie Mac economists have also found that subprime borrowers tend to get stuck in the subprime market when they refinance (Courchane, Surette, and Zorn 2004).

Recent legislation in North Carolina and other states has prohibited or severely restricted prepayment penalties (GAO 2004). If in fact these are often sold to consumers whose welfare would be maximized by avoiding them, such prohibitions would promote efficiency. More important, public policy ought to promote the migration of subprime borrowers back to the prime credit markets. Prepayment penalties functioning as a barrier to the entry of price competitors who seek out consumers with improved credit seem both inefficient and inequitable, especially in light of the market’s ability to price prepayment risk through interest rate adjustments.

Prohibitions on prepayment penalties and restrictions on up-front points and fees operate similarly to simplify pricing, driving the costs of risk back into the interest rate. If the opportunity price hypothesis is correct, these measures might ameliorate information asymmetry and search problems and improve pricing efficiency. Another policy option would allow more complex price structures, such as prepayment penalties, financing of fees, or balloon

payments, but only in conjunction with counseling intended to equip the consumer with information to make a rational choice. Of course, counseling costs money too.

Some final policy observations relate to equity rather than efficiency. Even if information, search, and entry barrier issues could be eliminated and subprime loan prices could reflect real world risks efficiently, it is nevertheless a serious problem for consumer borrowers and our society to allow an unreasonable degree of risk to be taken. For example, if there is a real risk of unexpected loss severities because there is a widespread appraisal fraud problem, do we want to allow the market to fix this problem in the long term by charging higher interest rates? If many subprime lenders are facing large litigation and penalty costs for fraudulent practices, as in the recent cases against Household and CitiFinancial, should the market raise rates and points to allow these practices to continue?

It is also worth keeping in mind that high-cost, high-risk lending results in both a substantial transfer of wealth from low-income borrowers to wealthy lenders and investors and in the serious consequences of default and foreclosure for individual families that are on the wrong end of the risk. These families may have incorrectly discounted the risks when borrowing or refinancing with a subprime loan. Just about any level of credit risk can theoretically be compensated for with the price of credit. A group of borrowers who have a 75 percent chance of defaulting, and in the case of mortgage loans, of losing their homes, can still produce profitable credit transactions. If the interest rate and fees are high enough, the payments made before default and the payments made by the 25 percent who do not default, together with recoveries from collateral, will make up any losses from foreclosure.

This sort of (hypothetical) efficient loan-sharking obviously provokes deeper objections, based on equity effects and the social costs of credit defaults. When the high-risk borrowers are poor and the providers of lending capital are rich, the equity effects are clear. From the standpoint of equity, money borrowed at high interest rates transfers income and wealth in the wrong direction, from poor borrowers to rich lenders. The social effects (what an economist might call negative externalities) are equally stark. If a group of high-cost, high-risk mortgage loans results in a 25 percent foreclosure rate (a number achieved by some U.S. subprime mortgage loan pools from the 1990s), a lender could make a profit and yet leave consumers' neighborhoods and lives in a shambles, with costs imposed on local economies and governments that are difficult to measure but obviously present (Immergluck and Smith 2004). Permitting high-risk mortgage lending may make some borrowers better off, but it makes the victims of foreclosure worse off than if they had

not had access to credit. Whether subprime mortgage prices are truly risk-based or not is therefore not the only important policy question. There are equally weighty or weightier concerns to be raised about the equity effects and social costs of even an efficient and robust risk-based credit market. Put another way, predatory lending is not simply a question of inefficient pricing.

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