Characteristics of Recent Adjustable-rate Mortgage Borrowers

Michael Finke[1], Sandra Huston[2], Emilian Siman[3], and Mel Corlija[4]

Abstract: *The demographic characteristics of recent adjustable and fixed-rate mortgage borrowers are compared among nationally representative survey cross-sectional data at three-year intervals from 1989 through 2001. While the overall proportion of ARMs in relation to FRMs has decreased, a trend toward increased use of adjustable-rate mortgages among lower income, less wealthy, less credit worthy, and single-headed households appears over this 13-year period. Findings from this study point to the need for targeted financial education to ensure that vulnerable households are making rational consumer decisions with full information regarding interest rate risk associated with adjustable-rate mortgage products.*

Keywords: *Mortgage loans, adjustable-rate mortgages, mortgage trends*

Introduction

Mortgage Preference and Choice

A recent opinion survey commissioned by the Consumer Federation of America (CFA) found that consumers who preferred adjustable-rate mortgages (ARMs) were more likely to be younger, lower income, and less educated than those who preferred fixed-rate mortgages (FRMs) (Consumer Federation of America, 2004). The CFA's opinion survey also found that those who preferred ARMs were less aware of the risks associated with interest-rate increases than consumers who preferred FRMs. As well, the greatest underestimation of the impact of an increase in interest rates upon monthly mortgage payments was found among Hispanic, younger, lower-income, and less educated respondents.

If consumers make mortgage choices without full information about the risks related to ARMs, and if market interest rates rise, there exists a possible market inefficiency that may eventually lead to increased foreclosures among the most vulnerable homeowners.

Do the consumer preferences highlighted in the CFA opinion survey match mortgage decisions actually made by consumers? In response to the CFA's opinion survey, this study presents mortgage trends by demographic characteristics of recent adjustable- and fixed-rate mortgage borrowers using nationally representative data at three-year intervals from 1989 through 2001 to explore the nature of the consumer mortgage market and determine if the characteristics of ARM and FRM borrowers have changed or remained relatively constant over this 13-year period.

If results from this study provide evidence to suggest that the distribution of ARMs has shifted to include more vulnerable consumers, then this would highlight the need for increased financial education and counseling among this population. While ARMs may have the benefit of helping more people become home owners, practitioners in the financial arena have an obligation to ensure that consumers choosing ARMs are fully aware of their susceptibility to market fluctuations. Trend results from this study will help financial professionals identify the emerging groups of consumers that need to be targeted for this education.

Mortgages and Homeownership

Mortgage payment variability is associated with the relative interest rate risk shared by the borrower and lender. If interest rates rise, a borrower may hold debt that pays beneath the market rate of interest, reducing the value of the debt instrument. If interest rates on the debt instrument vary with the market rate of interest, the value of the debt instrument is maintained and thus the risk to the lender is reduced. The borrower may choose between a fixed-rate loan where the repayment amount is constant throughout the life of the loan, or the borrower may choose a variable rate loan where payments are adjusted periodically to reflect the current cost of borrowing as measured by prevailing interest rates. The interest rate risk to the ARM borrower is partially limited by caps, or maximum allowable increases in the interest rate applied to the loan, and the

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frequency of interest rate re-calculation periods. Generally, introductory interest rates are lowest for mortgages for which borrowers bear the greatest proportion of interest rate risk.

Today nearly 7 in 10 households are homeowners. Over the past decade and a half, homeownership rates have steadily increased from 63.9% in 1989, to 64.1% in 1992, to 64.7% in 1995, to 66.3% in 1998, to 67.8% in 2001, and were at 68.9% at the end of the second quarter of 2005 (U.S. Census Bureau, 2005). Nationally, single-family homes financed with adjustable-rate mortgages represented fifty percent of mortgage origination in 1985 (Federal Housing Finance Board, 2004). For the twenty years from 1985 to the present, ARM purchases have generally continued to decline except for five periods (1987, 1988, 1994, 1999, and 2000). In 2003, ARMs accounted for 19% of mortgage originations (Mortgage Bankers Association, 2004). Homebuyers who opt for an ARM are provided with potential benefits that FRM homebuyers cannot take advantage of – i.e., more house for (perhaps) less money. Because an ARM provides the opportunity to take advantage of lower introductory interest rates, homebuyers have access to larger loan amounts under conventional eligibility ratios and ARMs offer potential monetary savings over FRMs if interest rates do not increase. These features may make ARMs attractive to buyers constrained either by income or by debt burden. However, these buyers face the speculative risk posed by greater exposure to interest rate fluctuations. By accepting this risk, the reward to the borrower is the possibility of lower payments through the life of the loan. However, assuming this risk provides the potential for increased mortgage payments when interest rates rise, the result is the possibility of decreased future consumption through displacement of other variable expenses or default and the subsequent loss of assets and availability of future credit.

Since the average U.S. homebuyer holds a mortgage for approximately five years (Carnahan, 2001), a household that plans to move sooner will be more likely to choose an ARM since short-run benefits outweigh the present value of potential mortgage payment increases. Households may also be willing to assume greater interest rate risk on a mortgage for the same reason investors are willing to accept greater risk on other financial instruments; they anticipate a payoff over time in terms of the present value of mortgage payments from choosing an adjustable-rate product. Those most willing to accept this risk may anticipate a wider spread between fixed and adjustable-rate mortgages, due perhaps to a greater spread on short-run interest rates or to an anticipated decrease in future market rates of interest. The possible decrease in future consumption resulting from increased mortgage payments may not seriously affect utility for borrowers who anticipate an increase in future income, who have wealth to protect against default or periodic mortgage payment spikes, or who are less averse to risk that might lower future consumption. Conversely, borrowers who have lower levels of human capital, less wealth, and who are more risk averse should be more likely to choose a fixed-rate mortgage.

This study compares demographic trends among respondents who recently, within the past 5 years, received either an adjustable-rate or fixed-rate mortgage between 1989 and 2001 in order to determine whether the characteristics of ARM borrowers changed during the 1990s. Of particular interest are those variables the Consumer Federation of America opinion survey found to be associated with either a preference for ARMs and/or an unrealistic assessment of potential risks related to ARM choice. Results from this current study will provide the first empirical evidence of a possible shift in the marketing of ARMs toward more financially distressed consumers.

Review of Mortgage Literature

Mortgage Preference

The study commissioned by the Consumer Federation of America (2004) of 1,015 individuals showed that 25% would prefer an adjustable-rate mortgage, while 64% favored a fixed-rate loan and 11% were undecided. Demographically ARMs were preferred by: 32% of respondents 18-24 years old, 33% whose income is < $25,000, 29% with a high school diploma as opposed to 21% with college degrees, and 37% of Hispanics, 31% of African-Americans, and 23% of Whites.

According to the CFA, some lenders target ARMs to individuals with lower incomes and/or credit scores. CFA Director Stephen Brobeck said such lenders were "acting irresponsibly" by marketing to individuals whose financial stability could be affected by rising interest rates on their ARM loan payment (CFA, 2004). Recently, Federal Reserve Chairman Alan Greenspan, speaking before a gathering of credit unions, announced that research showed "many homeowners might have saved tens of thousands of dollars had they held adjustable-rate mortgages rather than fixed-rate mortgages during the past decade" as interest rates declined (Simon and Silverman, 2004). Clearly, the choice of an adjustable-rate mortgage makes financial sense to those willing and able to assume some interest rate risk; however, others may be assuming risk that they should not rationally bear – either due to a misunderstanding of the implications of this risk, predatory lending, or simply pressure to live in a more

expensive house than borrowers could otherwise afford.

Mortgage Choice

The relationship between demographic characteristics and mortgage choice is characterized in a number of prior analyses as a function of both a household's borrowing constraints and its ability/willingness to withstand interest rate risk. Since many household characteristics associated with ability to withstand the income risk (the reduction in current consumption brought about by payment volatility, see Campbell and Cocco, 2003) reflect a higher socio-economic status, it is often assumed that these households will be more likely to choose an ARM. This is confirmed in Dhillon, Shilling, and Sirmans (1987), who find that wealthier households and married households are more likely to choose adjustable-rate mortgages. Phillips and VanderHoff (1994) find that mean income is higher among ARM borrowers than FRM borrowers (although wealth is roughly equal), and those who chose ARMs tended to borrow more. ARM borrowers were also roughly the same age and had the same level of education as FRM borrowers. Sa-Aadu and Megbolugbe (1995) find that ARM borrowers are younger than FRM borrowers; however they have a higher mean income and can anticipate a steeper future earnings path than FRM borrowers. There is ample evidence from U.S. census data suggesting a steeper future earnings path among those with higher educational attainment (Day and Newburger, 2002).

Although empirical estimates from the 1980s and 1990s appear to support the hypothesis that more financially stable households are more likely to accept the greater interest rate risk of an ARM, it is possible that some households with borrowing constraints may be forced to either consider buying a house with an ARM or not buying a house at all during periods of high interest rates (Sa-Aadu and Megbolugbe, 1995), and may use adjustable-rate mortgages as a means of affording a house during periods where real house prices are increasing (Hendershott, 1990). If ARM choice is motivated primarily by housing affordability concerns, it is possible that many of the demographic characteristics that were associated with rational ARM choice as a means of minimizing borrowing costs over the life of a loan during periods of moderate housing prices will change as housing prices increase. The proportion of homeowners paying more than half their incomes for housing increased by 27 percent between 1997 and 2001 (Joint Center for Housing Studies, 2003), with the greatest burdens among homeowners earning less than $50,000 and minority homeowners (Simmons, 2004). It is possible that the demographic composition of those choosing adjustable-rate mortgages may have shifted from those best able to withstand the risk from interest rate volatility to those who use the ARM as a means of affording a home.

Methods

Data

Data used in this study include five cross-sectional sets at 3-year intervals of Survey of Consumer Finances (SCF) starting with 1989 and ending with 2001. The SCF, sponsored by the Federal Reserve Board, provides detailed financial characteristics of U.S. households. The samples in the study were restricted to respondents indicating they had obtained a mortgage within the past five years. The descriptive data in this analysis is weighted to mirror the characteristics of the U.S. population (Kennickell and Woodburn, 1997) and all dollar values are represented in terms of 2001 dollars using the consumer price index (CPI).

Analyses

Descriptive statistics of recent ARM and FRM holders are calculated for each three year survey period between 1989 and 2001. Income and net worth percentile categories are included to represent resistance to interest rate risk and affordability constraints. Mortgage composition among groups categorized by educational attainment is presented as a proxy of future earnings path and affordability constraints. The composition of mortgage types is also presented by race and age categories. Age represents a proxy for both mobility and affordability, both hypothetically favoring an increased preference for ARMs among younger households. Prior literature has identified marital status as a predictor of ability to withstand income risk, and ARM composition is compared among married or living with a partner and single-headed households. The proportion of recent ARM holders experiencing affordability constraints may be captured, in part, by contrasting ARM and FRM holders who have been turned down for credit in the past 5 years and those who were past due on debt repayment and/or bills for more than 60 days at some point in the previous year.

Differences in proportions within a given sample year are tested for statistical significance through a Z-test. The Z-statistic is calculated to compare the probability value from Z at the 0.05 level of significance.[a] Differences in the proportion of respondents who recently obtained an ARM within each row category are compared to the proportion within the same category who recently obtained a FRM during the same year. Row categories that are statistically significantly different between recent FRM and ARM borrowers are bolded in each table, with smaller values italicized. Bolded row categories are symmetric between ARM and FRM borrowers within each sample year. For example, in Table 2 which presents the proportion of

total ARM and FRM mortgages obtained within income percentiles, the lowest income quintile (0-20%) represents a statistically significantly larger proportion of recent ARM -- higher value bolded -- borrowers than FRM -- lower value bolded and italicized -- borrowers in 2001 while there are no significant differences of proportions for this income quintile within the previous sample years -- no bold or italics.

To assess mortgage type proportion differences among the sample years across the different variables – income and net worth percentiles, education, age, race, and marital status of respondent, as well as credit history behavior – ordinary least squares regression analysis was used to calculate trend lines and test for significant differences using the slope coefficients. While this approach does provide some insight into the demographic changes over time, the results must be interpreted in light of the following caveat. Because there are only 5 data points available for the regression analyses, while line fit may be "good" (i.e., relatively high R2) the statistical significance of corresponding slope coefficients suffers from low power of test (n=5).

Results

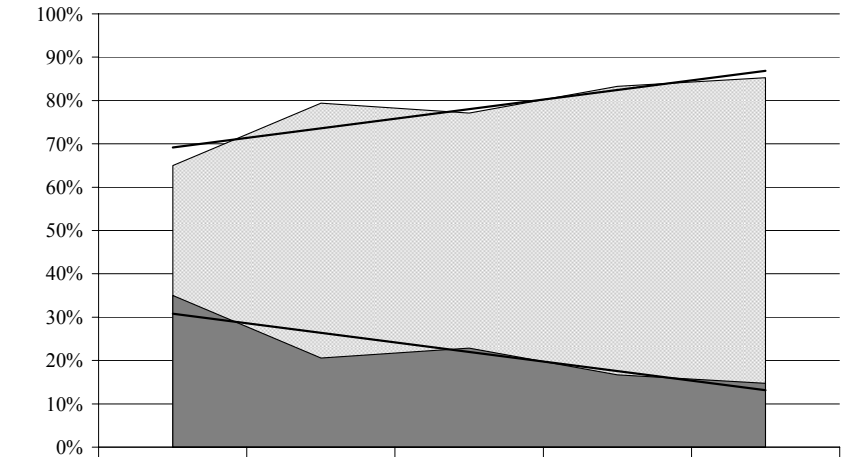
Table 1 shows the weighted descriptive statistics of those who obtained mortgages within the last five years in each SCF survey between 1989 and 2001.

Figure 1 shows the proportion of adjustable-rate mortgages (ARM) versus fixed-rate mortgages (FRM) obtained within the previous five years among respondents for each year of data. Trend lines indicate that ARMs have declined from a high of 35% in 1989 to a low of 15% in 2001, while FRMs have increased from 65% in 1989 to 85% in 2001. The slope of these trend lines is statistically different from zero at a 5% level of significance (p-value = 0.046). Consistent with Campbell and Cocco (2003), ARMs represent a minority of mortgage instruments and have become less popular in recent years.

Table 1. Sample Size and ARM Proportion

	1989	1992	1995	1998	2001	Trend line p-value
Adjustable-rate mortgage	233	198	304	204	190	**0.046**
Fixed-rate mortgage	433	765	1026	1017	1096	**0.046**
ARMS/Total Mortgages	35%	21%	23%	17%	15%	

Figure 1. Proportion of ARMs vs. FRMs



	1989	1992	1995	1998	2001
FRM	65%	79%	77%	83%	85%
ARM	35%	21%	23%	17%	15%

Table 2 shows the proportion of ARMs versus FRMs by income category. Results from the Z-tests for income indicate within year differences are present for each survey year except 1998. For example, in 1989, respondents in the 40-60th quintile had a lower proportion of ARMs and those in the 90th decile had a greater proportion of ARMs compared to FRMs within that year. Respondents in the 20-40th quintile in 1992 and the 80th decile in 1995 and 2001 had lower proportions of ARMs compared to FRMs. Conversely, respondents in the 60-80th quintile in 1995 and the 0-20th quintile in 2001 had a significantly greater proportion of ARMs compared to FRMs.

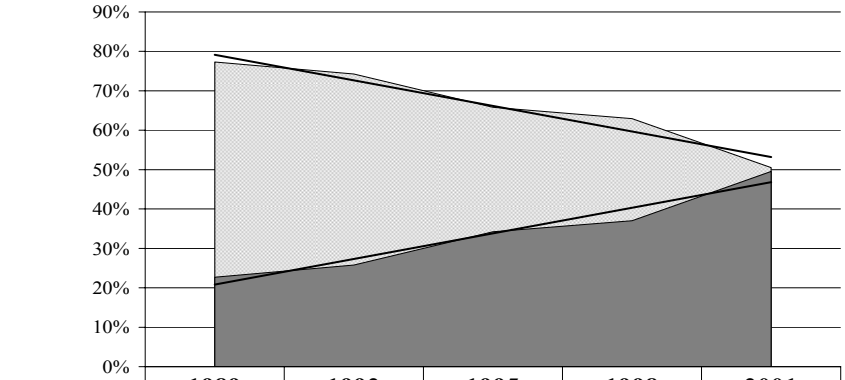
Figure 2 presents the ARM proportion distribution among the lower (below the 60th percentile) and higher (60th percentile and above) income categories. The statistically significant slope coefficients of trend lines indicate that there has been a consistent trend toward an increasing proportion of adjustable-rate mortgages obtained by those in the lowest three income quintiles from a combined total of 22.7% in 1989 to 34.2% in 1995 and 49.5% in 2001. Trend lines estimated for the higher and lower income groups suggest a decline in proportion of ARMs for the higher income group with a corresponding increase in proportion of ARMs for the lower income group, with trend line slope

Table 2. Mortgage Type by Household Income

Mortgage Type	Income percentile category	1989	1992	1995	1998	2001	Slope* (p-value)
ARM	0-20	4.14	3.43	6.51	4.96	**10.64**	**7.247 (0.005)**
	20-40	8.27	***6.58***	***7.3***	11.56	14.7	
	40-60	***10.27***	15.76	20.4	20.52	24.19	
	60-80	32.97	34.76	**35.41**	24.43	24.83	**-7.240 (0.005)**
	80-90	19.13	15.35	***12.5***	15.71	***9.71***	
	> 90	**25.21**	24.12	17.89	22.82	15.93	
FRM	0-20	2.34	4.73	4.05	4.58	***4.74***	0.286 (0.225)
	20-40	10.46	**13.08**	**11.9**	9.93	11.16	
	40-60	**17.8**	17.48	16.47	20	19.38	
	60-80	31.52	28.47	***28.56***	30.9	28.11	-0.286 (0.226)
	80-90	19.73	17.83	**19.35**	16.96	**18.01**	
	> 90	***18.15***	18.41	19.67	17.64	18.6	

*Slope of the OLS regression to determine trend line from 1989 through 2001. Bolding indicates significant difference in proportion at p>0.10, Italicized figures indicate a significantly lower proportion (non-italicized bold, higher proportion) who obtained either ARMs or FRMs within row category.

Figure 2. ARM Proportion among High and Low Income Groups



	1989	1992	1995	1998	2001
High Inc.	77%	74%	66%	63%	50%
Low Inc.	23%	26%	34%	37%	50%

coefficients statistically significantly different from zero at the 1% level of significance. Where these were once an almost 80-20 split between high and low income groups, over time this has changed to a 50-50 split in ARM borrowers between the two income classes.

Although there were minor proportion fluctuations within the income distribution of those who obtained fixed-rate mortgages between 1989 and 2001, the proportion obtained by lower- and higher-income categories remained remarkably stable indicated by the high p-values for the slopes of the fitted trend lines.

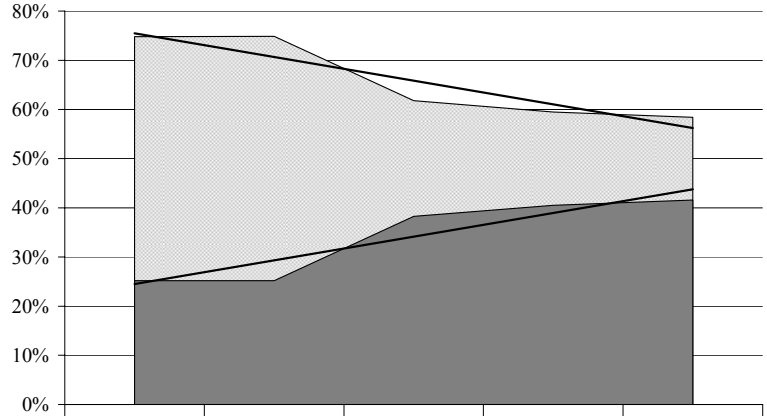
Table 3 shows the proportion of ARMs versus FRMs by net worth category. Results from the Z-tests indicate within year differences among some net worth categories are present within each survey year. Most notably, respondents in the 25-50th quartile, in both 1989 and 1992, had a significantly lower proportion of ARMs compared to FRMs. However, for respondents in the lowest net worth category (0-25th percentile) in all subsequent data years (1995, 1998, 2001) the proportion of ARMs was significantly higher in comparison to FRMs.

Table 3. Mortgage Type by Household Net Worth

Mortgage Type	Net Worth percentile category	1989	1992	1995	1998	2001	Slope* (p-value)
ARM	0-25	6.63	5.05	**10.01**	**11.83**	**14.6**	**1.605**
	25-50	***18.55***	***20.12***	28.23	28.68	26.98	**(0.027)**
	50-75	**41.94**	34.76	33.76	***20.1***	32.02	
	75-90	19.16	**23.32**	15.85	14.45	16.12	**-1.605**
	> 90	**13.72**	**16.76**	12.14	**24.94**	10.28	**(0.027)**
FRM	0-25	4.77	6.48	***7.03***	***7.73***	***7.03***	-0.285
	25-50	**35.24**	**33.32**	31.61	29.21	30.13	(0.015)
	50-75	***31.33***	32.85	33.33	**32.64**	31.64	
	75-90	20.38	***16***	14.71	19.67	19.23	0.285
	> 90	***8.28***	***11.36***	13.31	***10.75***	11.98	(0.015)

*Slope of the OLS regression to determine trend line from 1989 through 2001

Figure 3. ARM Distribution among High and Low Net Worth Groups



	1989	1992	1995	1998	2001
High NW	75%	75%	62%	59%	58%
Low NW	25%	25%	38%	41%	42%

Figure 3 presents the ARM proportion distribution among the lower (below the 50th percentile) and higher (50th percentile and above) net worth categories. The statistically significant slope coefficients of trend lines indicate that there has been a consistent trend toward an increasing proportion of adjustable-rate mortgages obtained by those in the lowest two net worth quartiles from a combined total of 25.2% in 1989 to 41.6% in 2001. Trend lines estimated for the higher and lower income groups suggest a decline in proportion of ARMs for the higher income group with a corresponding increase in proportion of ARMs for the lower income group, with trend line slope coefficients statistically significantly different from zero at the 1% level of significance. Correspondingly, trend line estimates for the proportion of FRMs are also statistically significant among high and low net worth groups, with FRMs decreasing in proportion among the low net worth group (from 40% in 1989 to 37% in 2001) and increasing among respondents in the high net worth group (from 60% in 1989 to 63% in 2001).

Table 4 presents the proportion of ARMs versus FRMs by education category. Results from the Z-tests indicate within year differences in only two of the five survey years – 1995 and 1998. In 1995 respondents with a high school education had a lower proportion of

ARMs compared to FRMs while those with a college degree had a higher proportion of ARMs compared to FRMS. In 1998 respondents with some college had a lower proportion of ARMs compared to FRMs. All other within year comparisons yield no statistically significant results.

When comparing mortgage type proportion distribution across the sample years, slope coefficients reveal no statistically significant results at the 0.05 level of significance. The result for the regression of ARM distribution for respondents with some college suggests evidence of a decreasing trend at the 11% level of significance

While these results suggest that no trend lines fit the ARM or FRM data over time, when looking at the difference between the beginning of the period, 1989 and the end of the period, 2001, those with a high school education have a greater proportion of ARMs 2001 compared to 1989. Conversely for FRMs, comparison of 1989 and 2001 proportions show no notable differences among any of the education categories.

Table 4. Mortgage Type by Education of Respondent

Mortgage Type	Education	1989	1992	1995	1998	2001	Slope*	p-value
ARM	no high school	9.97	6.6	10.28	7.57	11.2	0.11	0.650
	high school/GED	21.71	32.7	***23.86***	27.57	32.45	0.54	0.367
	some college	24.76	16.35	15.54	***15.77***	14.44	-0.71	0.103
	college degree	43.57	44.35	**50.32**	49.09	41.91	0.05	0.922
FRM	no high school	11.88	7.96	8.55	7.34	8.84	-0.22	0.281
	high school/GED	27.07	29.94	**30.79**	26.57	27.14	-0.11	0.665
	some college	18.43	17.71	18.99	**22.71**	19.03	0.21	0.385
	college degree	42.61	44.39	***41.67***	43.39	44.99	0.13	0.452

*Slope of the OLS regression to determine trend line from 1989 through 2001

Results in Table 5 show the mortgage distribution within and across years by race of respondent. Z-test scores indicate within year differences in three of the five survey years – 1995, 1998, and 2001. Hispanic respondents had nearly double the proportion of ARMs compared to FRMs in 1995 and in 2001, yet nearly 4 times greater FRMs compared to ARMs in 1998. Similarly, for Whites ARM proportions were higher than FRMs in 1998, but the reverse was the case in 2001.

The only trend line revealed through OLS regression at the 1% level of significance is an increasing trend in the proportion distribution for FRMs across the sample years for African Americans. It is interesting to note that at the 12% level of significance, this increasing trend for African Americans also exists for ARMs, suggesting that African Americans have an increasing share of the total mortgage pie over the 13-year period from 1989 to 2001. At the 10% level of significance there is evidence to suggest that FRM proportions are decreasing over time between 1998 and 2001 for respondents of races other than White, African American, and Hispanic. One other point of interest is the dramatic and statistically significant increase in the proportion of ARMs held by Hispanics in 2001 compared to 1998, and to a lesser extent in 1995.

Table 5. Mortgage Type by Race of Respondent

Mortgage Type	Race	1989	1992	1995	1998	2001	Slope*	p-value
ARM	White	83.04	81.8	82.6	**91.49**	***73.05***	-0.34	0.686
	African American	5.44	7.13	5.8	6.98	11.63	0.41	0.119
	Hispanic	7.43	6.38	**5.94**	***1.19***	**10.33**	0.02	0.963
	Other	4.08	4.69	5.66	***0.34***	**4.99**	-0.08	0.759
FRM	White	82.26	83.38	86.59	***83.44***	**81.99**	-0.02	0.947
	African American	5.29	6.56	6.95	8.58	10.06	**0.39**	**0.002**
	Hispanic	8.04	5.37	***3.03***	**4.02**	***5.99***	-0.18	0.449
	Other	4.41	4.68	3.44	**3.96**	***1.96***	**-0.19**	**0.085**

*Slope of the OLS regression to determine trend line from 1989 through 2001

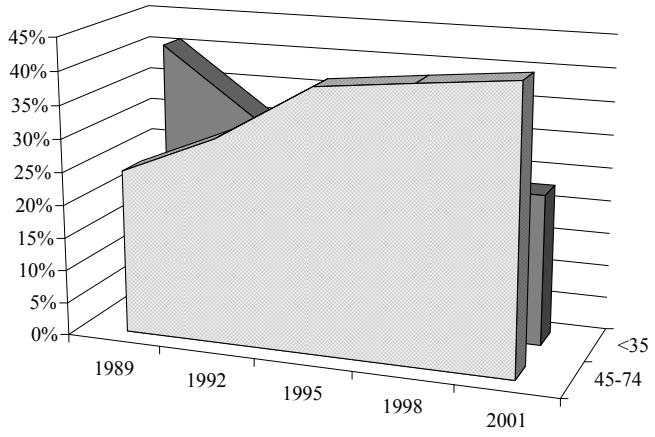
Table 6 shows the proportion of ARMs versus FRMs by age category. Results from the Z-tests indicate within year differences in all survey years except 1989. Respondents less than 35 years of age had a lower ratio of ARMs to FRMs in 1992 and a higher ratio of ARMs to FRMs in 2001. Respondents between the ages of 45-54 had a lower proportion of ARMs compared to FRMs in both 1995 and 1998, while respondents 34-44 had a lower ratio of ARMs to FRMs in 2001. The proportion of ARMs for respondents between the ages of 55-64 and those 75 and older was greater than the proportion of FRMs in 1998. All other within year comparisons yield no statistically significant results.

Table 6. Mortgage Type by Age of Respondent

Mortgage Type	Age	1989	1992	1995	1998	2001	Slope*	p-value
ARM	< 35	38.07	***23.54***	29.59	24.53	**36.99**	-0.04	0.965
	35 - 44	37.96	37.45	35.71	33.08	***25.49***	**-0.98**	**0.032**
	45 - 54	14.86	24.86	***16.2***	***18.16***	21.88	0.24	0.647
	55 - 64	6.9	9.25	10.72	**16.8**	8.74	0.37	0.426
	65 - 74	1.69	3.65	6.59	4.19	5.21	0.25	0.228
	>= 75	0.54	1.24	1.18	**3.23**	1.69	0.14	0.215
FRM	< 35	40.93	**30.65**	26.89	22.75	***22.86***	**-1.47**	**0.024**
	35 - 44	34.22	36.72	33.21	35.34	**33.44**	-0.10	0.600
	45 - 54	14.26	19.63	**23.26**	**25.21**	24.67	**0.88**	**0.028**
	55 - 64	9.32	8.69	11.65	***11.77***	11.68	**0.26**	**0.085**
	65 - 74	1.26	2.59	4.66	4.13	6.23	**0.38**	**0.014**
	>= 75	0.01	1.72	0.32	***0.8***	1.12	0.04	0.616

*Slope of the OLS regression to determine trend line from 1989 through 2001

Figure 4. FRM Distribution by Age



	1989	1992	1995	1998	2001
45-74	**25%**	**31%**	**40%**	**41%**	**43%**
<35	**41%**	**31%**	**27%**	**23%**	**23%**

When comparing mortgage type proportion distribution across the sample years, slope coefficients for ARMs indicate a decreasing trend at the 0.05 level of significance for respondents 35-44 years of age. The slope coefficients for FRMs show a decreasing trend for respondents less than 35, and an increasing trend for respondents between the ages of 45 and 74. Figure 4 shows this reverse relationship among these statistically significant age categories.

Results in Table 7 present the mortgage distribution within and across years by marital status of respondent. Z-test scores indicate within year differences in only one of the survey years. In 1992, married respondents had a higher proportion of ARMs compared to FRMs while single household heads had a corresponding lower proportion of ARMs compared to FRMs.

Trend lines calculated through OLS regression reveal a decreasing trend in ARM proportion across the years for respondents who were married or living with a partner and an increasing trend in ARM proportion among single household heads from 1989-2001 at the 1% level of significance. On the other hand, FRM proportions remained relatively flat over this same 13-year period for both married and single respondents.

Table 7. Mortgage Type by Marital Status of Respondent

Mortgage Type	Marital Status	1989	1992	1995	1998	2001	Slope*	p-value
ARM	married/partner	85.8	**82.46**	74.12	74.13	70.54	**-1.30**	**0.010**
	single	14.20	***17.54***	25.88	25.87	29.46	**1.30**	**0.010**
FRM	married/partner	81.56	***74.21***	77.4	77.58	76.96	-0.19	0.563
	single	18.44	**25.79**	22.6	22.42	23.04	0.19	0.563

*Slope of the OLS regression to determine trend line from 1989 through 2001

Table 8 shows the mortgage proportion distribution within and across years by credit history. Credit history is captured through two variables – whether the respondent was turned down for credit within the past five years and whether the respondent was at least 60 days past due on debt repayment at any time during the previous year. For the first variable – turned down for credit – Z-test scores indicate within year differences in two of the five survey years – 1989 and 2001. The pattern is the same for both years indicating that those who had been turned down for credit had a higher proportion of ARMs compared to FRMs, while those who had not been turned down for credit had a corresponding higher proportion of FRMs compared to ARMs.

For the second variable – outstanding debt repayment for at least 60 days over the past year – Z-test scores indicate within year differences in two of the five survey years – 1992 and 2001. Again, the pattern is the same for both years indicating that those who had outstanding debt repayment had a lower proportion of ARMs compared to FRMs, while those who did not have outstanding debt repayment had a corresponding higher proportion of ARMs compared to FRMs.

Table 8. Mortgage Type by Credit History

Mortgage Type	Turned down for credit	1989	1992	1995	1998	2001	Slope*	p-value
ARM	Yes	**26.18**	17.11	21.84	23.39	**33.39**	0.69	0.343
	No	***73.81***	82.89	78.16	76.62	***66.61***	-0.69	0.344
FRM	Yes	***19.54***	22.63	23.01	27.04	***20.23***	0.19	0.611
	No	**80.47**	77.37	76.99	72.95	**79.76**	-0.19	0.609
	Outstanding Debt PMT							
ARM	No	93.42	***92.55***	95.98	94.74	***90.97***	-0.09	0.720
	Yes	6.58	**7.45**	4.02	5.26	**9.03**	0.09	0.720
FRM	No	95.34	**96.14**	94.97	94.54	**96.42**	0.02	0.857
	Yes	4.66	***3.86***	5.03	5.46	***3.58***	-0.02	0.857

*Slope of the OLS regression to determine trend line from 1989 through 2001

When comparing mortgage type proportion distribution across the sample years, slope coefficients reveal no statistically significant results at the 0.05 level of significance for either ARM or FRM proportions. While these results suggest that no trend lines fit the ARM or FRM data over time for either credit history variable, when looking at the difference between the 1992 and the 2001 for the first variable (turned down for credit), Z-test statistics reveal that respondents who have been turned down for credit had a lower

proportion of ARMs in 1992 compared to 2001. Of course, the reverse is true for those who had not been turned down for credit within the past 5 years. Conversely, a comparison of FRMs between these same years shows no notable differences in proportions between those who had or had not been turned down for credit. When omitting the 1989, trend lines calculated for the years 1992-2001 indicate a statistically significant (p-value = 0.045) increasing trend for ARM proportions among those who had been turned down for credit and a decreasing trend for ARM proportions among those who had not been turned down for credit within the past 5 years.

Conclusions

Descriptive results of adjustable-rate mortgage choice from the Survey of Consumer Finances substantiate previous findings that over time ARMs have become a decreasing proportion of total mortgages initiated by consumers. Rational household mortgage instrument choice involves a household's financial ability to accept payment volatility, their risk aversion, and the reward for increased risk resulting from the interest rate spread between FRMs and ARMs. According to Campbell and Cocco (2003), yield spreads between mortgage instruments were widest in 1992-1994, and narrowed through the decade to a low point in January of 2001. The reduced popularity of ARMs evidenced in Table 1 mirrors the decreasing interest rate advantage of the instrument; however, it is possible that the benefit of homeownership made accessible through an ARM outweighs the impact of a reduced spread for resource-constrained homeowners. The decreasing proportion of ARMs over the 13-year period of this study may also be a function of an increasing number of refinanced fixed-rate mortgages among households taking advantage of historically low rates (and spreads) who are already homeowners and thus may be wealthier, older, and have better credit.

The results from this study tracking consumer choice are generally consistent with the recent opinion survey of consumer preference toward ARMs (Consumer Federation of America, 2004). Trend results from this research provide evidence to suggest that indeed the characteristics of ARM borrowers are shifting to include more and more financially vulnerable households.

An increasing proportion of households having recently obtained an adjustable-rate mortgage were in lower income categories, and while in 1989 the ratio of lower-income to higher-income ARM borrowers was nearly 1:4 (23% vs. 77%), by 2001 this ratio had dramatically increased (1:1) such that the proportion of ARM borrowers was evenly split among these two groups (50% vs. 50%). Interestingly, the proportion of fixed-rate mortgages obtained by respondents across all income levels has remained relatively constant during the 13-year period capturing the 1990s decade, providing evidence to suggest that perhaps increased homeownership among lower income categories is a result of moving lower income consumers into ARM products as opposed to FRM products.

Similar to findings for income, trend results for household net worth indicate that lower-wealth households (less than 50th percentile) constituted an increasing proportion of ARM borrowers from 1989 to 2001. In 1989, the ratio of ARM borrowers in higher wealth versus lower wealth classes was 3:1 (75% versus 25%), and by 2001 this gap had reduced to a 3:2 ratio (58% versus 42%). Clearly, these trends on income and wealth point to the increased vulnerability of ARM borrowers and run counter to the notion of households with the greatest resistance to financial shock selecting an ARM product.

In addition to the findings regarding income and net worth, trend results indicate that ARM proportions are increasing among single-headed families and households with credit history problems. There is strong evidence that ARM borrowers in the 2001 SCF are less creditworthy than in 1990s survey years. One in three ARM holders had been turned down for credit in the last five years, compared to one in five FRM borrowers. Single-headed households are at greater risk from income disruption and households which have been turned down for credit lack financial sophistication and/or the resources to maintain current consumption commitments. Again, these results suggest that even though the ARM pie itself is shrinking, the composition of ARMs is changing so that more vulnerable consumers are gaining an increasingly larger piece of that pie.

There is some evidence to suggest that African American- and Hispanic-headed households are entering the 21st century with a greater proportion of ARMs compared to years past, and these are also groups that financial educators will want to make sure to target with information that clearly presents the consequences and likelihood of the interest rate risk associated with ARM products.

These data paint a surprisingly consistent portrait of adjustable-rate mortgage holders from the most recent SCF as financially less stable than those who have chosen adjustable-rate mortgages in previous years of the survey. While a larger absolute proportion of adjustable-rate mortgages continues to be held by those best able to withstand potential changes in monthly payments, trend results indicate that adjustable-rate mortgage choice among resource constrained

households is gaining ground in terms of relative proportion share.

Increasingly households experiencing financial instability are choosing adjustable-rate mortgages without the human capital, wealth, or current income to protect against possible interest rate volatility. If these choices are a rational acceptance of risk weighed against the benefits of homeownership, then these data do not represent a consumer problem. If, however, many of these vulnerable households are also less able to correctly assess the risk associated with ARMs, then they may subjecting themselves to a greater threat of future financial disruption than they would knowingly be willing to accept.

Characteristics of borrowers who made up an increasing proportion of ARM borrowers in 2001 are similar to the characteristics of borrowers who generally pay a higher interest rate on their mortgage and are more likely to be considered subprime borrowers (Hogarth and Hilgert, 2002). According to the Joint Center for Housing Studies (2005), the share of ARMs jumped from 18% in 2003 to 35% in 2004, and low teaser ARM rates will result in a 0.4 to 1.5 percent increase in mortgage payments for these borrowers in 2005. The report also notes a rise in subprime mortgage lending in the past decade, as well as a sharp increase in the share of interest-only mortgages to one out of every three home purchase loans in 2004. The popularity of mortgage instruments that defer principal payment to later periods reflects an increasing trend toward catering to resource-constrained homeowners.

Have the characteristics of adjustable-rate mortgage borrowers changed? According to results from this study over the period from 1989 through 2001, the answer appears to be yes. There is a shift in ARM borrower composition away from those with the greatest resistance to financial shock toward those with the least resistance. The findings from this study, particularly those related to income, wealth, and creditworthiness, do provide evidence that financial constraints may be enticing families into mortgage products that provide greater access to homeownership while at the same time (perhaps less obvious to some consumers) adding to household portfolio leverage and exposure to interest rate risk. Why should financial practitioners target these vulnerable groups with specific education related to understanding interest rate risk associated with ARMs? Because it is in everybody's best interest to ensure informed choice and prevent consumer loss that results from information asymmetry.

Endnotes

[a] The Z-test for difference between proportions:

$$Z = \frac{(P_1 - P_2)}{s_{P_1 - P_2}}$$ where P_1 and P_2 are the proportions to be contrasted and $s_{P1\text{-}P2}$ is the standard error of difference between the two proportions. For more detail, please see Sanders, D.H. (1990). *Statistics: A fresh approach.* (5th ed.). New York: McGraw-Hill, Inc.

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