

Consumer Confusion in the Mortgage Market

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Abstract:

Today, roughly 60 percent of home loans are done through mortgage brokers, who negotiate their fees one-on-one with borrowers. Brokers have the advantage of experience and skill, plus information about wholesale terms that are unavailable to the borrowers. Borrowers can pay cash for all settlement services, including the broker's fee, or they can, in exchange for a higher interest rate on the loan, have the lender cover some or all of these costs. For borrowers who choose to roll all settlement costs into the rate, the informational advantage of the broker is less severe because borrowers can shop on the basis of rate alone. Indeed, the lowest broker fees are associated with the easiest transactions for borrowers to evaluate—those where fees are all rolled into the interest rate. Among the 2,700 loans analyzed here, with average broker fees of \$2,425, the fees on all-in loans are \$900 lower than those on other loans. Broker fees are also profoundly related to borrower education, and borrowers with a bachelor's degree pay their brokers \$1,500 less than those without, other things equal.

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Executive Summary

I study mortgage broker compensation and other settlement costs, as well as the mortgage interest rates paid by borrowers, in a sample of 2700 loans, funded through one national lender but written by thousands of mortgage brokers. I calculate total fees to brokers as cash from the borrower plus the cash paid in the form of a yield spread premium to the broker by the lender, minus credits from the broker to the borrower. Borrowers and mortgage brokers negotiate the fee one-on-one. The average fee is \$2,425.

The data confirm that shopping for a mortgage is not easy. Borrowers attempting more difficult shopping strategies that involve a tradeoff of rates and points pay higher fees on average than borrowers who roll closing costs into the interest rate and thus can shop on the basis of rate alone. Borrowers who roll at least the broker's fee (plus possibly some or all other closing costs) into the interest rate on their loan pay broker fees that are \$900 lower on average than other borrowers, other things equal. Borrowers who roll all closing costs into the interest rate pay total closing costs that are lower by \$1500 than those of other borrowers, other things equal.

In addition, borrower confusion is strongly related to the level of interest rates. The higher rates are, the more borrowers try to pay points to reduce their rate, and the more mistakes they make, to the broker's benefit. This costs them about \$440 for each percentage point rise in the level of interest rates.

Borrowers benefit from education. Those with a bachelor's degree on average pay \$1500 less in broker fees than borrowers with only a high school education, other things equal, such as house value and metropolitan area income. The education differential is smaller, but still large, for the easier shopping strategies that allow borrower to shop on the basis of rate.

The race of the borrower matters. African-Americans pay their brokers on average an additional \$500 and Hispanic borrowers \$275, compared to other borrowers, after accounting for education and other characteristics.

The sex of the broker matters too. In a subset of the data for which I know the sex of the broker, the female brokers make \$570 less per loan, other things equal, than their male colleagues. This result appears to arise from the female brokers' lower inclination to exploit clueless borrowers.

Introduction

Twenty years ago, to arrange a mortgage loan or a refinance, borrowers would visit a lender's branch office and see a bank loan officer. Starting in the late 1980s, independent mortgage brokers began to displace in-house loan officers. In 2002, roughly 60 percent of residential single-family loans were originated by mortgage brokers. Brokers are compensated by commission only, and operate independently, providing service wherever it is needed—often at the homes or offices of borrowers. Many borrowers never visit a broker's office or attend the loan closing.

Broker fees are negotiated one-on-one between borrower and broker. The broker is not the borrower's agent, but a salesperson. It is safe to say that the brokers know a great deal more about this transaction than the borrowers do. How the borrowers cope with this informational disadvantage as well as the resources they bring to the task manifest themselves in the fees they pay to their mortgage brokers.

The charges to the borrower for a home mortgage origination are substantial. In the set of roughly 2,700 loans studied here, originated between 1996-2001, (covering two refinancing booms) average total closing costs are \$4,050 on an average loan amount of \$130,000. Closing costs include the services of the broker or loan officer, title insurance, appraisals, fees to the settlement agent, fees to local authorities (county, city) for recording the transaction and mortgage, services of a lawyer in some States, various inspection fees (flood, pests, earthquake), and sometimes fees to the lender as well. These fees are all in addition to any sales commissions paid to realtors involved in a house purchase transaction, and do not include additional cash the borrower may need at the closing for items such as hazard insurance, mortgage insurance, property taxes, and accrued interest, which are not appropriately classified as costs of closing. The broker's fee is usually the single largest item among the closing costs. In the set of loans examined here, the average fee to the mortgage broker is \$2,425.

The patterns in the data here regarding how borrowers shop for a loan, how borrowers pay for their closing costs, and how borrower characteristics are related to broker fees, closing costs, and interest rates are strong. They shed considerable light on the present controversies

regarding the regulation of settlement service providers under RESPA (the Real Estate Settlement Practices Act). This paper is an effort to lay out some of the facts relevant to the present policy debate.

The Borrower's Choices

Taking out a mortgage loan is not only the largest, but also the most complex transaction most consumers ever undertake. Borrowers have the option of 15, 20, and 30 year terms for their loans. They can choose an interest rate that is fixed for the term of the loan, or adjustable by formula. Among adjustable interest rate loans, there are variations as to how often the rate adjusts and the level of caps on the amount the loan can adjust in a given adjustment interval and for the life of the loan, as well as different indices to which the interest rate may be linked.

An additional complexity arises because individual residential mortgages are prepayable with no or minimal prepayment penalties (by state law in all states). When the loan has a fixed interest rate, the option to prepay has considerable value, and it is reflected in the interest rate on the loan. Even adjustable rate loans have a non-trivial prepayment option value due to caps on how much the interest rate can change for a given interval and for the life of the loan. (All ARMs have both annual and life-of-loan caps, by Federal law, partly as a result of the TILA (Truth in Lending Act) requirement that lenders disclose the total number of dollars that could ever have to be repaid on the loan. Without caps, the possible total is unlimited.)

The choice regarding how to pay for closing affects the borrower's interest rate, which in turn influences her inclination to prepay for any given move in interest rates. At one extreme, the borrower can seek a "no cost" loan, on which the lender will absorb all of the closing costs through a higher interest rate. Borrowers can also pay the closing costs in cash. Borrowers also have the interior options of providing some cash themselves and having the lender provide some. But borrowers have yet another alternative, which is to pay cash not only for the closing costs, but to bring additional cash to the closing in exchange for an interest rate even lower than the rate offered if the borrower just paid the closing costs in cash. This is often described as "paying points" on a loan.

What is the borrower's incentive to pay points to get a lower interest rate? Since the goal of taking out a loan in the first place is to spread the

cost of a home over many years, why not always choose the option that rolls all the costs into the interest rate (the so-called, but mis-named “no-cost” loan)? Because paying for the closing costs with a higher rate not only raises the rate in order to absorb these costs, but it raises it further because borrowers with a higher rate are, other things equal, more likely to prepay. This adjustment goes in both directions: For the borrower who expects to be in the same house for a goodly while, and thus to not have reason to prepay other than to refinance at a lower rate, the reduction in the interest rate resulting from the borrower’s willingness to pay points brings a lower interest rate not only because the borrower has in a sense made an early payment against principal, but because the lower rate reduces the likelihood of prepayment, and the value of the prepayment option.¹ Borrowers cannot disclaim their option to prepay, but they can make it less valuable (and thus less costly) by paying points to lower their interest rate (or by choosing an ARM instead of a fixed-rate loan).

If the borrower expects to move in a few years, the higher interest rate (on a no-cost loan) may have a lower expected present value cost for her than if she expects to stay in the house and keep the loan for a longer period. In principle, borrower’s expectations about movements in interest rates should also effect their decisions. In sum, a borrower’s lowest cost way to pay for closing costs, and best overall mortgage deal, will depend on how long she expects to have her loan, which is governed by 1) how long she expects to stay in the house, and 2) by her expectations regarding movements in interest rates.

One more factor complicates the borrower’s choice: tax law. For a loan to purchase a house, origination costs and points paid at closing are deductible from income for tax purposes when paid. On a refinanced loan, points and fees are not deductible up front. However, if a borrower covers her closing costs on a refinance with a higher interest rate on her loan, all of the additional interest is just interest, and is, as such, deductible. This pushes the refinancing borrower towards rolling all the closing costs in to the rate.

¹ The value of the option to prepay and the separating equilibrium are discussed in Stanton and Wallace, and Breuckner. See references.

Wholesale Lenders, Mortgage Brokers, and Rate Sheets

Mortgage brokers typically do business with a dozen or so wholesale lenders who stand ready to commit funds and lock an interest rate, and then to actually provide funds for the loan at closing. The wholesale terms on the various alternatives offered are communicated to mortgage brokers on “rate sheets” that lenders send at least daily to mortgage brokers. Lenders who provide such rate sheets are making what are called “table-funded” loans in mortgage banking. This means that the loan is funded by the wholesale lender at the closing table, and the broker never owns the loan. This arrangement sits in contrast to that of “correspondent banks” who have capital and substantial lines of credit and can fund loans temporarily themselves, and do in fact temporarily own the borrower’s loan, though loans are usually shortly sold into the secondary market. The loans studied here are all table-funded loans done through the same large, nationwide, wholesale lender by several thousand different brokers. Below is a typical rate sheet from an anonymous table-funding lender for a day in the month of April 2000, for 30-year, fixed-rate, conventional loans:

Rate	<i>lock period</i>			
	15 days	30 days	45 days	60 days
9.750%				
9.625%				
9.500%				
9.375%				
9.250%				
9.125%	103.375	103.250	103.125	103.000
9.000%	103.000	102.875	102.750	102.625
8.875%	102.625	102.500	102.375	102.250
8.750%	102.375	102.250	102.125	102.000
8.625%	102.000	101.875	101.750	101.625
8.500%	101.500	101.375	101.250	101.125
8.375%	101.000	100.875	100.750	100.625
8.250%	100.625	100.500	100.375	100.250
8.125%	100.250	100.125	100.000	99.875
8.000%	99.750	99.625	99.500	99.375
7.875%	99.125	99.000	98.875	98.750
7.750%	98.625	98.500	98.375	98.250
7.625%	98.250	98.125	98.000	97.875
7.500%	97.625	97.500	97.375	97.250
7.375%				

The left-most column, in bold, shows the contract interest rate on the loan. This is the interest rate that will be applied to the principal balance on the loan to calculate the borrower's payments. The top line indicates the term for which the lender is willing to lock in an interest rate. If the loan does not close before the lock expires, the borrower may not be able to get that rate if rates generally have moved up. The lock is an option to the borrower which the borrower has no obligation to exercise. Sometimes brokers (and retail lenders as well) require an up-front payment of several hundred dollars from the borrower, often in an application fee, to provide a lock.

The figures in the grid indicate the amount of cash the lender will deliver or require at closing for a given rate and lock term. For example, the cell for a rate of 8.25% and a 30-day lock indicates that for a \$100,000 mortgage, the lender will deliver \$100,500 to the closing table, and that this offer is good for the next 30 days. The borrower who selects this option will have a mortgage with a principal amount or notional amount of \$100,000, the interest rate used to calculate payments will be 8.25% and the lender will provide \$500 in cash at closing which can be used to cover closing costs, including the broker's fee, or returned in cash to the borrower. This \$500 is called the *yield spread premium*. By contrast, in order to get a rate of 7.5% on a thirty-day lock, the borrower who wants a loan of \$100,000 notional value will have to deliver \$2,500 cash at closing, that is, to pay 2.5 points at closing. Sometimes, especially for large dollar amount loans for which the 1/8 tick in which mortgage interest rates are quoted is constraining, the borrower will get a check at closing for the excess of the YSP over the closing costs.

Note that for the 45 day lock period, there is an interest rate, in this instance 8.125%, for which the lender delivers exactly the notional loan amount at closing, and neither requires nor provides additional cash. This is called the *par* interest rate for the 45 day lock. Note also that there is no par rate for the 15, 30, or 60 day locks. Since mortgage interest rates are quoted on ticks of one-eighth of a percentage point, there is no reason to expect that there will be a loan quoted exactly at par, since one will arise only if the par interest rate happens to fall exactly on a tick. Loans with interest rates above par are called premium loans, on which the lender pays a yield spread premium. This payment is

also sometimes called a “service release premium” a “broker’s premium”, “lender’s premium”, “deferred premium” and even “discount rebate”. The terminology used for this payment on HUD-1 settlement statements is far from uniform. Perhaps the “service release premium” crept in because the typical payment on a premium loan is on the same order of magnitude as the value of the loan servicing on the same loan.² The term “discount rebate” reflects a little more logic, because the yield spread premiums are clearly analogous to the discounts and are properly thought of as negative points. The borrower can pay points or receive points, and when the borrower receives points, the borrower “pays negative points”, and receives a yield spread premium. The yield spread premium is actually nearly always paid to the broker, not the borrower. Sometimes the borrower sees benefit from it, and sometimes she does not. When and how are the issues I study in this paper.

Mortgage brokers are generally forbidden by contract with the wholesale lenders to show lenders’ rate sheets to borrowers. Some large brokers, especially those doing business on the Internet, have their own rate sheets, (likely derived from rate sheets, possibly of multiple lenders) that they do show to borrowers to help them understand and choose among their alternatives.

Lenders also typically have a set of adjustments to the wholesale pricing represented on the rate sheet. Brokers get a positive adjustment, for example, from most lenders for a loan of more than \$100,000, a further adjustment for a loan over \$250,000, and often for a loan that is a refinancing. A negative adjustment is often made for self-employed borrowers (who default at a slightly higher rate) or for exceptionally poor

² When mortgages began to be securitized, it was necessary to create an institution to assure that the booking of payments and monitoring of borrowers (and pursuance of foreclosure if necessary) continued after a lender sold the note into the secondary market. This is achieved by paying an interest rate strip to the mortgage servicer who performs these functions. This interest rate strip (44 basis points for GNMA, 27 basis points for Freddie and Fannie) is more than it costs on average to service loans. Thus, servicers bid for the right to receive the interest strip and perform the servicing. With their investment as a hostage to exchange, (to be lost if the guarantor forces a transfer of servicing) the servicer has incentive to keep the loan current and performing. Servicing on new loans typically sells in the range of one to one and a half percent of the principle amount of the loan, and is a function of average loan amount, credit quality, and prepayment speed.

credit, low documentation (some deficit of the usual records establishing the borrowers' income, assets, and credit history), or no escrow. Adjustments are also sometimes made based on the experienced quality (low delinquency and default, and not unusually fast prepayments) of a given broker's book provided to the lender. The specific adjustments to pricing are a proprietary part of lender pricing strategy.

The Angst of Points

The term *points* is a source of confusion in mortgage lending. As I used the term above, in reference to the rate sheets for a brokered loan, it is money paid by (or received by) the borrower to (from) the wholesale lender (through the broker) in exchange for a lower (higher) interest rate. In the setting where the lender and broker are the same party, as with loans made in a lender's retail office by a loan officer who is a full time employee, *any* payment made at closing by the borrower potentially reduces the borrower's interest rate from the rate that would prevail on a no-cost loan, and thus this payment could reasonably be characterized as points. Which interest rate should be regarded as par (the rate on a no-cost loan or the wholesale lender's par rate) is a matter of vantage point. Home mortgages are unique in that origination costs are often broken out separately. One never sees this, for example, on auto loans, signature loans, or revolving credit loans. These loans always incorporate origination costs into the loan rate. What is different and important about the mortgage loan is its long amortization period and prepayment option, and thus the lenders' desire to sort borrowers, and some borrowers' desire to be sorted, on the basis of likelihood of prepayment.

It is thus not surprising that some mortgage brokers describe their own fees to borrowers as points, and not necessarily deceptively so. If the potential difference between broker points and lender points were not enough to confuse borrowers, not so long ago (pre-1984), the FHA Commissioner at HUD set the rate and (origination) points allowed on FHA-insured and VA-guaranteed loans, (then a much larger share of all mortgages). The market could function in its usual way so long as market interest rates and points were below FHA limits. But when the market interest rate moved above the FHA limit, transactions became quite complicated. Since there was no restriction on seller-paid points, to get a sale completed, buyer and seller would agree to adjust the stated

sales price of the house upwards, thus giving the seller more cash, the seller then paying points to the lender. Some transactions even had realtor-paid points. Usage evolves, and emerging from this trying interlude of lender points, seller points, and realtor points, in addition to borrower points, it is no mystery that the term points is fraught with confusion. Generally speaking, a point is one percent of the loan principal paid at origination. The payment of points can go from borrower to lender, borrower to broker, from lender to broker or borrower, and in the case of the old FHA constraints, from borrower to seller and then from seller or realtor to lender.

The Relative Difficulty of Different Loan-Shopping Strategies

For the borrower, the simplest transaction to understand is the no points, or no-cost loan. The borrower seeking a no-cost loan can simply shop for the best interest rate. If a borrower has chosen, because she is refinancing or because she expects to move or refinance within a seven to ten year horizon³, to shop on the basis of rate, her shopping task is substantially simpler than that of the borrower who is trying to evaluate rate/point tradeoffs. In addition, the borrower's comparative informational disadvantage to the broker is reduced because the broker is not in a position to offer the borrower rate/point choices that lure her towards the choice with lower NPV for her, but higher value to the broker.

This strategy of rolling all costs into the rate and shopping for the best rate is a desirable strategy for a borrower who does not expect to have her loan for more than seven to ten years. Most mortgage loans are prepaid well before they mature, so lenders set their rates to recoup their up-front costs sooner than the loan's full term. Rate sheets typically offer terms that imply an expected loan life of roughly seven years. As a result, the borrower who actually pays off her 30-year loan over 30 years ends up paying for the closing costs several times over if she rolled closing costs into the rate.

³ This was the prepayment interval implicit in the 2000 rate sheets I examined. The rate sheets for 2003 have shorter expected prepayment intervals.

Next simplest for the borrower is to pay non-broker closing costs in cash, and shop on the basis of rate. This would roll the broker's fee, but not other closing costs, into the rate. In principle, RESPA protects the borrower using this strategy from excessive up-front fees, because brokers are prohibited from receiving kickbacks or charging markups on third party settlement services. The borrower's disadvantage under this strategy is that RESPA may not protect her as fully as its authors intended. It seems that the framers of RESPA saw the third party settlement service providers as essentially competitive price takers, and thus believed that if the broker (in this case) did not mark up these charges or receive any referral fees, costs to borrowers would be minimized. The data here suggest otherwise. The higher the fraction of settlement charges rolled into the interest rate, the lower are the total closing costs on the loans, not just the broker's fee. In addition, there is a set of 50 loans with no itemized settlement charges at all, but only disclosure of a YSP. These loans have even lower total closing costs than the loans with itemized charges paid for through a YSP. This suggests, of course, that the RESPA proposal to allow settlement service providers to offer firm price packages (in exchange for a Section 8 exemption) to borrowers will help them sort out the deal and encourage competition that reduces total settlement costs.

A more difficult shopping strategy is to pay all closing costs, including the broker's fee, in cash, but pay no additional points, and shop on rate. Here the borrower would have to have a correct idea of what the broker's reservation fee might be, and this is the additional complication over strategies #1 (all rolled into the rate), and #2 (broker's fee, but not third party closing costs, rolled into the rate). Here the borrower is at a clear disadvantage to the broker in that the broker's information on broker reservation prices is surely better than hers.

Finally we have the hardest task, paying all settlement costs in cash and in addition paying points to reduce the interest (coupon) rate on the loan. Here the broker has the advantage of seeing all the rate sheets, plus experience and presumably, some skill. Indeed, most brokers are former realtors (in some States all mortgage brokers must be licensed as realtors) who were good with numbers and transited to mortgage brokerage.

The borrower who expects to hold a loan to maturity can, in principle, get a lower present value cost for her total mortgage transaction by paying cash for her closing costs and paying some points. This however, requires that she search for both a reasonable broker fee and a good rate, and be able to make the rate/point tradeoff. And, as noted previously, this comparison must include an evaluation of tax implications in the case of refinanced loans, for which origination costs and points paid up front are not deductible. And on either a retail loan or a brokered loan, it is difficult for the borrower to know which points are paid for origination and which actually go to buy down the interest rate, because the HUD-1, even on a table-funded loan, seldom discloses the precise payment to the lender for points.

The borrower who pays part of her closing costs in cash and pays for the rest with a yield spread premium has a shopping task as complicated as that of a borrower who is paying points, because she must, like the borrower paying all cash for the closing, have an idea of appropriate compensation for the broker and other settlement providers, and then must in addition compare rates and points. If she could examine the rate sheets her task would be easier, but still not easy.

We should expect that mortgage brokers will be much better at gauging the rate/point trade off on mortgages than borrowers are. First, they have more experience and they have the lenders' wholesale terms in the form of rate sheets to compute the birds-in-bushes equivalent to birds-in-hand for them. So even if brokers were prey to the same biases from total dollars paid⁴ and other sources that borrowers are prey to, the straightforward capture of present value in the rate sheets assures that they get the trade-off right. I presume here that the wholesale market is sufficiently competitive to force lenders' rate sheets to be strictly driven by net present value principles, including a valuation of the borrower's option to prepay.

⁴ Experiments by Suzanne Shu (2002) show that in choosing among loans, people consider not only the internal rate of return (APR), but also the number of payments, the total dollars paid, and the absolute size of payments.

In sum, given that she wants a 30-year, fixed-rate loan, the borrower's strategy for paying for closing costs results can be ranked by difficulty as follows:

1. Incorporate all closing costs into the rate and search for a loan with the lowest rate.
2. Incorporate the broker's fee into the rate, pay other closing costs with cash, and shop on rate.
3. Pay all closing costs, including the broker's fee, in cash, and shop on both broker fee and rate.

Then the two most difficult, both of which require skill in evaluating the rate/point tradeoff:

4. Pay some closing costs with cash, and some with a payment from the lender for a premium interest rate.
5. Pay all closing costs in cash and pay points to reduce the interest rate.

Opting for the simplest shopping strategy is not necessarily the best long-run cost minimizing strategy for the borrower. Because most loans are prepaid well before maturity, sometimes because interest rates fall and borrowers refinance, and sometimes because borrowers move, lenders build their rate sheets to recoup any up front costs (yield spread premium) in roughly seven years. The farther is the borrower's coupon rate above par, the faster the implied terms in the rate sheet recoup the lender's upfront costs. This is true in both directions – the cells at a discount on the rate sheet reflect expectations of later prepayment the farther the rate below par.

Here lies the one informational advantage possessed by the borrower: how long will the borrower have the loan? Any information about likely movements in interest rates, and thus relevant to refinance-motivated prepayments, is equally available to both borrower and lender (and in any case elusive). But the borrower knows much more than the lender does about whether, for example, she intends to expand her family and want a bigger house, or change jobs, and as a result will likely move and prepay her loan. The single most important fact the lender will use to infer the likelihood of prepayment is the coupon rate the borrower

chooses, because the level of the coupon rate will exert a strong force on her decision to refinance.

Can the broker and borrower conspire to the lender's disadvantage? Perhaps in the short run. The mortgage lending business is getting more and more sophisticated about collecting and processing information, and as it does, each level is more effectively monitoring the specific business it does with each partner. Freddie and Fannie, for example, and even Ginnie, monitor the loans they get from each wholesale lender for defaults and delinquencies, and if the books of loans they get from different lenders move away from norm, the terms on which future business is done will reflect this. It would behoove a wholesale lender to monitor mortgage brokers similarly. Among the adjustments to the rate sheets are those for "gold" and "platinum" broker customers, and surely the quality of the book the customer has delivered influences these terms. Little is said about this, as lenders regard adjustments as part of their proprietary strategy, in other words, they are deep dark secrets.

Factors Related to Mortgage Broker Fees

So far I have established that 1) mortgage finance is complex; 2) selection of a mortgage is not an easy decision for borrowers, but some shopping strategies are easier than others because they require less information and no computations; and 3) compared to borrowers, brokers have the advantage of experience plus the information in the rate sheets. My main interest here is how broker fees vary with borrower shopping strategy and measures of shopping difficulty. But there are many factors other than the difficulty of the shopping strategy that influence broker compensation, and these must be accounted for to accurately measure the impact of shopping strategy and other sources of confusion. This section lays out the available factors that can be accounted for in measuring the impact of shopping difficulty on broker compensation.

The variable to be explained is the broker's total compensation, which equals

1) the cash that the borrower pays the broker in the escrow,
plus

2) the amount of the YSP paid outside the escrow (often described as “paid outside of closing” or POC on a HUD-1 settlement statement) from the lender to the broker,

less

3) any credits from the broker to the borrower, including credits for interest rate buydowns.

Keep in mind that the HUD-1 is not a controlling legal escrow document for all parties to the settlement, but only for the borrower’s cash payments to the broker, and (on a purchase transaction) to the seller and realtor.

I classify the determinants of broker compensation into three broad categories. First, there are **true cost factors**. These are measures of the time and trouble to the broker for a loan involving more paper shuffling, documentation, and effort on the part of the broker that cause a given loan to be more expensive. Variables available in the data that potentially measure time and trouble are 1) the borrower’s credit score, 2) another credit indicator for A- credit (all loans in this set are A credit except for fourteen A- loans), 3) the loan-to-value ratio (LTV), 4) whether the loan is a refinancing or a purchase transaction (refinancings are more straightforward for the broker, as there is no realtor or seller to deal with, establishing title is a repetition of an earlier task, and the borrower is obviously not a new borrower), 5) the calendar time the broker has to close the loan, 6) the day of the month on which the loan is closed (reflecting crowding at the end of the month), 7) season (reflecting crowding in the summer, when most home sales take place), 8) the general level of earnings in the area, and 9) quarterly national loan volume, which captures the crowding in refinancing booms.

Second are the factors that reflect the potential for **price discrimination**. The borrower and broker are involved in a one-on-one negotiation. The brokers know more about the level of wholesale interest rates and points than borrowers do. The borrowers may know more about their own reservation prices than brokers, but important clues, like their incomes, their credit scores, and the amount of their loan, have to be disclosed to the broker in order to apply for the loan. Even if the borrower knew exactly what prices were offered by other brokers, she might accept an offer because there is a cost to visiting another broker. The higher the

borrower's opportunity cost of time relative to money, the more likely she will be to accept an inferior-to-market deal. Therefore we would expect that borrowers whose time is worth more would be charged more for service both because they want more service and are less inclined to take the time shop for it. We do not have data on individual borrower income, but we do have 1) the median family income for the borrower's census tract, 2) the value of the borrower's house, and 3) the average value of houses (owner-occupied dwellings, including condominiums) in the borrower's census tract. Several factors are potentially both cost factors and a source of information for price discrimination. Some take on a sign indicating that in the balance, they are capturing mainly price discrimination.

The relationship between the amount of the loan and broker fees, which almost everyone expects to be related, and is related, to both broker's and lender's fees, as it is to realtor's fees, is subject to several interpretations. On the one hand, brokers have little in the way of explicit costs that are related to loan amount. Perhaps lenders want some additional documentation for larger loans (another income tax return for the borrower, or another appraisal on the house), but brokers do not fund loans, and thus have no opportunity cost of money tied up in a loan commitment, as would a lender. On the other hand, people with higher income may be happier dealing with a broker in the same social stratum (similar education, clothes, car) and while this is feasible, it is only feasible at a higher price. Another possibility is that the lender's adjustments pass the lender's incentives on to the broker in this sense: lenders have some fixed costs not a function of loan size in acquiring all loans, and thus would prefer the broker to bring larger loans, other things equal. They thus build incentives into the adjustments to the rate sheets to encourage brokers to do this. Brokers thus are likely to spend more effort chasing larger loans than smaller loans, making the cost of the broker's services (which must cover all of the broker's efforts, not just the successful ones, in the long run) higher.

Third, we have the results of **potential confusion** the borrower may experience in shopping for her loan. Here I focus on how the borrower pays for settlement services and on borrower education. This builds on the discussion earlier of the relative complexity of the possible shopping

strategies borrowers might adopt, and why we can attribute the impact that these strategies have on broker fees to confusion.

The variable that can capture loan shopping strategy is the ratio of the YSP to the broker's fee. Have patience, dear reader, read slowly, and pay close attention to this next passage to better understand the results of the estimations to come.

Consider again the borrower with the simplest approach to shopping, the one who rolls all closing costs into the interest rate on the loan and consequently can shop for a mortgage purely on the basis of rate, the way she might shop for terms on a car loan, for example. For these loans, a YSP will cover all closing costs. We can identify these loans in the data as the loans for which the YSP is larger than the broker's fee. If this is the simplest shopping strategy, and the broker's information advantage is smallest for them, we would expect the loans with YSP/broker fee greater than one to have lower broker fees than other loans.

The next simplest shopping strategy is that of paying the broker's fee with a YSP, but paying for other settlement services with cash, relying on a competitive market for these services, plus RESPA, to deliver good prices for them. For these loans, the broker's fee is exactly equal to the YSP, and the ratio of YSP to broker fee equals one. So again, we can relate the fee negotiated between the borrower and broker to the ratio of YSP/broker fee.

A slightly more complex strategy, one that depends on the above forces (competitive market and RESPA) plus some knowledge on the part of the borrower as to the broker's reservation price, is to pay cash for all settlement services and shop on the basis of rate. The loans that succeeded in this strategy would all be "par" loans, and have a ratio of YSP to broker fee of zero, because the YSP on par loans is zero.

Finally, we have the two difficult strategies. First is the strategy of paying all closing costs in cash and in addition, paying points to buy down the interest rate. Second is paying for closing costs partly with cash and partly with a YSP. For the buydown loans, the ratio of YSP to broker fee will be negative (because points are the negative of the YSP), unless the borrower has failed in this strategy, and ended up with a premium loan instead of a discount loan, resulting in a high broker fee because both borrower (in cash) and lender (in the form of a YSP) make a

payment to the broker. For the borrowers intending to pay some closing costs in cash and some with a YSP, the ratio of the YSP to the broker's fee will be between zero and one. Thus, for the loans with a ratio of YSP/broker fee between zero and one, we will find three types of loans – borrowers who intended to pay some closing costs with cash and some with a YSP, and did well, some who aimed for this choice and did poorly, and some who were trying to buy down their interest rate but did not shop well on the basis of interest rate and thus paid both a high broker fee and a high rate, inducing the lender also to make a contribution to the broker in the form of a YSP. The successful buydowns are easy to establish because they have positive buydown amounts, and thus positive ratios of buydown to broker fee.

Based on the above discussion, a variable we can use to describe the shopping strategies is the ratio of YSP to the broker's fee for premium loans, and the ratio of the buydown to the broker's fee for discount loans. (Recall that the broker's fee is equal to cash paid to the broker by the borrower, plus the YSP, minus any credits from the broker to the borrower. When such credits appear they are nearly always for settlement services paid for by the broker out of the YSP.) The data accommodate this well because they were collected precisely with the purpose of looking at the broker's fee in relation to how the fee was paid (by cash from the borrower, cash from the lender, or both).

To get a sense of how this variable relates to shopping strategy, look at Figure I. (If you print that page in color, you can see the kernel line of regression.) First, note that there are mass points (unusual densities) in the data at two important points—first, where the broker's entire compensation is paid in cash from the borrower (where $YSP = 0$ and thus $YSP/Broker\ Compensation = 0$) (par loans were deliberately over-sampled). These points represent the par loans, those for which the borrower paid all closing costs, including the broker's fee, in cash. The second mass point is where the YSP exactly equals the broker's fee, and the ratio equals one. This mass is a natural phenomenon, not the result of over-sampling. For loans with a higher ratio, the YSP is sufficient to cover the broker's fee plus at least some other closing costs as well. Any no-cost loans would have ratios above one in this scatter.

In terms of ex ante shopping strategy, we cannot distinguish among 1) the borrowers who were trying to pay points to buy down their rates but

failed to choose well, and 2) those who were trying to pay only part of their closing costs in cash and failed to choose well (thus paying a high broker fee and a high rate). On an ex post basis, however, they are clear. Both groups will bring cash to closing and, by signing on for a premium rate, induce the lender to pay the broker cash at closing also. Any shopping strategy that involves the borrower bringing substantial cash to closing is a difficult one, because the borrower must be able to compare loans with different points and rates.

In terms of the variable YSP/broker's fee, we can rank the difficulty of shopping strategies and the tasks she must perform, in order of increasing difficulty:

YSP/broker's fee $\gg 1$ compare rates only

=1 compare rates, compare third party closing costs

=0 compare rates, compare third party closing costs, and compare broker fees

$>0, <1$ compare rates, compare broker fees, compare third party closing costs, and be able to trade-off rate against up-front cash

YSP/broker's fee < 0 implying buydown/broker's fee > 0 – as difficult as the task above, because it requires comparing rates, broker fees, third party closing costs, and the trade-off of rate against points.

One More Confusion Factor

One might imagine that as interest rates rise, fewer loans are demanded, and mortgage broker compensation would either stay the same (if the brokers have alternatives that they can switch to easily, making supply elastic) or fall (if supply is inelastic). We would thus expect the coefficient on the market rate of interest in this estimation to be negative.

It is not. Instead, the coefficient on the market-wide rate of interest, measured by the average rate on 30-year fixed-rate loans reported monthly by the FHFB, is large and positive. I believe this is because when rates are high, borrowers pay more points (easily confirmed with a time series of rates and points) and when they pay more points, they make more mistakes to the borrower's benefit. I leave a fuller explanation of this to the section on results.

In sum, I posit that mortgage broker's fees are a function of

cost and price discrimination factors:

borrower's loan amount

borrower's loan-to-value ratio

borrower's credit score

simplicity of the mortgage type, using a dummy variable to indicate 30-year, fixed rate loans

simplicity of transaction, using a dummy variable to indicate a refinancing

borrower credit if credit is A minus, also a dummy

metropolitan area (or county) income

season, reflecting crowding in the summer

number of calendar days the broker has to complete the loan – lock days

number of days to the end of the month, reflecting crowding at the end of the month

house value

neighborhood (census tract) house values

borrower income

And then factors intended capture borrower confusion:

borrower education

market rate of interest

quarterly loan volume (to control for the impact of market rate)

shopping strategy, as reflected in the ratio of YSP to broker fee, as discussed above. This variable is fitted as a spline with break points at the relevant ratios of YSP to broker fee (a spline interpolates along a straight line between break points). The break points in the spline are at

0.0 (zero, the par loans),

0.5 (maximal rate/point confusion),

1.0 (where the broker's fee is paid entirely by the lender in the form of a YSP,

1.5 (where at least some closing costs are rolled into the rate),

2.5 (where nearly all closing costs are rolled into the rate, and

4.0 (where virtually all closing costs are rolled into the rate and the broker's fee is low relative to other closing costs).

In addition, since borrower race is required by HMDA and available as a variable, and in most lending data do matter, I include variables to indicate borrowers who are

African Americans

Hispanic

Econometric Issues

The basic assumption behind the estimations is that the independent variables (reflecting cost, price discrimination, and borrower confusion) are uncorrelated with the unexplained element of broker compensation. For example, if better educated borrowers get better deals has more to do with native analytical skill than just book learning, or these customers are cheaper for brokers to serve because they need less counseling, then the coefficient on education will not reflect the change in a borrower's fees that would result if she had a different level of education.

While I believe this assumption is justified, there are three variables, all related to confusion, that merit some discussion. They are education,

the market rate of interest, and the spline representing shopping strategy.

I believe that the education variable is capturing the impact of education, for two reasons. First, the decision to go for a no-cost loan, the easiest shopping strategy, is not influenced by education (demonstrated in the probit analysis in Table III), but the cost of a no-cost loan is clearly influenced by it. Even in this easiest shopping strategy, there is an advantage to the better educated. Second, the size of the coefficient, roughly \$1,500, more than half of the average broker fee, is simply far too large to be plausible as a cost factor. Better educated borrowers are not that much better organized than other borrowers. The correlation between credit score and the BA education measure is only .2. The correlation between credit score and similar measure for high school completion is .15.⁵

The choice of shopping approach itself seems particularly vulnerable on this point. People who are less skilled at mortgage choice generally may also be less skilled at deciding which shopping strategy suits them best. If so, the estimated impact of shopping strategy may be biased because choice of a difficult shopping strategy may simply indicate the borrower does not realize this strategy is more difficult because of her inherently inferior understanding of mortgages, in particular, of the rate/point tradeoff.

Indeed, in the dark hour almost nothing here seems exogenous except for the market rate of interest, quarterly mortgage loan volume, and borrower race, and possibly the crowding factors, since they are ultimately caused by the motions of the heavens. A borrower with a well-ordered life has gone to school a good while, saved a lot and has a low LTV, a good income and a valuable house, has been diligent and orderly and thus has a high credit score, and has chosen to live and work in a city that doesn't sleep. Her income is high enough to tolerate the uncertainty of an ARM, and she doesn't bet against the market on movements in interest rates. Once she has locked the rate, the closing is not in crisis mode and needn't be done at any particular time of the

⁵ As a general matter, the tract level completion of high school variable shed no light on anything in this study.

month, and the lock can be of a comfortable length. The choice of whether to roll all costs into the interest rate (short expected time in the house) vs. pay points (long expected time in the house) is conscious and purposeful and incorporates tax consequences. And she has some idea of how much her broker should be paid and even inquires as to whether the broker's proposed terms involve a YSP, the sign of a deeply knowledgeable borrower.

Wait a minute here... Will anyone other than a knowledgeable, purposeful borrower ever succeed in paying points? Surely the answer is no. First, paying points requires a lot of cash, because the borrower must pay all closing costs in cash (several thousand dollars) and then pay points in cash (several thousand more dollars) to arrange this. Second, in order to benefit from paying points, rather than merely enriching the mortgage broker, the borrower must really understand the deal and realize that the interest rate she is getting for paying points is worth paying points for. Paying points is a dangerous strategy unless the borrower understands the deal well.

On the other hand, all sorts of hapless, cash-strapped borrowers could stumble into the no-cost strategy. But these are the very borrowers who, along with the sly frequent movers, get the best deals. The probit estimate of factors related to choice of a no-cost loan (more precisely, loans for which $YSP \geq$ broker compensation) in Table III indicates that the strongest factors are 1) the borrower is refinancing, 2) closing in a hurry, 3) has a larger loan (but not jumbo), and 4) lives in a high income metro area. Factors associated with choosing *not* to roll costs into the rate are that the borrower is 1) financing in a shoulder period, and 2) has a jumbo loan. Factors notably irrelevant to the choice are education, income, credit score, and the market rate of interest.

In particular, the irrelevance of education to the loan shopping choice pushes towards interpreting the coefficients on the shopping strategy spline as truly measuring what borrowers lose as a result of choosing a more difficult strategy or gain from an easier one.

Several different specifications can inform us as to which borrower characteristics lead borrowers to lower broker fees, and also indicate whether the assumption of uncorrelated errors and variables is reasonable.

As a first assay, we can drop the shopping strategy and market-induced confusion variables and see whether the coefficient for education (or any other variables) takes on a different coefficient. Second, we can do the estimations for different subsets of the loans reflecting the shopping strategies of varying difficulty, and see if the coefficient for education takes on different values. If education is a less important input to the least difficult strategy, we can infer that this strategy is indeed associated with less borrower confusion, even if the education variable is measuring inherent skill rather than the value added from going to school. We will not be able to distinguish between whether being gifted with numbers sends borrowers to school or whether going to school improves one's skill with numbers. As one who has spent substantial time teaching, I am pretty sure school contributes something, at least for a few months.

The Data

The data for this study are a byproduct of the author's involvement as an expert witness in a dispute about mortgage lending practices. The data to measure broker compensation come from three sources. The first source is the HUD-1 settlement statements required at all mortgage closings. This document summarizes the cash required from the borrower at closing for the down payment (on a purchase loan), the unpaid settlement charges, and any additional other accruals to be settled at closing such as interest, property taxes, and insurance. While most HUD-1s appear to be reliable for purposes of computing third party (other than broker and lender) closing costs, they are inadequate to determine mortgage broker compensation because they often fail to disclose payments of yield spread premiums, and these payments (averaging \$1,250 in the loans here) are a substantial part of broker compensation. About one-third of the HUD-1s for loans on which yield spread premiums were paid (according to the lender's electronic records) lack any documentation of the YSP.⁶ Thus the second source of information used in this study is the lender's electronic records. These

⁶ In the initial efforts to obtain data to speak to these issues, two teams of people were hired to read and transcribe information from the HUD-1s. These teams were not equipped with any actual YSP payment from the lender's electronic records. As a result, the data produced missed the YSP on about one-third of all premium loans, all of which had YSPs. The two teams obtained similar results.

records have complete information on yield spread premiums and loan buydowns. A third source of data, available only for a subset of the loans, is the mortgage broker's back office records for 108 loans made through a single mortgage broker and funded by this same wholesale lender. These 108 loans thus have the highest quality data, as well as some additional information, including the sex of the mortgage broker.

The loans included in the analysis were generated in three sets. First, included are all of the loans funded by the single lender that were originated through a single mortgage brokerage over the period 1996-2001. These 108 loans are ones noted above as having the highest quality data. The second set is a total of roughly 600 brokered loans comprised of 200 each that were above par (premium, with positive YSP), at par, and below par (discount, or negative YSP, or points paid to the lender). The loans selected were those made on dates chosen by a judge, again from the 1996-2001 period. If the chosen dates did not have enough loans to fill the required number of each type, additional loans were pulled from adjacent dates. The third set of roughly 2000 brokered loans consisted of all the loans made on yet another set of dates, also selected by a judge. For these 2000 loans, no effort was made to over-sample par or discount loans. Taken all together, the set is over-sampled for par and discount loans. Not all of the HUD-1s were fully legible, and some had broker fees so low as to be suspected "friends and family" loans (less than \$250 to the broker), so the loans analyzed here are about 2700 of the 2850 brokered loans from the set.

While the loans were chosen without prejudice with respect to any expectations about broker compensation, the sample is better described as selected out of the blue rather than as a representative random sample. For example, the sample over-represents some days relative to others, to no purpose. What can I say? They should have called the economists sooner. Nonetheless, the data appear to be satisfactory for the questions addressed here. No aspect of the sample design depended on the key variables of my analysis.

From the HUD-1 settlement statements, data gatherers collected cash compensation to the broker and lender, and to all other providers of settlement services, including title insurance, legal services, settlement services, recordation fees, etc., plus any credits from the broker or lender to the borrower. (The database contains a description of the payment,

the payee and amount paid for every line entry on each borrower's HUD-1.) The broker's compensation is the sum of cash payments from the borrower to the broker, plus any YSP paid by the lender to the broker (YSPs are usually paid to the broker, and only rarely directly to the borrower) less any credit from broker to borrower, or any settlement charges covered by the broker, less any discount points paid to the lender.

From the lender's electronic records come data on yield spread premiums, discount points (negative yield spread premiums), borrower credit scores, loan amounts, loan-to-value ratios, zip codes, the term for which the loan was locked, the date on which the loan was locked, the settlement date for the loan, details such as whether the loan was a refinance, an FHA or VA loan, fixed or adjustable interest rate, term (15, 20, 30 years), whether the borrower was married, or self-employed, and borrower race. The level of market-wide interest rates and points are the nationwide monthly average rates and points for the 30-year fixed-rate loan taken from the Federal Housing Finance Board web site. Median area income for each metropolitan area (or county, for non-metro loans) was taken from the US 2000 Decennial Census by zip code. Addresses from the HUD-1 settlement statements were geo-coded to obtain the census tract for each loan. For each loan's census tract, the following variables were obtained, by tract, from the US 2000 Decennial Census: the level of median family income, mean property value for owner-occupied units, the fraction of the residents over 18 who had graduated from high school or had a GED, and the fraction of the residents over 18 who had a bachelor's degree.

Results of the Estimations

The Cost and Price Discrimination Variables

Regression #1 in Table I reports the results of estimating broker compensation as function of all the variables above. Regression #2 reports the estimations for all of the above variables minus those that capture confusion factors, including education, the shopping strategy spline, and the market rate of interest. The coefficients of the variables in the second regression (without the confusion factors) are essentially the same as those in the first.

The coefficient and standard error on the first variable **loan amount**, confirms that broker's fees are strongly related to loan amount.

Credit scores summarize borrowers' past borrowing behavior and are relatively new. They became part of the mortgage market's tools only in the early 1990s. As of 1966, only half of the loans made through FHA had credit scores in the loan files. By 2000, nearly all loans through all lenders had credit scores. The mortgage lending industry (lenders, the private mortgage insurers, and Freddie Mac and Fannie Mae) has found that credit scores are as powerful a predictor of default as loan-to-value ratio. Credit scores are scaled much like SAT scores, and in these data vary from 300 to 850. I did not have borrower credit scores for all loans, so I used an estimator of credit score for about 200 of the loans here. Including these loans with estimated credit scores has only one important influence on the results – the measure of any differential paid by Hispanic borrowers. Without the loans with estimated credit scores, there is little economic or statistical significance to Hispanic status. With them, it becomes clear that Hispanic borrowers do pay higher broker fees. Evidently some relatively expensive loans to Hispanic borrowers were among those lacking credit scores.

Credit score is negatively related to broker fees. Better credit gets the borrower a lower broker fee, as makes sense if better credit means less trouble for the broker. When a borrower's credit score is low, the broker sometimes puts in effort to help the borrower update records to improve her credit score. If the credit score is good to begin with, this is unnecessary. The economic value of the credit score variable is not trivial. From marginal credit (600, the 3rd percentile) to excellent credit (800, the 97th percentile), the broker's fee falls by about \$600.

The **loan-to-value** ratio is another potential cost factor, as low down payment loans often require additional effort such as use of government programs involving more documentation, more paperwork for mortgage insurance, delays, etc. Here LTV is measured on scale of 1 to 100. The estimation shows a consistent but small positive relation to broker fees. The difference in broker fees for a 5 percent down payment loan and a 30 percent down payment loan is an additional \$65.

Inclusion of a dummy variable to indicate a **30-year, fixed-rate loan** was inspired by the popularity and (seeming) simplicity of this standard

loan design. Roughly \$5.5 trillion of the \$6.5 trillion total outstanding mortgage debt at this time is of the 30-year, fixed-rate variety. Perhaps brokers would have to spend less time explaining things to borrowers going for the simplest, most popular terms. The coefficient of this term indicates that loan design has little influence on broker fees, as it is both economically small and statistically weak.

Though refinancings are surely simpler transactions than purchase loans, refinancing borrowers pay an additional \$140 in broker fees, measured with fairly high precision. This is not the result of crowding in refinancing booms, because that factor is controlled for by including quarterly national loan volume. Perhaps because quarterly national loan volume measures the volume at the time of the customer's own closing with error (because it covers the entire quarter), the refinancing dummy is picking up some of its power. Deleting either variable from the estimation increases the size, but not the standard error, of the other.

A- credit is related to substantially higher broker fees. There are only 14 A- loans in this set, but they are expensive—roughly an additional \$1500.

Race does matter, controlling for other factors, even education. **African-Americans** pay an additional \$500 in broker fees⁷, and **Hispanic** borrowers \$275 more.

Giving the broker 60 days instead of only 30 days to get a loan closed saves a borrower about \$70, despite the higher value of the option on a longer lock. The longer lock should in principle, cost the borrower more (look back at the rate sheet to see that this is the case). Evidently the time pressure on the broker overwhelms the option value of the longer lock, as the coefficient on the **lock period** is unambiguously negative.

⁷ Nearly all of the power of the coefficient is coming from the larger loans. If I restrict the regression to only census tracts in which at least half adults have a BA (600 loans), the coefficient for African American rises to \$2000, with a standard error of \$500. Brown (1990) has some ideas as to why this might be so, echoed informally by observers of minority borrower focus groups. Also interesting is that in this restricted regression, the coefficients on the confusion variables (spline and market rate) are similar to those for the entire sample, but with a much lower intercept, while the coefficient on education goes to zero, as does the coefficient for Hispanic loans.

(But later when we look at borrower interest rates, we will see that the longer lock does cost the borrower more in terms of rate.)

The ***days-to-the-end-of-the-month*** variable captures the congestion that results from most borrowers wanting to close their loans at the end of the month. The histogram of loan closings by day looks like a saw tooth, with closings bunched at the end of the month. This congestion is priced, and it costs about \$300 more to close at the end of the month than the beginning of the month. I have talked to many mortgage brokers about this phenomenon. They all agree that most people want to close at the end of the month, but all insist that they, personally, do not price this congestion. The data are adamant that it is priced. (As we shall see, the wholesale lending market prices it also.)

In New York City where wages are high, doctors and plumbers make more money, and mortgage brokers do too. ***Metropolitan area median family income*** (from the 2000 US Census) has a big impact on broker fees. For non-metro zip codes, I used county median income. From areas where metro area median income is \$30,000 (1st percentile in these data) to those where it is \$80,000 (the 99th percentile) average broker fees rise by about \$500.

There is considerable ***seasonality*** in residential real estate transactions. Most home sales takes place in the summer. This seasonality is mainly driven by the school year, as California (where it is pleasant most of the time) home sales are no less seasonal than in Minnesota (where it is comfortable to be outdoors only in May and September, sometimes)⁸. There is probably some Hotelling property to this equilibrium also. Given that the bulk of sales occurs in the summer, the best time to shop for a house is in the spring and summer and the best time to put a house on the market is in the spring and summer, even though broker fees are a little higher. So transactions gravitate even more strongly to the summer than the coordination with the school year would dictate. Examining average mortgage broker fees by month, I found that fees were higher in summer and winter, and lower in spring and fall. It seems that getting a mortgage loan in January is like getting a beach umbrella at the same

⁸ Confirmed by examination of national home sales by month and region, 1995-2000, from data on the Homebuilder's web site.

time—possible, but expensive, because most sellers have closed shop. The best capture of seasonality was to classify March, April, and May, and September, October, and November as **shoulder** and the rest of the months as non-shoulder. It is roughly \$200 cheaper to do a loan in the shoulder months.

The last variables are the census tract level measures of median **family income**, and the census tract measure of the average **house value** of owner occupied dwellings. Broker fees are positively and strongly related to neighborhood family income, and weakly negatively related to neighborhood house value. The income variable is not only statistically important, it is economically meaningful – moving from a census tract with income of \$40,000, the 10th percentile in these data, to \$100,000, the 90th, adds an additional \$550 to the cost of a loan. Of course, mortgage brokers are privy to solid data on borrower’s incomes, and are thus well-positioned to charge more to borrowers with high time value. And the measure here is for the census tract, not the individual borrower, and thus measured with error and biased downward. The true value is likely higher.

Confusion Factors

In this negotiation between mortgage broker and borrower over the broker’s compensation, the broker has many more cards than the borrower. First, the broker has the rate sheets, plus certified financial information about the borrower, but also, the broker has far more practice and skill with the transaction. Given this advantage of the broker, of what advantage is some book learning to a borrower?

Education is a profound advantage, answers the regression. The difference between living in a census tract in which all adults have a bachelor’s degree vs. one in which no adult has a bachelor’s degree is savings of a breathtaking \$1,472 in mortgage broker’s fees. And of course, since we have only an education measure for the census tract, not for the individual borrower, the borrower’s own education is measured with error and the coefficient is biased downwards. Correction for the bias (underway, stay tuned) will likely make the savings even larger.

Next, we have the **market rate** of interest, measured by the rate reported by the Federal Housing Finance Board for 30-year, fixed-rate loans closed in the same month as the borrower's loan. The coefficient on the market rate of interest reflects borrower confusion in a profound way.

The standard demand/supply story would predict that mortgage broker fees would either fall as interest rates rose (and loan demand fell) or stay the same (if supply was perfectly elastic). Instead, the coefficient on the market rate of interest is robustly (across a great variety of specifications, involving not merely a fishing expedition but a draining of the pond) and substantially positive, indicating that broker fees rise by about \$440 for each percentage point rise in mortgage interest rates. While the standard classical demand/supply story should, in principle, be part of the phenomenon, by far the more important force is borrower confusion over rates and points.

Consider three possible explanations for this phenomenon.

First, the "thin market" story: In this theory, when rates rise, fewer loans are demanded, brokers leave the market, brokers are less dense, there is inherently less competition because brokers are less dense, and broker compensation rises due to competition becoming more monopolistic.

The second explanation is the "silver-tongued devil" story: Rates rise, fewer loans are demanded, brokers leave the market, and the ones who stay are the more skilled salespeople, who cajole borrowers into higher fees.

The third explanation is the "higher rates, higher points, more confusion" theory. Here we start with the fact that when rates are high, borrowers pay more points to buy down the rate. This phenomenon is so strong that it is evident to the naked eye in a time series of rates and points, and vehemently confirmed in a simple regression of rates on points, again from monthly FHFB data on 30-year fixed-rate loans. If, when rates are high, people are more frequently trying to pay points in higher amounts, the most difficult of the loan shopping strategies, they will make more mistakes, and leave more money on the table. The brokers pick up money borrowers leave on the table. Thus, when rates are high, borrowers pay more points and make more mistakes, and the brokers collect the remains.

This last explanation is also consistent with what the behavioral experimenters (see especially Suzanne Shu, 2002) have found: borrowers do pay attention to both APR and to total dollars ever to be paid as well as to the coupon rate (the rate used to calculate payments). When rates are high, changes in upfront payments and the coupon rate will have a larger impact on total dollars paid relative to their impact on APR, than when rates are low.

The data speak with respect to these hypotheses. The first two hypotheses, “thin market”, and “silver-tongued devil”, require that high broker fees be associated with a *low* volume of mortgage lending. The third hypothesis does not require this. So if broker fees are positively related to loan volume, we can reject the first two hypotheses. The data here cover a six-year period including two refinancing booms, so there is ample variation in loan volume. Thus, including both a measure of market rate and a measure of the volume of mortgage lending at the time the loan was made, can inform us as to whether the third hypothesis fits the data. (If we reject the third hypothesis, there is no hope for distinguishing between the other two with the available data here.)

Why would borrowers pay more points when interest rates are high? One possibility, consistent with the classical economics of borrower choice, is that when interest rates are high, the prepayment option is more valuable—and more costly—and induces borrowers to pay points to put themselves in a lower prepayment likelihood category to reduce the interest rate on their loan. This strategy pays only if they expect to stay in their houses and keep their loans for a long while. It is a difficult strategy.

A second possibility looks to behavioral economics: when interest rates are high, small changes in points paid will make for larger changes in total dollars paid over the life of the loan, but make for smaller changes in the APR or internal rate of return on the loan.⁹ Both numbers are required disclosures of TILA (Truth in Lending Act). Thus, when interest rates are high, brokers have more reasons to lead borrower in the

⁹ Suzanne Shu’s work reporting these experimental findings helped me finally see why the broker’s fees were so consistently positively related to the level of interest rates, through the connection of the level of points to the level of rates.

direction of paying points, and thus have a stronger informational advantage. Both classical and behaviorist hypotheses are consistent with the data, which cannot distinguish between them:

1) at higher rates, borrowers are more inclined to pay points to reduce the value of the prepayment option, but the rate/point trade off is difficult, and they make mistakes and their mistakes are to the broker's profit;

2) at higher rates, the differential on total dollars paid for any points added is larger, while the differential on APR is smaller. If borrowers care about both of these attributes, they are more likely to select a combination that has a lower NPV to them, and a higher NPV to the broker. The rate sheet allows the brokers to capture this difference, and they do.

What the data do reject is the possibility of either the "thin market" or "silver-tongued devil" theories of the mortgage market. The variable **quarterly loan volume** takes on a positive coefficient, confirming that broker compensation rises rather than falls with loan volume, as would be required of these two hypotheses.

In addition, there is substantial and systematic variation (in hundreds of dollars) in broker fees and total closing costs by state. But the inclusion of the State dummies does not change the coefficients on the other variables examined here, and this story is already long enough, so I will save the state issues for another paper.

Confusion and the Relative Difficulty of Shopping Strategy

Next we have the set of variables that capture how the borrower pays for closing costs.¹⁰

<i>Ratio of YSP to Broker Fee</i>	<i>Fee Differential at this Ratio</i>
0 (par loans)	-\$617
0.5 (most difficult)	68
1.0 (broker's fee = YSP)	-847
1.5 (YSP > broker's fee)	-1036
2.5 (easiest shopping)	-2731

The coefficients on the spline break points, shown in the table above, confirm the relative difficulty of different shopping strategies. The more closing costs are rolled into the rate, the lower is the broker's fee. This is demonstrated by the coefficients at spline values of 1.0, 1.5, and 2.5 descending as the ratio rises, showing that broker fees fall as borrowers roll more and more of their closing costs into the rate and the ratio of YSP to broker fee rises.

The loans on which borrowers are struggling hardest to evaluate the rate/point tradeoff (at ratio = .5) have the highest fees, on average, with a differential of more than \$900 compared to no cost (and more) loans and of nearly \$700 compared to par loans. Borrowers on average pay the

¹⁰ All of these results are indifferent to whether the YSP was disclosed or not. Including a dummy variable for whether the YSP was found on the HUD-1 changes no coefficients in any meaningful way. This may be because while YSPs are poorly disclosed on HUD-1 Settlement Statements, or because they are almost never disclosed at all on Good Faith Estimates, the preliminary statement of closing costs that lenders and mortgage brokers are legally obliged to give to residential mortgage borrowers when they take out a loan application. Thus, most borrowers may not learn about broker compensation coming from the YSP, if they learn about it at all, until settlement. Settlement is not a good time to try to negotiate about the broker's fee. HUD-1s also rarely disclose exactly the amount being paid to the lender for a buydown on discount loans. In any case, these data thus do not help us determine whether better disclosure of the YSP would help borrowers negotiate broker fees because it is uniformly poorly disclosed.

broker more when they are pursuing strategies where the broker's informational advantage is greater. Moreover, the highest broker fees are those on which *both the borrower and the lender* bring substantial cash to closing.

However, the borrowers who are successfully obtaining buydowns on their loans are also negotiating low broker fees. These borrowers evidently are well-equipped to deal with the complexities of the mortgage market on average.

How much of this result of shopping strategy is coming from better educated people adopting easier shopping strategies? We can address several ways, first by re-estimating the regression by omitting the variables that capture shopping strategy plus extra confusion coming from the level of interest rates. This change in specification alters the coefficient on the measure of borrower education essentially not at all.

This alternative regression also accommodates the computation of a partial F-statistic test of significance on the confusion variables as a group, including the spline, the market rate of interest and quarterly loan volume. They are highly significant.

Another slicing of the data is also informative, and that is to look at the relative value of education for a simple classification of easy vs. difficult shopping strategies. Restricting the estimate to only those loans with at least the broker's fee rolled into the interest rate ($YSP/\text{broker fee} \geq 1$) (the easier strategy), and then to loans with $YSP < \text{broker's fee}$, (the harder strategy) I obtain the results in Table II. This slicing is especially interesting because the more detailed spline estimated earlier puts all the big loser loans into one bucket, the one where $YSP/\text{broker fee}$ is >0 but <1 , but dividing the loans into only two groups does not. This is because the borrowers who try to pay points but fail pay a lot of cash, but also pay a high rate, inducing the lender to contribute cash to the closing also. Dividing the loans in to only two groups, YSP higher than the broker fee, and YSP lower than the broker fee, both groups contain both more successful and less successful outcomes.

The coefficient of greatest interest between these two regressions is the one on education, shown in bold in Table II. The value of education in negotiating the broker's fee is higher for the difficult strategies than in the overall estimates, and lower for the easier strategy of rolling costs

into the rate. It is only lower by just over one standard error. But given that education is measured with error, and that the economic value of the coefficient is so large, and even the economic value of the difference is large, it should be taken seriously. And recall that the probit analysis of which borrowers choose to roll closing costs into the rate detected no influence from education. Thus, there is something real here – borrowers who, for whatever reason – that they are refinancing, short of cash, in a hurry to close—*but not because they are more or less educated*—obtain substantially lower total broker fees (also shown in bold in the summary statistics at the bottom of the table), and the importance of education in this negotiation, while still quite large, is not as large as for the more difficult strategies.

Education is the most interesting, but not the only interesting difference in these two estimations. Notice that for the easier shopping strategy, the coefficients indicating borrower race differentials go below zero.¹¹ This suggests that there is something important about shopping strategy that can make a difference for minority borrowers. Note also that the extra cost for an A- loan is cut almost in half, from \$1400 to \$750. Why is the coefficient on the market rate of interest so much higher for the easy shopping strategy? Anyone with any clue should email swoodward@sandhillecon.com right away and get included on that thank you list on the cover page.

Are borrowers who rolled all fees into the rate or paid points pursuing optimal strategies given their situations? To answer this would require knowing more about each borrower's mobility plans. Expecting that borrower choices would be driven by expectations of movements in interest rate would be fanciful given the lack of success serious experts have in this domain. Ex post, of course, all borrowers here should have rolled everything into the rate, because interest rates have subsequently fallen and all should have refinanced by now, well short of the lender's expectations as implied in the rate sheets. Such was not the case for borrowers who took out a 30-year, fixed-rate loan in a year like 1965.

¹¹ Before you get too excited, let me disclose that there are only 4 African American and 5 hispanic loans among the 600 no-cost loans. Across the entire sample, 22 percent of the loans are no-cost, while only 5 percent of the minority loans are no-cost. This fact is interesting also.

Sex of the Mortgage Broker

For a subset of 108 loans, we have the records of a mortgage brokerage office in addition to the HUD-1s and lender's records. Included are data on the sex of the dozen individual brokers of that office. Of the 108 loans, 28 were written by female brokers. Regression #6 shows the results of estimating broker compensation with the usual suspects plus the sex of the broker, but no shopping strategy variables. This estimation leaves out the variables that describe how the borrower pays the broker because this appears to be part of the difference in how the male and female brokers operate. (This set of loans had no loans to African American or Hispanic borrowers, only one A- loan, and generally less variation in all independent variables.) There is little ambiguity that the female brokers made \$572 less per loan than did their male colleagues, other things equal. Among these 108 loans there were a dozen with total fees of more than \$4000, and no female brokers were represented among them.

If I include the variables that capture how people pay their brokers (the spline on the ratio of YSP to broker fee) the coefficient on *female* falls to a mere -\$30. This suggests that the main difference between the male and female brokers is the degree to which they are exploiting confused borrowers opting for difficult shopping strategies.¹² A scatter plot of broker compensation against the fraction of broker compensation coming from the YSP, with the female-brokered loans indicated by squares instead of diamonds, (Figure 2) the naked eye can detect that the female brokers have lower fees than the males especially in the range where the borrowers' handicap is greatest, where YSP/broker fee is near .5. The raw average fee for the women brokers is \$2,494, while the average fee for the men is \$330 higher. The standard deviation of fees for the women is \$795, while for the men it is \$1,338. What the regression results suggest is that the women brokers are serving more customers who are attempting to make the rate/point tradeoff, but exploiting their

¹² I also include a table of the means and standard deviations of the values of loan characteristics for female and male brokers to show that there is little difference in the customers the two groups are serving.

disadvantage less. Women are such nice people. Or maybe they are less skilled at detecting the clueless borrowers?

Borrower Interest Rates

How do these differences among borrowers manifest themselves in the interest rates they pay on their loans? This question can also be addressed with this data. In Table III, the dependent variable is the difference between the borrower's own rate (measured as the coupon rate, or rate applied to the principal for computing payments) and the market rate, (measured as the average rate reported by the FHFB for 30-year, fixed-rate loans closed in the same month). Independent variables are the percentage YSP (the dollar amount of the YSP divided by the principal amount of the loan), the percentage buydown, credit score, market-wide average points (also from FHFB, on 30-year fixed), a dummy to indicate the loan is a 30-year fixed, a dummy to indicate the loan is either an FHA-insured or VA-guaranteed loan, a dummy for whether the loan is a jumbo (an amount above the ceiling eligible for purchase by Freddie Mac and Fannie Mae), whether the borrower is married, self-employed, refinancing, African American, Hispanic, and the same measures of census tract education, income, and house value as before, plus metro area income, seasonality, the number of days for which the lock applied, and even days-to-the-end-of-the-month.

The coefficients should be interpreted as percentage point changes in the interest rate for a change in the independent variables. For example, a YSP of one percent of the loan balance (vs. par) produces a rise in the interest rate of about $\frac{1}{4}$ of a percentage point, or 25 basis points. The *YSP* and *buydown* variables take on large coefficients measured with high precision, which is to be expected. The main reason for including these variables is that any effects coming from the broker level are captured in the YSP. The interest rate on a loan falls a tiny but highly detectable amount as *loan amount* rises. This implies that mortgage brokers are sharing some of the adjustment (included in the YSP here) for large loans with borrowers.

The rates on *30-year, fixed-rate* loans are 46 basis points above the average of other loans, again, no surprise because the other loans are either ARMs or have shorter terms. Government insured loans (FHA and

VA) get a rate a quarter of a point below others (but these borrowers pay explicit insurance premiums not included in the interest rate). Jumbo loans have interest rates that are about 35 basis points higher than conventionals, A minus borrowers pay almost an entire additional percentage point in interest (in addition to the extra \$1500 to their brokers).

Note that the coefficients on the race variables are essentially zero, both statistically and economically. From this we can infer that the race differentials seen at the broker level are strictly at the broker level, entirely captured in the YSP insofar as they influence the interest rate, and no additional differential is generated at the wholesale lender level. Finally, a bachelor's degree is worth nearly an eighth of a point, as is a loan done in the shoulder season. So not only the broker's services, but even the lender's money, is cheaper in the shoulder months.

The number of days for which the loan is locked has a small but highly detectable impact on the borrower's interest rate, and consistent with the value of the lock being higher with longer locks, the coefficient is positive.

Even the time of the month at which the loan is closed is detectable in rates. Any of the cost of crowding at the broker level that is absorbed by the lender has already been accounted for by including the YSP (the lender's contribution to the broker's fee) in the regression. Thus, not only the broker's services, but also the lender's money, is a tiny bit more expensive, but detectably so, just at the time when everyone else wants it too. To the borrower, the broker and the lender, all three, the rags of time matter.

The wholesale lending market is highly competitive and well-informed on both sides. The lenders have numerous metrics of the market, and the brokers have many rate sheets from competing lenders. Thus, we should infer that it is pure cost forces that give rise to these highly systematic differentials in coupon rates, and they are not the result of price discrimination or confusion.

Reflections

I imagine that on the whole, the findings in this paper will not much please anyone. In particular, the discovery of just how ill-prepared some borrowers are to deal with the mortgage market and how much it costs

them is disheartening. That less well-educated borrowers do less well may be not too surprising, but the size of the disadvantage, nearly \$1500 per loan, on average, is shocking.

How did this situation come about? Has it always been thus? Can anything be done? I believe that the culprit was technology.

Prior to the invasion of mortgage brokers, lenders made loans in their retail offices. At that time, it was typical for lenders to compensate loan officers on the basis of volume, and to give long-run bonuses for low-default books of business (since much of the responsibility for loan underwriting was with the loan officer), but for the most part, loan officers were compensated to only a limited degree, if at all, on the profitability of the loan. Thus, they were given little incentive to figure out how to craft choices so as to move a borrower towards a loan more profitable for the lender.

In the brokered mortgage world, the rate sheet allows the broker to capture all of the profits on a loan that he can, because in posting prices to the brokers, the competing wholesale lenders are surely setting rate sheets so as to leave themselves indifferent as to which rate/point cells the broker and/or borrower select. It would not be profit maximizing for the wholesale lender to do otherwise. We can infer that in the old retail branch office world, banks left a lot of money on the table due to the poorer technology and the inherent rigidities of a bureaucracy. The mortgage broker leaves less.

What caused the broker invasion? One essential tool of recent origin for mortgage brokerage is the fax machine, to receive rate sheets from lenders on a daily or more-than-daily basis.¹³ Pre-fax, lender offices received the equivalent of a rate sheet from a parent entity by some sort of dedicated wire, on a big noisy machine with a one-inch diameter cable and folded continuous paper. These dedicated connections were expensive and could not be operated from a car, as fax machines can. As of 1990, my office at HUD national headquarters did not have a fax machine.

¹³ I owe this insight to my husband, Robert E. Hall, whose willingness to indulge me in endless conversation about the economics of mortgage market has made this a much better paper.

Another tool that made things easier for brokers was credit scores. They surely make things easier for retail lenders, also, but the possibility of completing an important part of the underwriting process over the internet, in a matter of a few seconds, makes the brokering of loans much more feasible than it was before. The next step will be on-line appraisals via the repeat-sales price indices now available on the web as well.

Economics has long been the great apologist for middlemen.¹⁴ Yet in the brokered mortgage market, it seems that the main role of the present middleman is to eat the core out of the lens in the Edgeworth box. In mortgage loan transactions, the potential gains from trade are substantial. Indeed they are so substantial, that without the mortgage brokers, nearly all trades (loans) would surely be competed anyway. Some borrowers, particularly those who are savvy about mortgages and have a high value of time, would be disadvantaged because they would have to visit lender branch offices and would be deprived of the services mortgage brokers, but seldom branch loan officers, can deliver. But other borrowers would be better off dealing with the more rigid old-style lender bureaucracies that were not so nimble at exploiting them.

Could these disadvantaged borrowers still go to the branch office and get a better deal than from a broker? Perhaps, but perhaps not. If the most savvy borrowers now deal with brokers, the discipline they impose with their knowledge produces only the private benefit of improving the deal they personally obtain from an individual broker, who is skilled at sizing up customers, instead of exerting a force on the posted prices of lenders, which has value for the clueless borrowers as well as the savvy.¹⁵

What about the wholesale lenders, can they resist the tide of mortgage brokerage? So far, the answer must be no, because the brokers are surely better at specializing in serving particular borrower niches than lender branch offices ever were. The branch office had to be a one-size-

¹⁴ The opening chapter of Alchian and Allen, describing the middlemen making a market in cigarettes in a prison camp, promoting gains from trade, comes to mind.

¹⁵ Consider the consumer who operates under the philosophy that anything she consumes by putting into her mouth, she can afford, and thus selects her groceries with little attention to price. She reaps considerable pecuniary externalities from the shoppers who pinch pennies and discipline the grocer's posted prices.

fits-many operation, whereas brokers, operating independently, can more precisely tailor themselves (to some degree, literally) to a specific sort of customer than retail offices ever could. Any lender that resists doing a wholesale business with mortgage brokers is sure to lose substantial market share to lenders who will.

But what technology has taken away, technology can potentially give back again, and more. I can imagine a website where lenders would be authenticated and credentialed, and allowed to bid on a given borrower's loan. Not a phoney auction with only a few bidders or posted quotes identified with their quoters, but a real auction with anonymity on the part of the lenders, so that the full force of the market to bid low is engaged. The borrower could be authenticated also, with credit cards and more the way other web sites authenticate customers. The borrower could request more than one loan variety, for example, a "no-cost" loan, and also one with points. Competition among the bidding lenders would assure that the borrower would receive bids that would get her quotes close to those of the best rate sheets for each rate/point combination.

This of course presumes the borrower has access to and is able to use the internet. And too that competition among different web loan auctions is sufficient that they do not replace the mortgage brokers as the most discriminating of monopolists. Lacking the knowledge provided by a face-to-face encounter, surely any monopoly would at least be less discriminating.¹⁶

For this auction to be able to happen in a high profile setting like a mortgage-lending internet site, operating directly in the radar of RESPA, will require HUD's blessing for putting together settlement packages as is proposed in the current RESPA rule. Based on the HUD-1s in this sample, there are many mortgage brokers doing this already. There were roughly 50 loans with no individual settlement services itemized, and several hundred more where the YSP covered all closing costs. In these cases, the total closing costs are much lower (by about \$1,500, as a regression coefficient) than on other loans. It seems that the

¹⁶ Institutions of the stock market deliver the most economical trade executions to retail (ordinary folks) investors by virtue of SEC-enforced auction markets. See Woodward (1996).

presumption of the original authors of RESPA, that the market for settlement services was a competitive, price-taking market, was wrong. Equipped, yea, armed, with today's technology, it is a discriminating monopolist's price-searching market. It is time that the law be changed to reflect reality and sweep away the barriers to service bundling and provide more real competition for borrowers.

One more reflection -- the results here provide the quantification of a previously undocumented, unmeasured, unknown and unappreciated virtue of low inflation and a stable price level--avoiding the costs of added borrower confusion arising from the aggravated struggle with the rate/point tradeoff when interest rates are high. At \$440 per percentage point of interest for each loan made, this value is not trivial. Of course, from a social point of view, this is a transfer, as the borrower's loss is the broker's gain. Monetary uproar produces a transfer of wealth to the financially clever. Another little way in which money matters.

Table I Determinants of Mortgage Broker Compensation

Dependent Variable: Mortgage Broker Compensation equal to cash from the borrower, plus the YSP, less credits to the borrower, less cash to the lender for a buydown.

	#1		#2		#3	
	Coefficient	t	coefficient	T	coefficient	t
C			3980	8.69	2355	1.21
loan amount	0.0123	26.13	0.0113	23.09	0.0152	9.61
credit score	-4.26	-9.39	-4.83	-9.42	-1.28	-0.89
loan-to-value ratio	5.82	3.44	6.42	3.52	8.64	1.26
D fixed rate, 30-yr	99.86	1.85	108	1.91	450	2.31
D refinance	139	2.36	17.6	0.29	17.92	0.09
D A- credit	1241	3.68	1569	4.41	110	0.12
D African American	496	3.68	564	3.96		
D Hispanic	274	2.11	253	1.85		
Lock days	-8.47	-5.45	-9.84	-6.01	-7.66	-1.71
Days to end of month	-8.15	-2.36	-16.5	-5.97	9.49	0.94
metro area income	0.0184	5.90	0.0146	4.44	-0.0252	-0.88
Shoulder season	-215	-4.19	-283	-5.53	192	1.13
tract median fam income	0.00566	2.72	0.00538	2.45	-0.00395	-0.45
tract average house value	-0.000505	-1.28	-0.000654	-1.58	0.000328	0.14
tract % BA	-1472	-6.78	-1463	-6.38	131	0.17
market rate	438	9.81				
Quarterly loan volume	1.073	2.47				
Buydown/broker fees	-377	-7.66				
T for 0	-617	-6.98				
T for .5	68	0.65				
T for 1.0	-847	-8.99				
T for 1.5	-1036	-6.07				
T for 2.5	-2731	-9.20				
T for 4	-2071	-3.00				
D female broker					-572	-2.62
R-squared		0.390		0.315	0.602	
Adjusted R-squared		0.384		0.311	0.542	
S.E. of regression		1194		1263	838	
Mean of the Dependent Var		2425		2425	2748	
SD of the dependent var		1522		1522	1239	
F statistic				79.96	10.05	
Prob (F statistic)				0.0000	0.000	
# of observations		2624		2624	108	
Partial F on the 9 confusion variables		35.48				
F(9, infinity) at probability .001		7.81				

Table II Broker Fees, Shopping Strategy, and Education

Dependent Variable: Mortgage Broker Compensation

	More difficult strategy		Easier strategy	
	YSP < broker compensation		YSP ≥ broker compensation	
	<i>Coefficient</i>	<i>t</i>	<i>Coefficient</i>	<i>t</i>
C	2024	1.44	-6651	-2.23
loan amount	0.0130	23.48	0.00771	8.47
credit score	-5.099	-9.07	-1.101	-1.09
loan-to-value ratio	5.94	2.95	6.82	1.99
D fixed rate, 30-yr	40.60	0.64	329	3.23
D refinance	129	1.87	148	1.32
D A- credit	1407	3.81	739	0.70
D African American	612	4.01	-141	-0.46
D Hispanic	337	2.28	-160	-0.56
Lock days	-8.40	-4.64	-9.69	-3.24
Days to end of month	-2.72	-0.70	-10.92	-1.38
metro area income	0.0198	5.34	0.0101	1.73
shoulder season	-338	-5.64	-40.04	-0.43
tract % BA	-1552	-6.00	-1230	-3.11
tract median fam income	0.00396	1.58	0.01080	3.00
tract avg house value	-0.00036	-0.73	-0.000819	-1.24
market rate	249	1.79	856	2.83
quarterly loan volume	-0.1036	-0.11	3.24	1.76
buydown/broker fees	-489	-10.11		
<i>R-squared</i>	0.388		0.300	
<i>Adjusted R-squared</i>	0.383		0.279	
<i>S.E. of regression</i>	1242		1949	
<i>mean, dependent variable</i>	2523		2075	
<i>SD dependent variable</i>	1581		1224	
<i>F statistic</i>	72		14.0	
<i>Prob (F)</i>	0.00000		0.00000	
<i>Number of observations</i>	2051		573	

Table III Determinants of Borrower Interest Rates

Dependent Variable: The borrower's own coupon rate (the rate used by the lender to calculate the borrower's payments) minus the Federal Housing Finance Board (FHFB) rate for 30-year, fixed-rate loans closed in the same month, from FHFB web site. Market points are from the same FHFB series.

Dependent Variable: Borrower's Own rate minus national average rate

variable	coefficient	t
constant	0.0882	0.74
ysp/loan amount	26.09	40.95
buydown/loan amount	-19.08	-13.73
credit score	-0.000201	-1.72
market points	-0.220	-3.46
loan amount	-0.00000097	-7.69
D fixed rate, 30-year	0.477	37.07
D FHA, VA	-0.242	-11.48
D jumbo	0.380	10.60
D A- credit	0.959	11.74
D married	-0.026	-2.12
D self	-0.00885	-0.35
D refinance	0.0302	2.24
D African American	0.0112	0.34
D Hispanic	0.0120	0.38
Tract BA %	-0.1193	-2.29
Tract median family income	-0.000000893	-1.80
Tract average house value	0.000000223	2.47
Metro area income	0.000000220	0.29
shoulder season	-0.161605	-11.52
quarterly loan volume	-0.000473	-4.41
days locked	0.00111	2.99
days to end of month	-0.00170	-1.96
R-squared	0.705	
Adjusted R-squared	0.702	
Mean dependent variable	-0.0438	
SD dependent variable	0.5265	
F statistic	290	
prob (F)	0.0000000	
# of observations	2695	

Table IV Factors Related to the Choice of a No-Cost Loan

Dependent Variable: dncost = 1 if ysp>=broker's fee

Method: ML Binary Probit (Quadratic Hill Climbing)

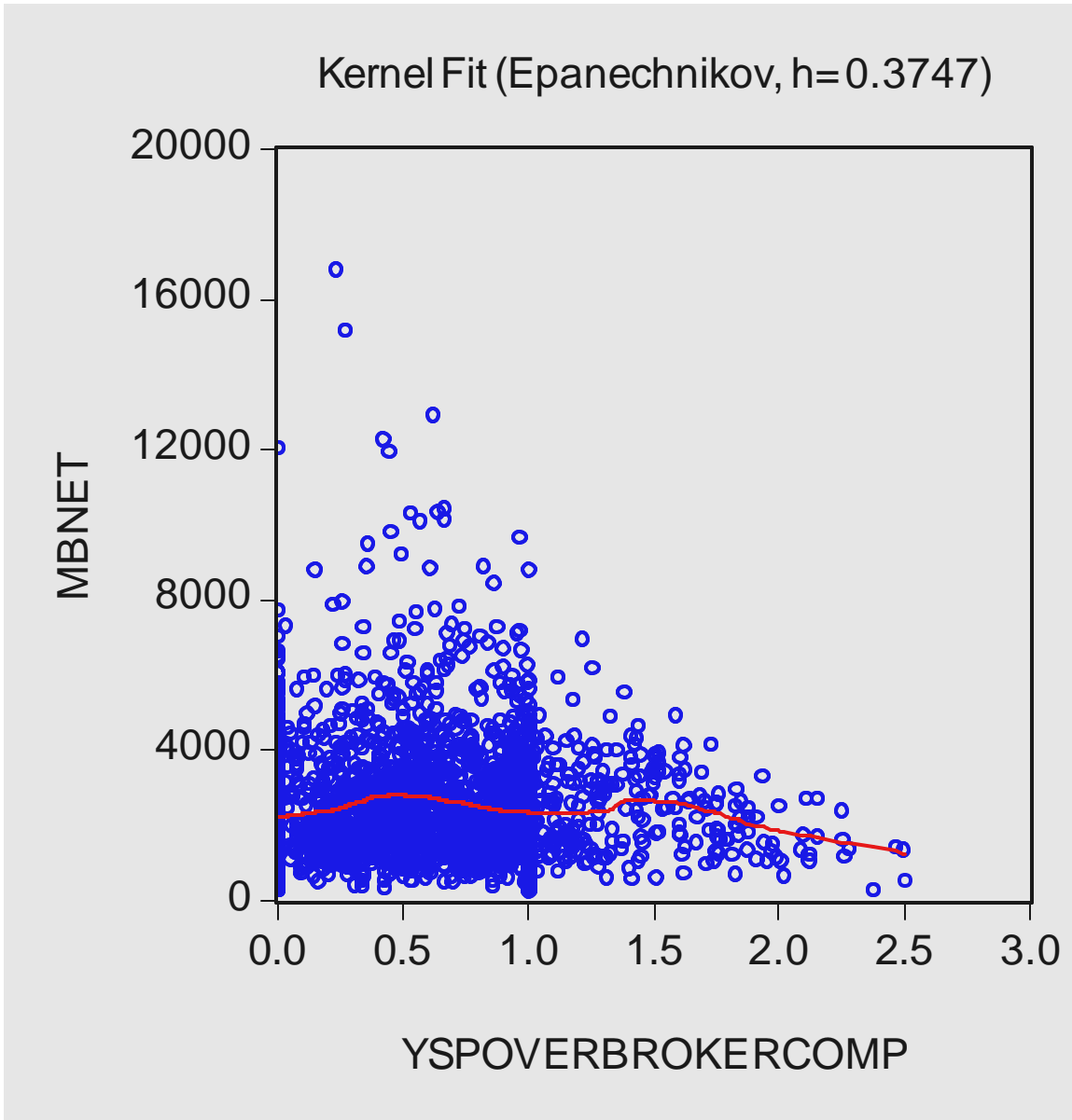
Included observations: 2717

Convergence achieved after 12 iterations

Variable	Coefficient	Z-Statistic
C	23.6	3.03
D refinance	0.57	4.79
loan amount	0.00000251	2.27
market rate	-2.56	-3.79
market points	-2.67	-3.16
shoulder season	-0.769	-5.98
D jumbo	-1.02	-3.20
metro area income	0.0000186	2.94
Days to end of month	0.034	4.11
D fixed 30	0.194	1.74
quarterly volume	-0.021	-3.40
loan-to-value ratio	0.007007	1.86
tract % BA	-0.151	-0.34
tract median family income	0.00000655	1.57
tract average house value	0.00000021	0.28
credit score	0.00132	1.26
Mean dependent var	0.216	
S.E. of regression	0.398	
Sum squared resid	428	
Log likelihood	-1326	
Restr. Log likelihood	-1419	
LR statistic (15 df)	186	
Probability(LR stat)	0.0000	
S.D. dependent var	0.412	
Avg. log likelihood	-0.488	
McFadden R-squared	0.065	

Figure I Broker Compensation vs. YSP/Broker Compensation

Scatter Plot: The fraction of the broker's compensation coming from the lender (YSP/Broker Compensation = $YSP_{OVERBROKERCOMP}$) vs. Broker Compensation = MBNET



Note that there are two mass points in the data – at zero, where the broker's compensation (as well as other closing costs) comes entirely from cash, and at 1, where the YSP exactly equals the broker's fee, and borrowers would pay remaining closing costs in cash. When the ratio is above 1, the YSP is sufficient to cover the broker's fee plus some other settlement services. Loans in the far right tail would have all closing costs covered by the YSP.

Figure II

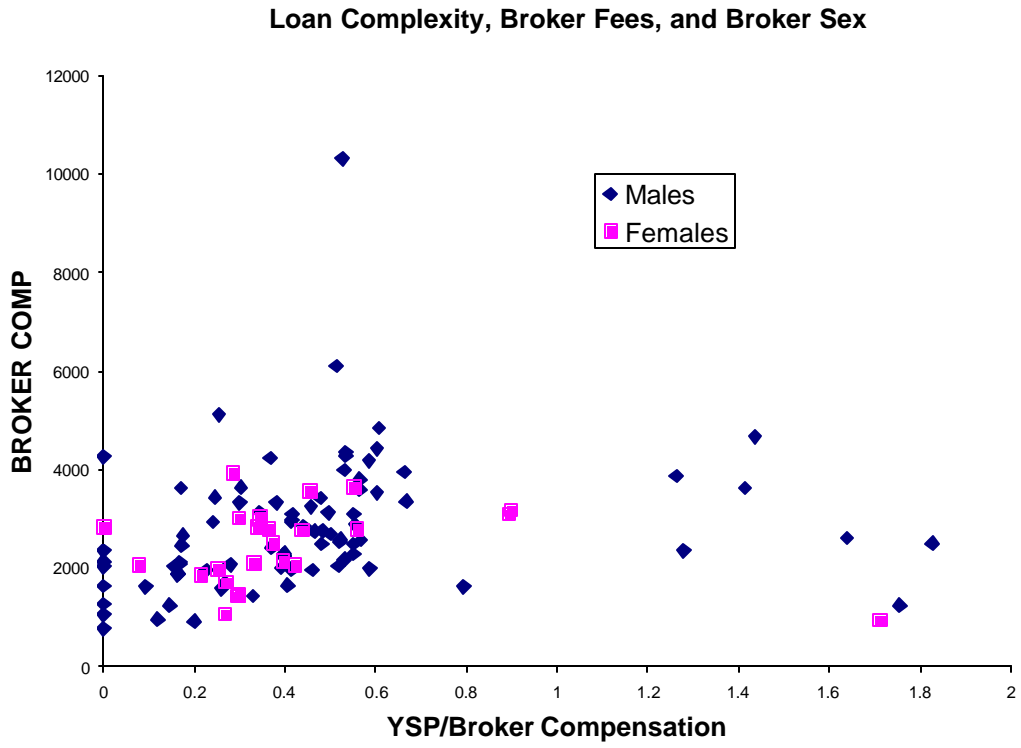


Table IV: Mean and standard deviation for loan characteristics, female vs. male brokers

	FEMALES		MALES	
	mean	<i>std dev</i>	mean	<i>std dev</i>
broker fees	2,471	<i>803</i>	2,836	<i>1,369</i>
loan amount	136,508	<i>61,803</i>	130,420	<i>64,493</i>
credit score	714	<i>49</i>	705	<i>66</i>
loan-to-value	81	<i>14</i>	74	<i>14</i>
qtrly vol	297	<i>96</i>	276	<i>84</i>
market rate	7.61	<i>0.56</i>	7.61	<i>0.46</i>
tract BA	0.42	<i>0.16</i>	0.38	<i>0.19</i>
tract HS	0.94	<i>0.04</i>	0.93	<i>0.06</i>
tract income	75,740	<i>19,585</i>	74,356	<i>21,018</i>
tract house value	183,406	<i>58,498</i>	194,449	<i>84,586</i>
shoulder season	0.67	<i>0.48</i>	0.49	<i>0.50</i>
days-to-end	11	<i>8</i>	13	<i>9</i>
days locked	38	<i>13</i>	30	<i>21</i>

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