Hybrid Interest Rate Choice in the Subprime Mortgage Market: An Analysis of Borrower Decisions

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November 2007

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I. Introduction

The development of a subprime mortgage market has been an important innovation in US mortgage markets over the last decade. The subprime market has expanded home mortgage and home purchase opportunities through a variety of new and traditional mortgage products to consumers with blemished credit histories or other attributes that raise their perceived risk as borrowers. The benefits of enhanced mortgage availability and customer choice come at a cost of higher risk, however. Subprime mortgage borrowers are several times more likely than prime mortgage borrowers to experience foreclosure or problems arising from delinquency during the term of the loan. The current problems in the subprime mortgage market underscore that this market is indeed very risky.

A hybrid interest rate mortgage is an adjustable rate mortgage (ARM) on which the initial rate is initially fixed for some period of time, after which the interest rate becomes adjustable. The most common hybrid mortgage in the subprime mortgages has an initial fixed rate period of two years. The initial fixed interest rate is often discounted from the current index plus margin, making the initial rate attractive relative to fixed and other adjustable rate mortgages.

Borrowers may choose a hybrid mortgage for several reasons: They initially cannot afford the payment size on a fixed-rate mortgage (which generally have higher interest rates); the ARM has a lower interest cost because they expect to move or refinance after a relatively short period of time; or they expect interest rates to remain constant or decline in the short term. Borrowers in the subprime market may have another reason for considering an adjustable rate mortgage, the possibility that they may be able to qualify for a lower risk mortgage in the future. One or more of these reasons may be a consideration in choosing a hybrid mortgage.

A major concern underlying current problems in the subprime mortgage market is the ability of many hybrid mortgage borrowers to afford the payment size after first interest rate reset. Margins in the subprime market are high, causing large increases in interest rates, and consequently monthly payment size, at reset. Hybrid loans that were affordable initially may not be affordable after reset. Rising interest rates and an end to home price appreciation may exacerbate the problem by hampering borrowers' ability to refinance their existing mortgage into another mortgage that they will be able to service. This paper uses the Financial Service Research Program's (FSRP) subprime mortgage database to examine choices of subprime borrowers' obtaining hybrid mortgages between the first quarter of 2000 and the first quarter of 2006.[1] The paper compares monthly

[1] Financial Services Research Program was formerly named Credit Research Center. The center changed its name when it moved to George Washington University in August 2006.

mortgage payment to income initially and after the initial interest rate reset. The paper also examines prepayment and delinquency experience of borrowers having different levels of payments to income.

The paper is organized as follows: We first describe the subprime mortgage database provide information on the relative frequency of use of the different mortgage products. Hybrid first mortgages accounted for about fifteen percent of mortgages originated by the large subprime mortgage lenders contributing to the database.

We then examine the profiles of borrowers using selected products. We find that that the subprime mortgage market is heterogeneous, with different products being chosen by different types of borrowers. Among our findings are that hybrid first mortgages have relatively high percentages of higher income but lower FICO risk score (that is, higher credit risk) borrowers than fixed-rate mortgages, a result that suggests the possibility that performance on hybrid loans may differ from that on fixed-rate loans.

The paper next investigates a dimension of risk for hybrid loans that has received recent attention, the risk of higher debt service burdens when hybrid loans reset the interest rate in an environment of rising interest rates. We do find a sizeable increase in the percentage of hybrid borrowers with relatively high debt service burdens after the first reset. Many of these borrowers may experience difficulty in servicing their mortgages after the interest rate resets. However, we also find a large percentage of borrowers using hybrid mortgages that did not commit themselves to relatively high mortgage debt service burdens at the first reset and presumedly will not experience serious difficulties. Also many hybrid mortgage borrowers refinanced loans before the first reset, often despite the presence of a prepayment penalty. These findings provide some basis for believing that many borrowers' decisions to use hybrid mortgages were not generally unsound from the start or made without consideration of risk. The currently fashionable view that the hybrid mortgage product is inherently flawed is not supported.

II. The Subprime Mortgage Database

The subprime mortgage database contains loan-level data on all loan originations and purchases of subprime mortgage subsidiaries of eight large financial institutions between third quarter 1995 and the first quarter of 2006. The subsidiaries originate loans through brokers, originate loans directly, and purchase loans from other lenders. Data include loan terms (e.g., lien, interest rate, type of interest rate, rate adjustment terms, balloons, negative amortization), borrower characteristics (income, FICO score, age, reason for obtaining the loan), and performance (historical delinquency, current delinquency, status at close). The database covers a large part of the subprime mortgage market, including a many of the higher price mortgages. Economists at the Federal Reserve estimated that an the fourth quarter 2005 version of this database accounted for nearly a quarter of originations of higher priced home purchase and refinance mortgages on owner-occupied homes in 2004 (Avery, Canner, and Cook 2005).

From the beginning of 2000 to the end of the first quarter of 2006, these subprime lenders originated or purchased about 5.71 million mortgages. Nearly all of the mortgages were closed end. Only about one in ten mortgages were open end: 2.7 percent of mortgages were open-end first mortgages, and 6.6 percent were open-end second mortgages (table 1).

1. Types of mortgage products, Q1-2000 to Q1-2006

Product	**Percent of loans**
Open-end first mortgages	2.7
Open-end second mortgages	6.6
Mortgages with negative amortization	<0.05
Mortgages with balloon payments	2.1
Closed-end, fixed-rate first mortgages	24.3
Closed-end, variable-rate first mortgages	24.4
Hybrid first mortgages	14.5
Closed-end, fixed-rate second mortgages	23.9
Closed-end, variable-rate second mortgages	0.2
Hybrid second mortgages	1.6
Total	100.0

Mortgages with negative amortization or balloon payments are niche products that are often used to reduce monthly payments at the beginning of a mortgage but have notoriety as predatory products. The eight subprime lenders originated or purchased few such loans between Q1-2000 and Q1-2006. Less than 0.05 percent of loans had negative amortization, and just 2.1 percent had balloon payments. Virtually all mortgages with negative amortization were fixed-rate second mortgages. Seventy-two percent of loans with balloon payments were first mortgages. Ninety percent of loans with balloon payments had fixed interest rates, and the remaining 10.1 percent were variable-rate or hybrid mortgages.

More than half of loans were closed-end first mortgages. Twenty-four percent of loans were closed-end, fixed-rate mortgages. The vast majority of these fixed-rate mortgages had a 30-year term to maturity. Twenty-four percent were closed-end, variable-rate mortgages. Fifteen percent of loans were hybrid mortgages. Of the hybrid first mortgages, about nine of ten were 2/28 hybrids.

III. Characteristics of Borrowers Using Selected Mortgage Products

This section compares distributions of borrower characteristics for various mortgage products. Closed-end, fixed-rate first mortgages are used as a benchmark for comparisons. The tables cover the period from Q1-2000 to Q1-2006. Although the exact percentages often changed from year to year, the distributions generally reflect differences in characteristics across products that prevailed during the period.

A. Balloon, Negative Amortization, and Second Mortgages

As mentioned, balloon and negative amortization mortgages are often used to obtain a lower monthly payment at the beginning of the loan. Balloon mortgages typically have relatively low fixed interest rates and may then be refinanced at end of the term at the prevailing market rate. Negative amortization loans do not fully pay interest in the beginning, adding the shortfall to the loan balance. Borrowers using mortgages with balloon payments had somewhat lower incomes than borrowers using closed-end fixed-rate mortgages (table 2). Forty-three percent of borrowers using loans with balloon payments had incomes less than $35,000, (the sum of the first three rows of column 2), compared to 38.2 percent of borrowers using closed-end, fixed-rate first mortgages.

2. Income at origination for selected mortgage products, Q1-2000 to Q1-2006
(Percentage distribution)

Income	**Closed-end, fixed-rate first mortgage**	**Mortgage with balloon payment**	**Open-end second mortgage**	**Closed-end, fixed-rate second mortgage**
Less than $15,000	6.7	7.8	0.4	4.5
$15,000-24,999	14.4	16.4	3.4	8.1
$25,000-34,999	17.1	18.7	8.9	13.2
$35,000-49,999	24.7	24.6	25.5	23.4
$50,000-74,999	22.2	20.5	22.0	27.7
$75,000-99,999	9.0	7.0	17.6	12.7
$100,000 or more	5.9	5.2	22.2	10.5
Total	100.0	100.2	100.0	100.0

The mostly fixed-rate balloon loans have characteristics that may be attractive to lower income borrowers. Interest rates on balloon loans are lower than interest rates on fixed-rate loans because the loan repaid or refinanced at market rates at maturity, usually five or seven years from origination. Hence, monthly payments are lower on a balloon mortgage than a fixed-rate mortgage. The monthly payment typically is fixed for five or seven years until maturity, a feature that provides some security for borrowers with limited ability to absorb increases in monthly payments due to interest rate increases.

In contrast to balloon loans, by far most borrowers using loans with negative amortization had relatively high incomes. Eighty-seven percent of borrowers using loans with negative amortization had incomes of $50,000 or more (number not in table), compared to 37.1 percent of borrowers using closed-end, fixed-rate mortgages. Borrowers using second mortgages also had relatively high incomes. Sixty two percent of borrowers using open-end second mortgages and 50.9 percent of borrowers using closed-end, fixed-rate second mortgages had incomes of $50,000 or more

An important indicator of risk is the FICO risk score, which predicts based on information in borrowers credit history the likelihood over the next two years of serious delinquency, bankruptcy, or other derogatory event. Borrowers using mortgages with a balloon payment had much lower FICO risk scores than borrowers using closed-end, fixed-rate first mortgages. Two-thirds of borrowers using mortgages with balloon

payments had FICO risk scores less than 620 (the sum of the first four rows of column 1 in table 3), compared to 49.1 percent of borrowers using closed-end, fixed-rate mortgages.

3. Borrower FICO risk score at origination for selected mortgage products, Q1-2000 to Q1-2006

(Percentage distribution)

FICO risk score	**Closed-end, fixed-rate first mortgage**	**Mortgage with balloon payment**	**Open-end second mortgage**	**Closed-end, fixed-rate second mortgage**
Less than 540	11.7	22.4	7.6	3.9
540-579	16.7	22.3	13.5	6.5
580-599	9.8	11.3	8.1	5.8
600-619	10.9	11.3	8.2	6.8
620-640	11.4	11.0	8.1	7.8
640-679	20.8	15.3	15.3	24.4
680 or greater	18.7	6.4	39.2	44.7
Total	100.0	100.0	100.0	100.0

Relatively fewer higher credit risk borrowers used negative amortization mortgages, open-end second mortgages, and closed-end, fixed-rate second mortgages than closed-end, fixed-rate first mortgages. Ninety eight percent of borrowers using mortgages with negative amortization (number not in table), 39.2 percent of borrowers using open-end second mortgages, and 44.7 percent of borrowers using closed-end, fixed-rate second mortgages had FICO risk scores of 680 or more. Recall that virtually all mortgages with negative amortization were second mortgages. That borrowers using second mortgages had higher FICO risk scores and higher incomes than borrowers using closed-end, fixed-rate first mortgages should not come as a surprise, considering the greater risk associated with junior lien status. This result likely reflects lender decisions regarding risk rather than borrower demand considerations.

B. Closed-End First Mortgages

Closed-end first mortgages can be differentiated by type of interest rate. Variable-rate and hybrid mortgages have adjustable interest rates, which are initially lower than interest rates for fixed-rate mortgages. They may be chosen for different reasons including because the borrower has relatively short time horizon, expects interest rates will not rise, or cannot afford the payments on higher rate fixed-rate mortgages. The use of an adjustable rate mortgage to afford the payments is risky because interest rates may rise and additional income to service the loan or the ability to refinance into a lower risk loan may not be realized.

Borrowers using variable-rate and hybrid mortgages had notably higher incomes than borrowers using fixed-rate mortgages. Whereas 60.3 percent of borrowers using variable-rate mortgages (sum of the last three rows in column 2 of table 4) and 48.1 percent of borrowers using hybrid mortgages had incomes of $50,000 or more (last three

rows of column 2), just 37.9 percent of borrowers using fixed-rate mortgages had incomes of $50,000 or more (last three rows of column 1). Lower income borrowers disproportionately had fixed-rate mortgages. When lower income borrowers did obtain an adjustable-rate mortgage, they obtained a hybrid mortgage by a considerable margin.

4. Income at origination for closed-end first mortgages, Q1-2000 to Q1-2006, by type of interest rate

(Percentage distribution)

Income	**Fixed rate**	**Variable rate**	**Hybrid**
Less than $15,000	6.7	0.8	4.1
$15,000-24,999	14.4	4.9	9.4
$25,000-34,999	17.1	10.8	14.2
$35,000-49,999	24.7	23.3	24.2
$50,000-74,999	22.2	32.4	28.2
$75,000-99,999	9.0	16.6	12.0
$100,000 or more	5.9	11.3	7.9
Total	100.0	100.0	100.0

Variable-rate and hybrid mortgages were disproportionately on higher valued properties than fixed-rate mortgages. Thirty-nine percent of variable-rate mortgages (sum of last three rows in column 2 of table 5) and 26.6 percent of hybrid mortgages (last three rows in column 3) were on properties valued $200,000 or more, compared to 16.5 percent of fixed-rate mortgages (last three rows in column 1). Mortgages on lower valued properties were much more likely to have a fixed rate, but hybrid mortgages were not uncommon on lower valued properties, especially in the $50,000 to $99,999 range.

5. Property value for closed-end first mortgages, Q1-2000 to Q1-2006, by type of interest rate

(Percentage distribution)

Property value	**Fixed rate**	**Variable rate**	**Hybrid**
Less than $50,000	18.2	1.2	7.1
$50,000-99,999	35.7	17.6	27.0
$100,000-149,999	19.1	23.3	23.1
$150,000-199,999	10.6	19.2	16.2
$200,000-249,999	6.1	13.8	10.4
$250,000-349,999	7.0	18.6	12.3
$350,000 or more	3.3	6.3	3.9
Total	100.0	100.0	100.0

Location of the property contributed to the concentration of adjustable rate originations in high-value properties. Geographic areas with high property values had especially large percentages of adjustable rate mortgages. Two-thirds or more of mortgages originated in the Pacific, Mountain, and New England Census divisions were variable-rate or hybrid mortgages (table 6). These divisions had the three highest median property values for

owner-occupied housing units in 2000.[2] Variable-rate mortgages were the most common type of mortgage in the Pacific and Mountain divisions. Hybrid mortgages were the most common type of mortgage in New England.

6. Location of property for closed-end first mortgages, , Q1-2000 to Q1-2006, by type of interest rate

(Percentage distribution)

Census division	**Fixed**	**Variable**	**Hybrid**	**Total**	***Memo: Variable + hybrid***
New England	29.0	22.2	48.8	100.0	71.0
Middle Atlantic	43.1	19.7	37.2	100.0	56.9
East North Central	34.4	32.1	33.6	100.0	65.7
West North Central	34.5	35.0	30.5	100.0	65.5
South Atlantic	44.0	23.9	32.1	100.0	56.0
East South Central	57.1	17.9	25.0	100.0	42.9
West South Central	54.4	20.8	24.8	100.0	45.6
Mountain	32.4	42.3	25.3	100.0	67.6
Pacific	32.9	45.5	21.6	100.0	67.1

Borrowers using variable-rate and hybrid mortgages were disproportionately represented in lower FICO risk score intervals and less than proportionately represented in higher intervals than borrowers using fixed-rate loans. Seventeen percent of variable-rate mortgage borrowers and 17.3 percent of hybrid mortgage borrowers had FICO risk scores less than 540, compared to 11.7 percent of fixed-rate mortgage borrowers (table 5). And whereas just over half of borrowers using fixed-rate mortgages had FICO risk scores of 620 or more, 40.3 percent of borrowers using variable-rate mortgages and 35.5 percent of borrowers using hybrid mortgages had FICO risk scores of 620 or more.

7. Borrower FICO risk score at origination for closed-end first mortgages, Q1-2000 to Q1-2006, by type of interest rate

(Percentage distribution)

FICO risk score	**Fixed rate**	**Variable rate**	**Hybrid**
Less than 540	11.7	17.0	17.3
540-579	16.7	20.1	20.5
580-599	9.8	11.2	12.8
600-619	10.9	11.4	13.9
620-640	11.4	11.4	12.7
640-679	20.8	16.7	15.2
680 or greater	18.7	12.2	7.6
Total	100.0	100.0	100.0

[2] The median value of owner-occupied homes in the United States was $119,600 (Bennefield 2003). Median values by Census division are as follows: Pacific, $194,800; New England, $158,500; Mountain, $134,500; Middle Atlantic, $130,500; South Atlantic, $112,600; East North Central, $111,200, West North Central, $94,000; East South Central, $86,300; and West South Central, $80,600.

A large part of variable-rate and hybrid lending was on high-value properties owned by higher income borrowers. Higher income borrowers may feel more able to absorb payment shock from ARM resets than lower income borrowers, who may have little discretionary income after monthly expenses. However, as mentioned, location of the property may contribute to the disproportionate share of adjustable-rate mortgages in higher property values. That geographic areas with relatively high property values have especially large shares of adjustable-rate mortgages suggests that some higher income borrowers may have chosen adjustable rate mortgages in order to afford more easily the payments on higher rate fixed-rate mortgages. The disproportionate share of adjustable rate mortgage borrowers with low FICO risk scores may reflect borrower self-selection. Borrowers with previous credit problems who believe that they can improve payment performance may choose a subprime adjustable-rate mortgage with the intention of refinancing later at a prime or lower risk fixed interest rate, for example. There may also be borrower self-selection or lender selection on the basis of some unobserved risk. Posey and Yavas (2001) show that the borrower's mortgage choice may serve as a signal of default risk enabling lenders to screen high-risk and low-risk borrowers.

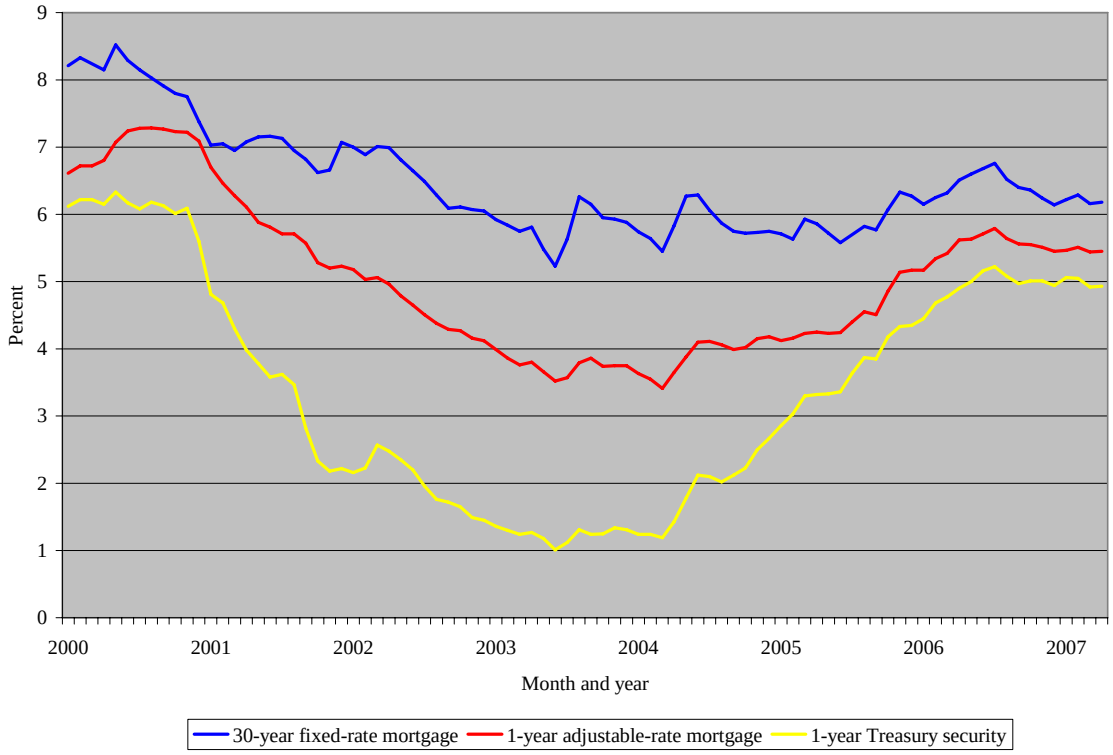
The next section examines a different source of risk for one of these products. The risk is that of increases in debt service burdens from interest rate resets on hybrid mortgages. This risk has become a particular concern because hybrid loans often have an initial discounted interest rate. Because of the initial discount, the first reset may produce a large increase in the monthly mortgage payment.

IV. Hybrid Loan Resets

Hybrid mortgages are a form of adjustable rate mortgages that have a fixed interest rate for a period of years. After the fixed-rate period, the rate is adjusted periodically based on the level of a market interest rate (index) at the adjustment date plus a margin. The most common interest rate indices are the London Interbank Offered Rate (LIBOR), a US Treasury Security constant maturities rate, and the 11th District Cost of Funds index. The margin depends on the frequency of adjustment and loan and borrower risk. As mentioned, about nine in ten of the hybrid mortgages in the subprime mortgage database are fixed for a period of two years. LIBOR is the most frequently used index.

The initial fixed rate for hybrids is usually priced at a discount from the current index value plus margin. This initial discounted fixed rate, which is sometimes called a "teaser rate," is an incentive to the borrower to take the hybrid loan. Hybrid loans often include a prepayment penalty to discourage borrowers from refinancing before the first reset. In our dataset, about seven in ten hybrid loans originated between 2004 and Q1-2006 had prepayment penalties (number not in tables).

1. 30-year fixed-rate mortgage, 1-year adjustable-rate mortgage, and 1-year constant maturity Treasury rates, January 2000 to April 2007

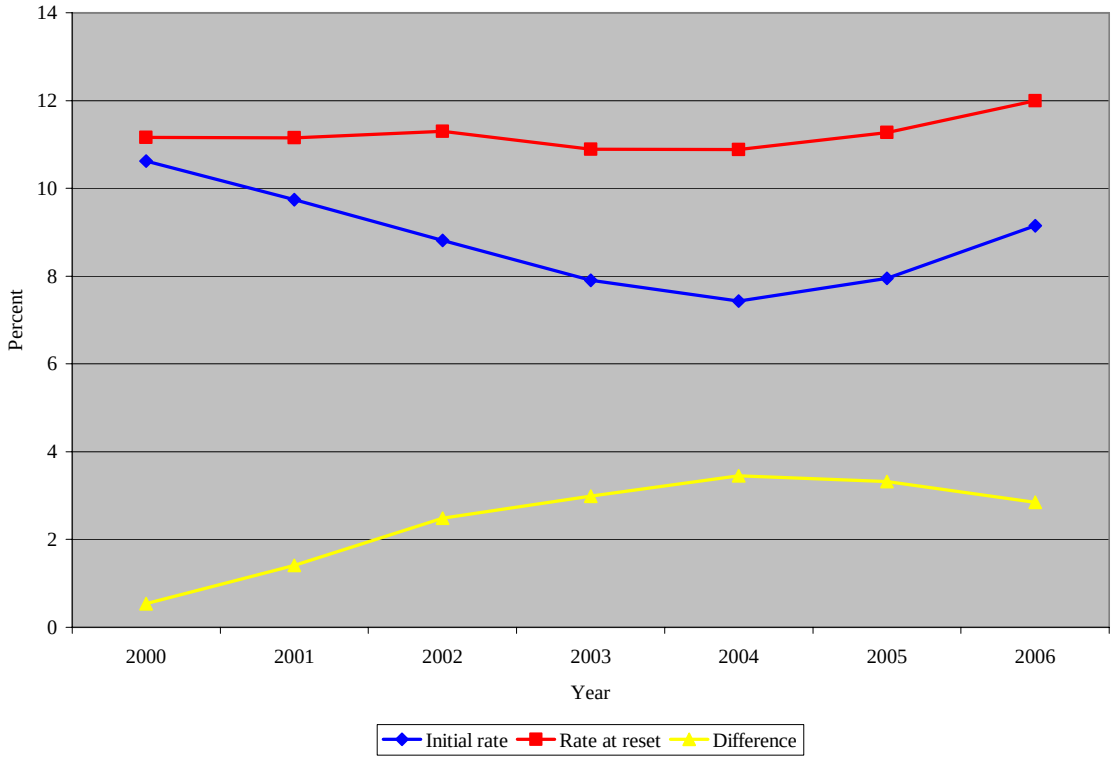


Sources: Board of Governors of the Federal Reserve System, Release H.15 Selected Interest Rates; Freddie Mac, Primary Mortgage Market Survey

Recent changes in interest rates adversely affect borrowers who obtained adjustable-rate mortgages in the early 2000s. Short-term interest rates, shown here by the one-year constant maturities Treasury rate, fell sharply from 2001 until mid-2003. Both fixed and adjustable mortgage rates also fell during this period (chart 1). The difference between fixed and adjustable rates was about two percentage points for most of the period and remained so for about a year after short-term rates began to rise. By 2006, the one-year Treasury rate had increased by about four percentage points since mid 2003. This rise in short-term rates has become became a concern because many of the hybrid loans that were originated in the low-rate period were beginning to reset.

Chart 2 shows by year of origination average initial rates and rates at reset for 2/28 hybrid first mortgages. The rate at reset was calculated by the index plus margin. We used the actual index value at the time of reset or the average of the most recent six months if the actual value was unavailable.

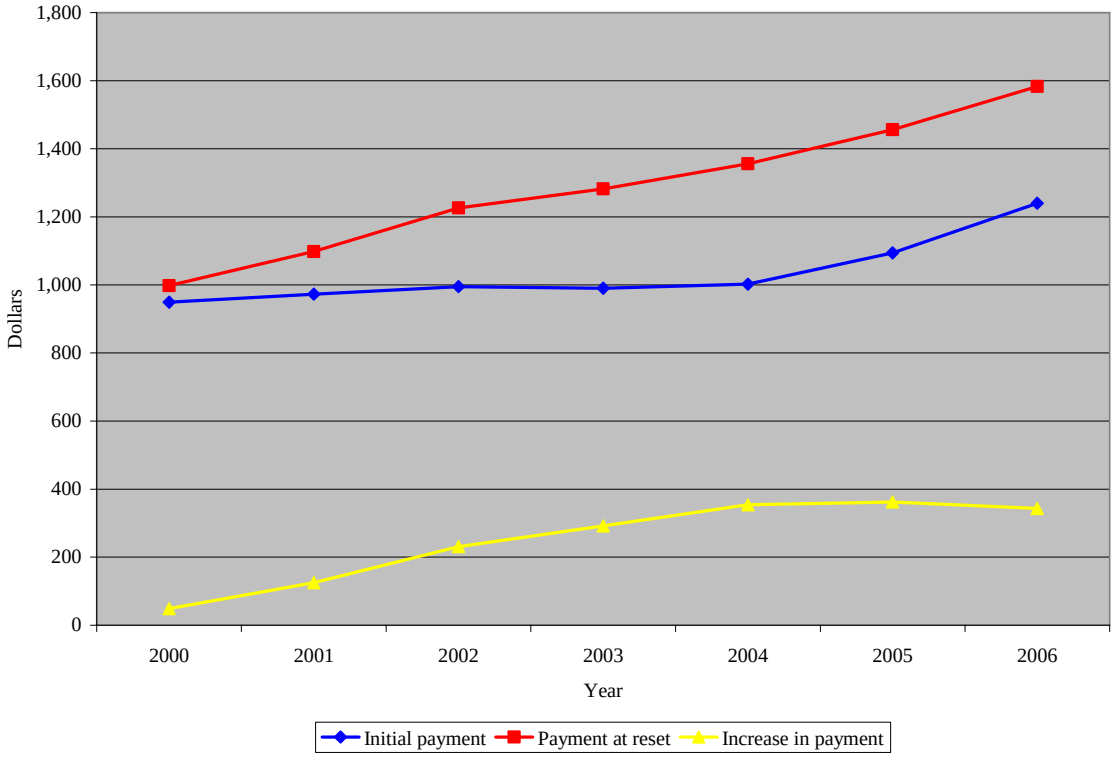
2. Average 2/28 hybrid interest rates initially and at reset, by year of origination



Interest rates for hybrid mortgages in the subprime mortgage database in the 2000s follow a similar pattern to that for the 1-year adjustable-rate mortgages shown in chart 1. The average initial interest rate for hybrid mortgages fell from 10.62 percent in 2000 to 7.43 percent in 2004 and then increased in 2005 and 2006. The period of declining short-term interest rates produced relatively small increases in the average interest rate at rest for loans originated in 2000 and 20001. Subsequent increases produced large differences between initial rates and rates at reset. For hybrid mortgages originated in 2002 or later, the difference between the initial rate and the rate at reset was more than two percentage points. Loans originated in 2004 have the largest difference, 3.45 percentage points.

Although loan amounts increased each year, the average initial monthly payment of interest and principal remained about $1,000 until 2005 because of falling initial interest rates (chart 3). In contrast, the average monthly payment at reset increased each year. Rising short-term interest rates since 2003 produced large increases in average monthly payments. For loans originated in 2004 or later, the average monthly payment at reset was about $350 greater than the initial monthly payment.

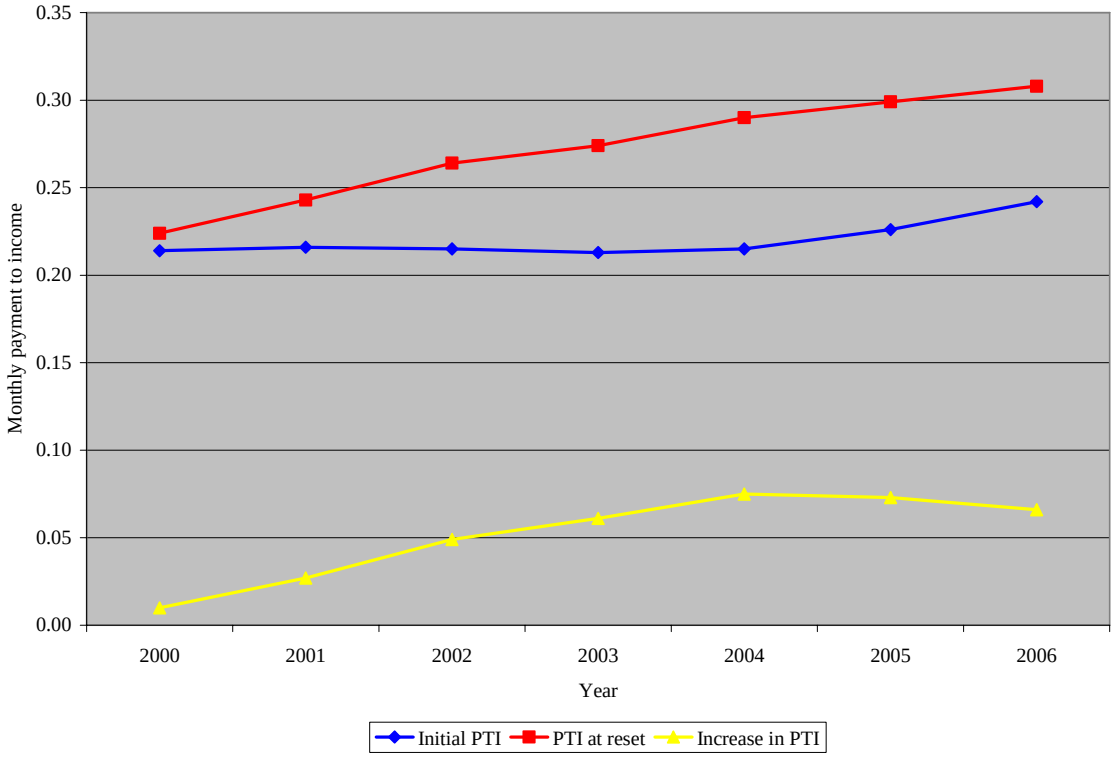
3. Average 2/28 hybrid monthly payments initially and at reset, 2000 to Q1-2006



Lenders assess the ability to service a mortgage loan using the ratio of the monthly mortgage payment to the borrower's monthly income. We estimate borrowers' ability to service their first mortgage debt at reset by the ratio of monthly payment to monthly income at origination. We do not have data on borrower income at reset. On average, borrower income is likely to be somewhat higher at reset than initially. Average ratio of initial monthly payments to income was about 0.21 or 0.22 between 2000 and 2005 (chart 4). In the first quarter of 2006, initial monthly payments to income, 0.24, was somewhat higher than earlier.

Lenders commonly view a payment-to-income ratio less than 0.28 as an acceptable debt service burden. The average ratio of monthly payments to income at reset was below 0.28 until 2004 For 2004 originations, average monthly payments to income at reset was 0.29, an increase 0.073 (34.9 percent) over initial payments to income. The average ratio of monthly payments to income was also above the 0.28 threshold in 2005 and the first quarter of 2006.

4. Average 2/28 hybrid payments to income initially and at reset, 2000 to Q1-2006



Distribution of Post-Reset Payments to Income for 2004-2006 Originations
Beyond the average payments-to-income ratio is considerable variation in borrowers' mortgage debt service burdens initially and after reset. Table 8 presents the distribution of initial payments to income by the distribution at reset. Mortgages that have prepaid or closed because of delinquency are separate categories. Ambrose, LaCour-Little, and Huszar (2005) note that prepayment rates for hybrid mortgages are high, especially around the date of the first reset. Prepayment is largely a consideration for 2004 originations, which were beginning to reset in 2006. There are few prepayments of mortgages originated after 2004. Since most of the loans had not yet reset at the time of data collection, post-reset payments to income are largely predictions based on the assumption that current short-term interest rates remain relatively stable at current levels.

Looking at the 2004 2/28 hybrid originations, 77.8 percent borrowers had initial payments to income less than 0.28 (last column of the first row in table 6). A higher ratio may be acceptable if compensating factors offset the risk. A small percentage of borrowers had relatively high ratios of payments to income at origination. In 2004, 10.0 percent of borrowers had payment-to-income ratios from 0.28 to 0.33, and 11.6 percent had ratios greater than 0.33 percent. The percentage of hybrid borrowers with relatively high debt service burdens increases noticeably after the first reset. Of 2004 originations, 18.3 percent of borrowers have payment-to-income ratios greater than 0.33.

The outlook for mortgages originated in 2005 and the first quarter of 2006 appears more worrisome. The percentage of borrowers with payments to income greater than 0.33 increases from 13.3 initially to 34.0 at reset for 2005 originations and from 17.6 to 40.2

for first quarter 2006 originations. Thus, a substantial percentage of hybrid borrowers potentially face relatively high payment-to-income ratios at reset.

8. Payments to income at reset or delinquency at close, 2004 to Q1-2006 by initial payments to income and year of origination

(Percent)

Initial payments to income	Open, payments to income at reset			Closed		
	<0.28	**0.28-0.33**	**>0.33**	**Not 60+ days past due at close**	**60+ days past due at close**	**Total**
2004 originations						
<0.28	33.5	9.2	7.1	27.0	1.1	77.8
0.28-0.33	0.00	<0.05	6.1	5.2	0.3	10.0
>0.33	0.00	<0.05	5.2	5.0	0.3	11.6
Total	33.5	9.2	18.3	37.2	1.8	100.0
2005 originations						
<0.28	44.6	14.0	10.5	4.8	0.1	74.0
0.28-0.33	<0.05	0.1	11.5	1.1	<0.05	12.7
>0.33	<0.05	<0.05	12.0	1.2	<0.05	13.3
Total	44.6	14.2	34.0	7.1	0.1	100.0
Q1-2006 originations						
<0.28	44.0	14.2	8.9	0.00	0.00	67.0
0.28-0.33	0.1	1.5	13.6	0.00	0.00	15.2
>0.33	<0.05	0.1	17.7	0.00	0.00	17.6
Total	44.1	15.8	40.2	0.00	0.00	100.0

The 2005 and 2006 originations still run many months at the lower payment levels before payments are reset, however. The 2004 originations, which were closer to the reset date, had considerable prepayments. Thirty-seven percent of 2004 originations were prepaid by the end of the first quarter of 2006 and were not 60 days or more past due when closed. Ten percent of 2004 originations that were prepaid and not 60 days or more past due were mortgages with initially high payments to income. Some of the 2004 prepayments may have involved less serious delinquencies or other problems. Nevertheless, it seems likely that many borrowers moved or were able to refinance their hybrid mortgages. It is quite likely that considerable percentages of 2005 and 2006 originations will also prepay close to the first reset date.[3] The terms at which they will be able to refinance are uncertain, however.

For a large percentage of mortgages in all three years, the payments-to-income ratio at reset would not be presumed to be a problem. The percentage of borrowers who had

[3] For 2004 originations, mortgages with relatively high payment-to-income ratios at reset were more likely to be closed than mortgages with lower ratios. Forty-seven percent of mortgages with payments to income at reset greater than 0.33 were closed, compared to 36.3 percent of mortgages with ratios less than 0.28.

payment-to-income ratios less than 0.33 initially and at reset was 33.5 percent in 2004, 44.6 percent in 2005, and 44.1 percent in the first quarter of 2006.

In sum, payment-to-income ratios at reset for a large percentage of hybrid mortgages originated between 2004 and Q1-2006 are not expected to exceed the commonly used threshold for acceptable mortgage debt service burden. A small percentage of loans were initially made at higher payment-to-income ratios, and substantial percentages of borrowers may have relatively high debt service burdens at reset, however. Many of these borrowers may face payment difficulties after the interest rate is reset. Mitigating this concern is prepayment experience with 2004 originations. A large percentage of 2004 hybrids prepaid. Relatively few were seriously delinquent at prepayment. Prepayments may also reduce the number of 2005 and 2006 mortgages with high debt service burdens at reset.

Another mitigating factor is the large proportion of higher income borrowers. Higher income borrowers typically have greater discretionary income after necessities to service debt, although we do not whether these borrowers are in this situation. Higher income borrowers may be subprime borrowers because they have relatively high levels of other debts. A relatively large percentage of hybrid mortgage borrowers have low FICO risk scores. It is possible that some low-FICO risk score borrowers will be able improve their risk scores and lower mortgage debt service burdens by refinancing into a lower risk mortgage. This consideration is also speculative.

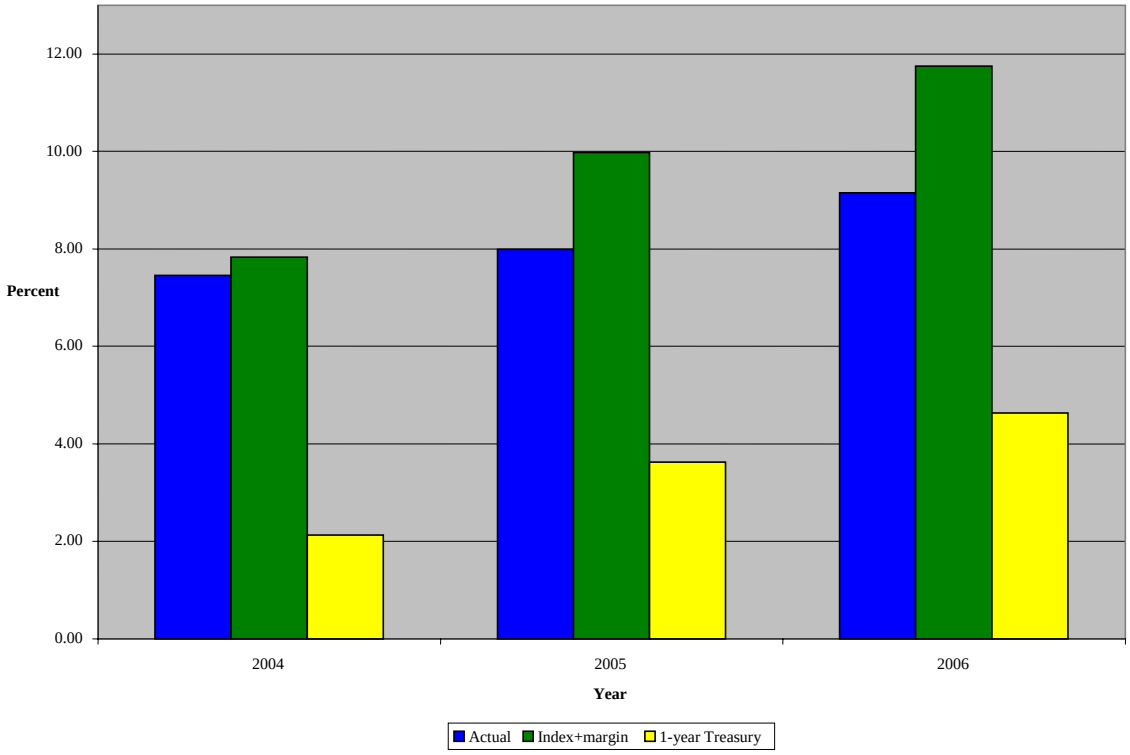
Payments to Income at Fully Indexed Rates

In 2004, the average fully indexed interest rate (index + margin), 7.83 percent, was 37 basis points above the average actual initial interest rate (chart 5). The average payment-to-income ratio at the fully indexed rate was 0.224, which was not much higher than the 0.216 average payment-to-income ratio based on the actual initial rate.

The situation was different for 2005 and Q1-2006 originations. The average initial interest rate for 2/28 hybrids rose in 2005 and 2006, but it rose at a slower rate than short-term interest rates. The average margin also increased in 2005 and 2006. Consequently, the difference between the fully indexed rate and the actual initial interest rate widened to 99 basis points in 2005 and 2.60 basis points in 2006. These differences suggest that low teaser rates were more prevalent in 2005 and 2006 than in 2004.

The changes in the hybrid market occurring 2005 and the first quarter of 2006 produced a sizable difference in payments to income between actual and fully indexed interest rates at origination. The average payments-to-income ratio at the fully indexed rate in 2005 was 0.272, compared to 0.226 at the actual initial rate. For the first quarter of 2006, the average payments-to-income ratio at the fully indexed rate was 0.304, compared to 0.224 at the actual initial interest rate. Payments-to-income ratios for the fully indexed rate at origination in 2005 and 2006 are much closer to payments-to income ratios for the interest rate at reset than the actual initial interest rate.

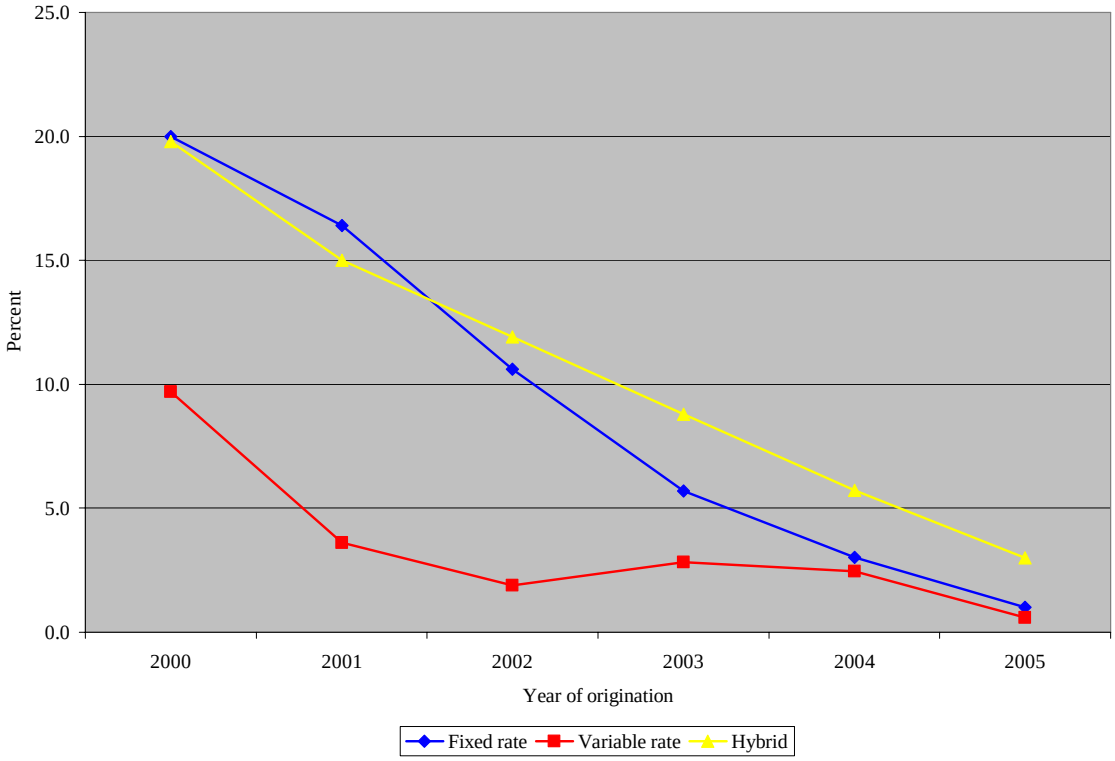
5. Average actual and fully indexed interest rates at origination



V. Payment Performance on Hybrid and Other Closed-End First Mortgages

Chart 6 presents 60 or more day delinquencies currently or at close for closed-end first mortgages by year of origination. More recent loans have lower rates than older loans because they are less seasoned. Delinquency rates across loans grouped by type of interest rate are notable. Delinquency rates on fixed-rate and hybrid mortgages were higher than delinquency rates on variable-rate mortgages. The difference was considerable for mortgages originated between 2000 and 2003, perhaps because falling short-term interest rates during this period reduced the amount of monthly payments on variable-rate mortgages. Delinquency rates for fixed-rate and hybrid loans were similar for mortgages originated from 2000 to 2002. Delinquency rates for hybrid loans originated since 2002 have been about two to three percentage points higher than those for fixed-rate mortgages. The difference in delinquency rates between hybrid and fixed-rate loans likely will increase after interest rates reset. Few of the hybrids originated in 2004 or 2005 were reset by the end of the first quarter of 2006. These findings for payment performance are consistent with observations of Ambrose, LaCour-Little, Huszar (2005) who found that lenders underwrite variable-rate mortgages more conservatively than fixed rate mortgage but that underwriting for hybrid mortgages appears to be relatively less conservative than variable-rate mortgages.

6. 60 or more day delinquencies currently or at close for closed-end first mortgages, by type of interest rate and year of origination



VI. Preliminary Conclusions

Subprime mortgage borrowers are not a homogenous group. Large differences in borrower profiles exist for different products. A notable difference is the relatively higher income and lower FICO risk scores of closed-end variable-rate and hybrid mortgage borrowers compared to closed-end fixed-rate mortgage borrowers. Borrower or lender selection may influence choice of type of interest rate, but we do not have evidence for this possibility at this time.

Our analysis of hybrid first mortgage resets for 2004 through Q1-2006 originations finds a sizeable increase in the percentage of hybrid borrowers with relatively high debt service burdens after the first reset. This finding is worrisome because many of these borrowers may have difficulty servicing mortgage debts after reset. The evidence is not entirely negative, however. A large percentage of borrowers using hybrid mortgages did not commit themselves to relatively high mortgage debt service burdens at the first reset. A large number of these borrowers probably will not experience great difficulty servicing their mortgage debt after the first reset. Also many hybrid mortgage borrowers in 2004 prepaid loans before the first reset, often despite the presence of a prepayment penalty. By far most borrowers who prepaid were not seriously delinquent when the loan was prepaid. Market conditions for refinancing 2005 and 2006 originations are not be favorable as those for 2004 originations. Nevertheless, it seems likely that a percentage of 2005 and 2006 originations will prepay before reset.

The diversity of borrower experience provides some basis for believing that many borrowers' decisions to use hybrid mortgages were not generally unsound from the start or made without consideration of risk. The currently popular view that the hybrid mortgage product is inherently flawed is no t supported.

The next version of this paper will provide additional analyses of hybrid loan choices. First, using data for fixed-rate originations, we develop a model to predict interest rates that hybrid mortgage borrowers would pay for fixed-rate mortgages. We are able to calculate points and fees paid by borrowers, enabling us to compare prices that hybrid borrowers actually pay with prices they would have paid and mortgage debt service burdens had they taken fixed-rate loans instead of hybrid mortgages. Second, we are able to identify many loans that were subsequently refinanced with the same lender. Information from the database on the subsequent refinancing provides evidence on the situation of the subset of borrowers who choose the same lender or are unable to refinance with another lender. Finally, we have additional information on the status of closed loans, including whether or not the loan was foreclosed.

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